



UNIVERSIDAD  
**DE ATACAMA**

FACULTAD DE HUMANIDADES Y EDUCACIÓN  
DEPARTAMENTO DE IDIOMAS

Artificial intelligence-based machine translation and  
human translation: English-Spanish translation of multi-  
word terms in scientific texts

Trabajo de titulación presentado en conformidad a los requisitos para obtener el grado  
en Licenciatura en traductología y Traductor e intérprete inglés-español

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Copiapó, Chile año 2023

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# ABSTRACT

The language services industry is undergoing a revolutionary merger with artificial intelligence (AI), especially in translation and scientific translation. AI is revolutionizing the accomplishment of unprecedented efficient and precise tasks. Despite challenges such as job displacement, professionals, freelancers, and students must strategically embrace AI as a transformative asset. In this study, we analyze professional human translation versus neural machine translation, specifically focusing on Chat-GPT and DeepL. We employ a multifaceted approach to delve into the intricate process of translating technical terminology from English to Spanish, specifically concentrating on the patterns "adjective + noun + noun" (situation 9) and "noun + noun" (situation 8) found in the text "Cellular and Molecular Immunology." The evaluation compares the translation accuracy of ChatGPT and DeepL, highlighting the superiority of ChatGPT in chain compounds with the "n + n" pattern of multiple terms but facing challenges with "adj + n + n" terms due to the complexity of English adjectives. Despite being a recent tool, ChatGPT demonstrated commendable terminological accuracy, especially in scientific contexts, approaching human translator accuracy more closely than DeepL. In post-editing, ChatGPT proved useful for simpler structures but encountered some limitations in translating chain compounds in cellular and molecular immunology, emphasizing the need for careful examination in nuanced linguistic contexts.

Keywords: artificial intelligence, multi-word terms, human translation, neural machine translation, Chat-GPT, DeepL

# RESUMEN

La industria de los servicios lingüísticos experimenta una fusión revolucionaria con la inteligencia artificial (IA), especialmente en traducción y traducción científica. Esta está revolucionando la realización de tareas eficientes y precisas sin precedentes. A pesar de retos como el desplazamiento de puestos de trabajo, los profesionales, autónomos y estudiantes deben adoptar estratégicamente la IA como un activo transformador. En este trabajo, analizamos la traducción humana profesional frente a la traducción automática neuronal, concretamente Chat-GPT y DeepL. Aplicamos enfoque multifacético para profundizar en el intrincado proceso de traducción de terminología técnica del inglés al español, centrándonos específicamente en los patrones “adjetivo + sustantivo + sustantivo” (situación 9) y “sustantivo + sustantivo” (situación 8) que se encuentran en el texto "Inmunología celular y molecular". La evaluación comparó la precisión de traducción de ChatGPT y DeepL, destacando la superioridad de ChatGPT en compuestos en cadena con el patrón “n + n” de varios términos, pero los problemas con términos “adj + n + n” debido a la complejidad de los adjetivos en inglés. A pesar de ser una herramienta reciente, ChatGPT demostró una precisión terminológica encomiable, sobre todo en contextos científicos, acercándose más a la precisión del traductor humano que DeepL. En la post-edición, ChatGPT demostró ser útil para estructuras más sencillas, pero se topó con algunas limitaciones a la hora de traducir compuestos en cadena en inmunología celular y molecular, lo que subraya la necesidad de un examen cuidadoso en contextos lingüísticos matizados.

Palabras clave: inteligencia artificial, compuestos en cadena, traducción humana, traducción automática neuronal, Chat-GPT, DeepL

# INTRODUCTION

## 1.1 Background and Context

Professionals in the language services industry are facing a new challenge: the impact of Artificial Intelligence (AI) on translation. To stay ahead, they must pivot their efforts towards strategic tasks, embrace emerging technologies, and develop complementary skills to machine-generated content. By doing so, they can ensure their continued relevance in the ever-evolving landscape of language services.

The impact of AI on various industries, particularly in the fields of translation and localization, has been revolutionary. As technology rapidly evolves, AI is revolutionizing the translation process and presenting both new possibilities and obstacles for professionals in this field, including independent translators and students studying translation.

One of the key benefits of AI in translation is the speed and efficiency it brings to the process. Machine Translation (MT) systems, powered by AI, can rapidly process large volumes of text, enabling quick turnaround times for translation projects. This efficiency is crucial in today's fast-paced global business environment, where organizations require swift and accurate translations to reach diverse audiences. Moreover, AI takes translation to the next level with its ability to constantly absorb new knowledge. By processing immense volumes of multilingual data, neural machine translation systems evolve and enhance their skills over time. This guarantees precise and culturally sensitive translations, minimizing the need for manual revisions from human translators.

The translation and localization industry stands to thrive by embracing AI, as it presents endless possibilities for growth and advancement. With the assistance of AI, professionals can now redirect their efforts towards more stimulating and valuable tasks, such as creatively adapting content, understanding cultural nuances, and utilizing specialized domain knowledge. By leaving the routine and monotonous translations to AI systems, there is now room for a more strategic allocation of human resources, ultimately leading to an enhancement in the overall quality of services.

As a freelance translator, incorporating AI technology into your work can greatly improve your productivity and positively impact your pricing. With access to the latest AI tools, you can take on larger projects, handle a variety of content types, and maintain consistency throughout your work. This not only allows you to expand your business operations but also allows you to cater to a wider range of clients.

While the use of AI in translation presents exciting possibilities, it also brings forth potential challenges. A pressing issue is the potential loss of jobs. With advancements in AI, there is a fear that mundane translation tasks may become automated, leading to a decrease in the need for human translators in certain fields. This could potentially result in tougher competition for freelancers, ultimately affecting their earnings and career opportunities.

The ever-changing translation industry poses both difficulties and advantages for undergraduate students studying translation. To remain competitive in the job market, students need to embrace AI and become proficient in emerging technologies. Additionally, students should prioritize honing complementary skills like post-editing of machine-generated content and cultivating expertise in fields where human intuition and cultural competence are irreplaceable.

The influence of AI on the translation and localization field must not be underestimated. Undoubtedly, it has revolutionized the process, bringing along numerous benefits such as heightened efficiency and higher-quality translations. However, it comes with its own set of challenges, including the fear of job displacement. Nevertheless, freelancers and students in translation studies must embrace this technological advancement and use it as a tool to elevate their skills and stay relevant in the ever-changing language services environment.

The emergence of AI in scientific translation marks an exciting period of advancement, offering a wide range of advantages and potential. First and foremost, AI **guarantees** unmatched precision and consistency in rendering intricate scientific terminology, crucial for accurately conveying complex concepts. Moreover, the speedy translation capabilities of AI facilitate the swift dissemination of cutting-edge research, fostering international collaboration among scientists with diverse linguistic

backgrounds. With the help of this technology, scientific translators can focus on their expertise and perfect translations for the utmost scientific accuracy.

As freelance translators, AI is a valuable tool that boosts productivity by taking over mundane tasks, freeing up time for more meaningful work. Not only does this allow for larger workloads to be managed without sacrificing quality, but AI also offers personalized solutions for distinct scientific fields, ensuring that translations adhere closely to their specific conventions. Additionally, for students embarking on careers in scientific translation, proficiency in AI tools is essential for success in a constantly evolving industry where technology expertly complements human skills. This ultimately leads to a smoother exchange of scientific knowledge on a global scale.

In the final analysis, the integration of AI in the language services industry, particularly in translation and scientific translation, offers unparalleled efficiency and precision. While it presents challenges, including potential job displacement, professionals, freelancers, and students must strategically embrace AI as a transformative tool. By honing complementary skills, such as adapting to emerging technologies and cultivating expertise in critical domains, individuals can ensure their continued relevance and contribute to the advancement of linguistic and scientific knowledge on a global scale.

## 1.2 Statement of the Research Problem

The problem to be investigated is defined as follows: there are theoretical and empirical gaps in the transformative integration of Neural Machine Translation (NMT) tools, exemplified by innovations like DeepL and Chat-GPT, within the contemporary translation landscape. This gap is greater in understanding the refined symmetry required between increased efficiency, ethical considerations related to artificial intelligence deployment, and the ongoing professional development imperative in the translation industry, especially with the confluence of remote work, AI-based tools, and NMT.

This justification is based on recognizing that although the literature review or state of the art coincides in pointing out the contribution of recent technological advancements such as DeepL and Chat-GPT in revolutionizing translation

methodologies, there are theoretical and empirical gaps that need to be resolved. In the theoretical area, numerous publications highlight the efficiency gains and challenges posed by AI-based machine translation, represented by tools like Google Translate and DeepL. However, there is a gap in understanding the delicate balance required between technology and service quality, particularly in addressing intricate linguistic nuances.

Moreover, researchers who have studied the antecedents and consequences of AI integration in the translation industry abound. However, despite this interest, there is a gap in comprehensively analyzing the multifaceted challenges and opportunities arising from the integration of NMT tools, specifically DeepL and Chat-GPT. In the empirical area, the detected gap concerns the evolving landscape characterized by the confluence of remote work, AI-based tools, and NMT, and how this poses challenges and opportunities for freelancers, companies, and translation services.

When we review the theory to understand why these failures have occurred, we find several reasons. The first reason is the rapid technological progress and global interconnectedness, leading to an increased reliance on cost-effective AI solutions by clients, thereby prompting a reevaluation of the emphasis on human expertise. From a theoretical perspective, it is important to resolve this gap because the concept of striking a subtle equilibrium between technology and service quality is crucial for the translation industry. From a practical perspective, it is important to resolve this knowledge gap because the concept of the ethical dimension in AI-based machine translation, given concerns related to privacy, data security, and potential biases, is paramount, especially when handling sensitive content and diverse cultural contexts. Ongoing professional development is imperative for translators to stay abreast of technological advancements and maintain a competitive edge in this transformative juncture for the field of translation.

### 1.3 Significance of the study

This study assumes paramount importance as it meticulously compares human translation with cutting-edge AI systems, specifically centering on the subtle analysis of multi-word terms within the expansive domain of linguistics. The focal points of examination are DeepL, a sophisticated software designed for precise text translation across diverse language pairs, and Chat-GPT, a versatile neural machine text processor

with a particular emphasis on translation capabilities. The purposeful selection of these two prevalent AI systems, rooted in contemporary language processing, extends beyond technical scrutiny, integrating the expertise of linguistic scholars and incorporating extensive research within the field of cellular and molecular immunology. The cellular and molecular immunology domain, rich in multi-word terms, serves as the basis for comprehensive analysis, contributing not only to translation studies but also providing a foundational reference for future research. Beyond methodological enhancements in assessing machine translation, this research holds implications for refining and optimizing the practical deployment of such systems within the intricacies of scientific translation. Through meticulous examination of translations in the cellular and molecular immunology domain, the study aims to unravel insights that enrich the academic landscape, advancing the broader understanding of human-AI interaction in translation contexts. The anticipated insights transcend technical subtleties, offering substantive contributions to the evolving discourse in this domain and addressing overarching research questions. Consequently, this research serves to augment the methodological landscape of scientific translation, NMT, and specialized terminology, providing valuable insights for researchers, practitioners, and the broader scientific community alike.

#### 1.4 Delimitation

This investigation meticulously delineates its limitations to offer a precise understanding of the study's focus. The research specifically concentrates on the comprehensive comparative analysis of human translation (HT) and machine translation (MT) capabilities, honing in on the proficiency of Chat-GPT and DeepL in translating multi-word terms—specifically those composed of multiple premodifiers with intricate classifications. The evaluation centers on Stageberg's (1968) classification of syntactic/structural ambiguity, with a primary focus on situations 8 and 9. The study deliberately excludes an exhaustive examination of all potential linguistic contexts, genres, and syntactic ambiguities, instead limiting its analysis to selected chapters from Abbas, Lichtman, and Pillai's *Cellular and Molecular Immunology* (7th edition) and its official Spanish translation published by Elsevier España.

Literary and theoretical delimitations ensure a focused evaluation of translation proficiency, steering clear of an extensive review of unrelated literature. The research is

delimited to English-to-Spanish translation, with no exploration of translation capabilities in languages other than English and Spanish. Additionally, the evaluation is conducted with the technological capabilities and versions of Chat-GPT and DeepL available at the time, without accounting for potential advancements or changes in the translation tools beyond the specified timeframe. These carefully defined limitations ensure that the research remains focused, manageable, and within the specified boundaries, providing a clear framework for its objectives.

## 1.5 Purpose of the Study

We aim to analyze professional human translation and neural machine translation systems, specifically Chat-GPT and DeepL. The focus is on translation accuracy and nuances of multi-word terms in Abbas, Lichtman, and Pillai's *Cellular and Molecular Immunology* (7th edition) and its official Spanish translation. To achieve this aim, the following specific objectives will be established:

1. To identify the most frequently occurring specialized multi-word terms associated with Stageberg's Situations 8 and 9 of syntactic ambiguity in the source text (ST).
2. To examine and contrast the prevalent specialized multiword terms linked to Stageberg's syntactic ambiguity situations 8 and 9, as seen in the ST and their translations. This includes a comparison between the official Spanish rendition and those generated by ChatGPT and DeepL.
3. To identify and categorize the prevalent translation techniques employed by human translation, ChatGPT, and DeepL in rendering specialized multi-word terms into Spanish.
4. To assess and determine which NMT system is better suited for post-editing purposes.

## 1.6 Research Questions

A strong research question is clear, focused, concise, complex, and arguable, allowing for in-depth exploration within limited space and encouraging debate.

Therefore, the following specific objectives logically connected, will address various parts of the research problem:

1. Between Chat-GPT, and DeepL, which one presents a higher accuracy when translating specialized multi-word terms if compared with the official translation?
2. Given that Chat-GPT is a recently developed tool, how does it ensure the same level of precise terminology as a professional translator?
3. What are the most used translation techniques by DeepL and Chat-GPT when translating syntactically ambiguous multi-word terms?
4. ChatGPT and DeepL boast impressive translation capabilities for specialized scientific terminology, even when faced with syntactical ambiguity. But how do their accuracy levels measure up against those of official human translation?
5. How does the comparative effectiveness and efficiency of post-editing processes for machine-translated content, specifically focusing on syntactically ambiguous specialized terminology, vary between DeepL and Chat-GPT?

## 1.7 Organization of the Dissertation

### Introduction and Literature Review

Our goal is to thoroughly examine the effectiveness of two translation systems - Chat-GPT and DeepL - when dealing with professional human translation. We will be focusing on their accuracy in accurately translating complex multi-word terms in Abbas, Lichtman, and Pillai's *Cellular and Molecular Immunology* (7th edition) as well as its official Spanish translation, paying close attention to any nuances that may arise. Recognizing the significant role of ChatGPT in translation tasks, the study builds on comparative analyses of Human Translation (HT) and Machine Translation (MT). The focus lies on multi-word term translation techniques employed by both HT and MT tools. The selected studies scrutinize the translation of situation 8 and 9 multi-word terms, allowing for an intricate distinction of similarities and differences between MT and HT. This research concentrates on the translation accuracy of these methods, shedding light on the distinctive features of ChatGPT and DeepL in the scientific domain.

### Theoretical Framework

Scientific translation, involving the conveyance of complex technical content, demands profound subject matter understanding and linguistic finesse (Altarabin, 2021). Challenges include the dynamic nature of scientific terminology and the cultural context of certain terms (Sánchez & López, 2020). Effective translation requires meticulous documentation, specialized resources, and expert consultation (Gonzalo Claro, 2005). Success hinges on precision, domain knowledge, and continuous learning. The study also delves into the intricacies of multi-word terms, emphasizing their structure and the challenges they pose during translation and interpretation, particularly with noun predetermination (Pajares & Romero, 1991). Machine translation (MT) involves using computer software, web pages, or apps to translate text, with the most common applications found on web pages. A recent advancement in MT is Neural Machine Translation (NMT), which employs neural networks in pre-trained AI to process language more akin to human cognitive processes, enhancing translation accuracy and nuance interpretation.

## Methodology and Conclusions

Adopting a mixed approach, the methodology combines qualitative and quantitative analyses to evaluate the translation quality of multi-word terms in the scientific textbook "Cellular and Molecular Immunology" using ChatGPT and DeepL. The investigation employs various metrics, presented through tables and graphs, to compare translation samples, techniques, and similarities. Findings aim to contribute to translation studies by assessing the accuracy and terminological precision of ChatGPT and DeepL in comparison to human translation. The research questions center on understanding the capabilities and limitations of these tools, providing a nuanced perspective on machine translation evolution and its implications for the field.

# LITERATURE REVIEW

In recent years, translation has become an indispensable profession worldwide, gaining momentum as it is integrated with MT tools. Although these tools solve efficiency concerns, their accuracy compared to professional human translators remains an important question. The emergence of ChatGPT, a generative pre-trained transformer, adds another layer to this debate. Since ChatGPT claims to be able to deliver high-quality translations quickly, it has become a staple in today's translation discussions. Translators increasingly incorporate such tools to improve their overall work. However, as a comprehensive MT system, ChatGPT should be thoroughly tested for reliability and accuracy. Microanalysis is essential to determining its reliability and effectiveness, especially when used as a post-correction tool in dynamic translational technology. The literature review reveals several research gaps in the field of MT systems. Firstly, while there is extensive research on the performance of popular tools like Google Translate and DeepL, there is a notable absence of comprehensive studies that specifically evaluate the capabilities of emerging systems like ChatGPT. The literature emphasizes the need to explore the influence of devices on ChatGPT outputs, providing a distinct perspective on the translation landscape.

## Insights from Studies on Medical, Scientific, and General Texts

Viver (2018) compares translations generated by MT tools, namely Babylon, Google Translate, and Systran, to demonstrate that these tools can complement the work of professional translators rather than replace them. Viver concludes that optimal results require MT and post-editing, with Google Translate being the most accurate according to her analysis. The study identifies key errors such as translation literalism, lack of Anglicism and proper name recognition, and deficiencies in typography conversion. Viver suggests future investigations focusing on specific domains, such as beauty subjects, to further evaluate translation accuracy. While our study shares similarities in comparing MT tools, it diverges in its focus on different systems like ChatGPT and DeepL, broadening our understanding of the subject.

Within the domain of scientific databases and research articles, Zulfiqar et al. (2018) scrutinized the reliability of MT in facilitating the comprehension of German

scientific databases and research articles. Numerous important scientific resources, including databases and papers in foreign languages, particularly German, have yet to be translated, limiting their accessibility. While Reaxys has acquired crucial sources like Beilstein and Gmelin, the presence of original German references requires the use of translation services. To assess the effectiveness of MT, this study focuses on evaluating Google Translate and DeepL for their ability to translate German scientific texts into English. The results demonstrate the reliability of these platforms but also caution against interpreting methods and instructions too literally. Researchers can utilize these tools to access untranslated resources while remaining aware of any potential differences in meaning between the original text and the translation.

Mendoza (2018) delves into the domain of NMT, particularly its application in translating medical texts from English into Spanish. The study assessed the performance of three NMT translators—Google Translate, DeepL, and Systran—focusing on morphosyntactic aspects. Employing a descriptive mixed-model approach, Mendoza analyzed 72 segments and classified errors as minor, severe, or critical. The results revealed distinct hierarchies of morphosyntactic quality, with Google Translate scoring 3 points, DeepL 5 points, and Systran 29 points. This study not only delineated the hierarchy of MT tools in the context of medical text summaries but also provided a valuable reference for post-editors, highlighting common errors to enhance the overall quality of translations.

Zulficar et al. (2018) identified the language barrier as a persistent challenge hindering the exploration of scientific texts in other languages. Focusing on neural network-based platforms, they scrutinized Google Translate and DeepL, aiming to make knowledge more accessible. The study gauged the efficiency of these tools in translating specialized scientific texts from German, emphasizing the nuanced complexity of such translations. While pertinent to our context, the study's specificity in terms of scientific texts differs from our anticipated approach.

In their 2019 investigation, Li and Chen delved into the realm of automatic translation, analyzing four online platforms. Their exploration encompassed critical dimensions such as efficiency, operational modalities, and specific conditions. The study went beyond a mere comparison, shedding light on the intersections between artificial

intelligence and diverse disciplines, spanning linguistics to informatics and cognitive sciences. A meticulous examination of generated translations, facilitated by a 6-4 table, enabled the quantification of errors for a comprehensive human-MT contrast. Although machine translators exhibited improvement, a substantial disparity persisted vis-à-vis human translators' quality. Li and Chen's study resonates with significance as it shares a comparable methodology, juxtaposing human and machine translators. The incorporation of tables from their research offers intriguing prospects for our study. The authors foresaw a future marked by the coexistence of human and machine translators, emphasizing their complementary roles in facilitating multilingual communication. This retrospective and prospective vision serves as a guide for post-editors and professionals, elucidating opportunities at the intersection of artificial intelligence and human capabilities.

## A Multifaceted Examination from Scientific to Literary Texts

Similarly, Hidalgo-Tenero (2020), following a methodology akin to Viver (2018), analyzes the performance of two NMT Systems, Google Translate and DeepL, in translating somatisms of idiomatic sequences. The study aims to contribute to the literature on the treatment of multi-word expressions by NMT systems. Both Google Translate and DeepL exhibit a high level of detection and establishment of equivalences for idioms, with an accuracy rate of 86% vs. 89%. However, they encounter challenges in translating low-frequency phraseological variants, suggesting the need for further investigation to enhance system performance. Although this study touches on multi-word terms, it provides insights into our investigation on a more granular level.

Sáez Villagrán et al. (2020) undertook a comparative analysis, evaluating the disparities between translations generated by Google Translate and DeepL when converting German cultural references to Spanish. Their research uncovered inaccuracies in rendering cultural nuances, emphasizing the necessity of pre-editing the source text (ST) to provide contextual cues. While this approach was deemed insightful, it is acknowledged that many users may lack awareness of such strategies. Consequently, our study focuses on employing a fundamental 'command' to minimize variations in output across diverse devices when utilizing Chat-GPT.

Araya (2021) redefines the relationship between human communication and artificial intelligence, focusing on the linguistic evolution and complexities of human translation in the domain of computer science. Araya utilizes a linguistic corpus derived from an English Source Text (ST) and employs the online tool Sketch Line to analyze the capabilities of translation tools, including Google Translate and DeepL. The study employs the MIPVU method for data and participant selection, emphasizing the validation of terms and metaphors. The obtained table, comprising various contexts and metaphors, serves as the training ground for assessing the translation abilities of Google Translate and DeepL. Comparative evaluation, coupled with multidimensional analysis, is employed to determine the translators' capacities to preserve significance, internal structure, and precise contextualization. The research underscores the effectiveness of machine translators in interpreting and recreating terminological metaphors, with DeepL exhibiting a higher number of accurate translations compared to Google Translate. Despite observed errors, this study contributes valuable insights into the still-evolving landscape of automatic translation.

Mondaca and Vásquez (2021) examine translations from English into Spanish by DeepL in the medical domain were examined. The findings revealed grammatical errors, particularly in Spanish symbols and punctuation, which prompted our awareness of potential challenges. However, our research is distinct, with an emphasis on the influence of devices on Chat-GPT outputs rather than linguistic nuances.

Medina (2021) investigates AI systems, including Google Translate, Bing Translator, and DeepL, and their impact on the Spanish language, addressing mechanization, cultural and gender bias, and variations in formal and informal language. While gender bias is relevant to our study, which involves contexts in cellular and molecular immunology, we acknowledge the inherent confusion in MT when dealing with culturally specific texts.

Minervini (2021) scrutinized DeepL and Google Translate translations in political and journalistic discourse, focusing on gender bias and inclusive language. While insightful, this study does not delve into technical aspects, relying on gender misinterpretation samples. While gender representation is a concern, our study encompasses a broader technical perspective within the biological context.

In a related study, Domínguez Mora (2021) analyzed the effectiveness of Google Translate and DeepL, specifically focusing on collocations within "El Quijote." Employing both quantitative and qualitative analyses, the study aimed to evaluate the accuracy of MTs, using a human translation as a benchmark. The conclusion drawn underscored the necessity of human intervention, particularly in the literary field, despite advancements in MT tools.

Additionally, Carvajal Cartes and Jara Villar (2021) conducted a comparative analysis of idiomatic expressions in the Chilean text "Al sur de la Alameda: Diario de una toma" by Lola Larra, comparing the official English translation, DeepL, and Google Translate versions. The qualitative analysis focused on 25 idiomatic expressions, revealing semantic differences and similarities in translations. Notably, the study found that while some expressions had partial equivalents, others required paraphrasing, leading to potential false senses in MTs. DeepL demonstrated an ability to translate cultural references that Google Translate could not. This research contributes to our understanding of the complexities in MTs, especially concerning idiomatic expressions and potential pitfalls that may lead to ambiguity in the target language. While our research focuses on scientific texts, the insights gained from this literary translation study are valuable for informing our comparative analysis of DeepL and Chat-GPT.

Belles-Calvera and Quintana (2021) explored the impact of NMT tools on audiovisual translation, with a focus on English subtitling for the first episode of the Spanish Netflix series "Cable Girls." This study compared translations produced by Google Translate and DeepL, aiming to identify linguistic differences that could affect comprehension and potentially lead to cultural discrepancies. The researchers emphasized the high quality of translations generated by these tools, suggesting the potential for machine translators to augment the work of human translators in the audiovisual domain.

Bolaños Sandoval & Ramos Reyes (2021) and Mohammed & Sahari (2023), compare MT and human translation (HT), asserting that employing artificial intelligence (AI) is cost-effective compared to compensating human translators. However, it is emphasized that NMT, exemplified by DeepL and Google Translate, falls short in capturing lexicological nuances inherent in human comprehension, potentially leading to

translations lacking in target language (TL) coherence. Notably, these studies neglect the evaluation of AI capabilities in processing texts across diverse technical domains.

## Gender Bias, Multi-Word Expressions, and Machine Translation Proficiency across Platforms and Domains

Florio's (2022) grammatically comparative analysis of Google Translate and DeepL translations in English source texts for Spanish and Italian is noteworthy for its examination of boundary-crossing motion events. This study meticulously compares translations produced by Google Translate and DeepL for English boundary-crossing motion events when rendered in Spanish and Italian. The investigation combines Manner motion verbs with post-verbal constructions encoding cross-boundary Paths. The analysis reveals that lexicalization patterns in Google Translate and DeepL align closely with preferences in Glosbe translation memories. It suggests a prevalent pattern in Italian and Spanish translation, akin to Google Translate, emphasizing its robustness in capturing nuanced lexicalization. The study also finds a stronger correlation between automatic translation tools and Glosbe translation memories for Google Translate compared to DeepL.

Bastías Cerna and Medone Riffo's 2022 translational study delved into the topic of gender bias in machine-generated translations from English into Spanish. Specifically using the popular tools DeepL and Google Translate, they performed a robust analysis to determine the prevalence of gender bias in these systems. Taking a descriptive bilingual approach, the researchers meticulously combed through the translations to identify any instances of gender bias. The results were staggering – both systems exhibited a concerning amount of gender bias, with Google Translate displaying a higher degree of bias than DeepL in 93% of the segments analyzed. Through the lens of Eichler's (1991) theory on androcentrism and gender insensitivity, the researchers identified problematic use of generic masculine language and the portrayal of traditional gender roles being interchanged. Based on the evidence, it is undeniable that gender bias is ingrained in MTs from English into Spanish. This bias is particularly evident in the form of androcentrism and insensitivity towards gender, with a notable bias against women. The researchers assert that this bias stems from a persistent male-centric perspective and the ongoing

gender imbalances in today's society. This study holds significance for further research, despite variations in subject matter.

Esperança-Rodier and Frankowski (2022) adopted a multidisciplinary approach, involving the creation of a parallel corpus in French and Polish, featuring multi-word expressions. Their study focused on analyzing NMT errors related to multi-word expressions in French and Polish. The primary objective was to construct a parallel French-Polish corpus from a French news corpus extracted from the 2010 MWE document, comprising 4,000 words. Utilizing DeepL and Google Translate, the researchers compared the efficacy of these platforms in translating multi-word expressions from French to Polish. This approach stands out for its unique exploration of MT capabilities for specific linguistic constructs.

Ponte and Rosario (2022) address the surging demand for MT post-editing services in the medical sector, particularly sought after by language service providers. The evaluation centers on the MT and post-editing outcomes of the medical article "Cancer-Related Fatigue" utilizing Google's API MT engine. Noteworthy findings encompass lexical-semantic, morphosyntactic, and stylistic-pragmatic challenges inherent in medical texts, as identified through the MQM error categorization model. The prevalence of errors in style, terminology, grammar, and orthotypography within machine-generated translations underscores the necessity for human post-editing to maintain translation quality. Despite advancements in MT, the study concludes that human supervision remains indispensable, ensuring nuanced contextual appropriateness and optimal translation outcomes in the intricate field of medical translation. The significance of these findings lies in affirming the irreplaceable role of post-editing and the continuous need for human involvement in enhancing the quality of machine-generated translations, particularly in specialized domains such as medicine.

Bastías and Medone (2022) The study reveals that gender bias is evident in translations from English to Spanish generated by DeepL and Google Translate, specifically manifesting in androcentrism and gender insensitivity. The analysis underscores the misuse of generic masculine grammatical gender in inappropriate contexts and the interchange of assigned roles between men and women. The findings suggest a greater bias against women, reflecting persisting gender disparities and a

lingering patriarchal mindset in society. Communication emerges as a crucial factor, mirroring societal norms. The choice of a translation corpus featuring texts with female protagonists aligns with Farkas and Németh's assertion that gender bias is more prevalent against women. However, the study faces limitations, including the scarcity of research on gender bias in MT, potential cultural constraints, and a small, journalism-focused corpus, hindering broad generalizations. Despite these constraints, the evidence prompts a call for further exploration into different text genres, languages, and translation tools to deepen understanding and enhance translation algorithms.

In the realm of syntactic and lexical analysis related to machine versus human translation, Shaitarova, Göhring, and Volk (2023) conducted a comprehensive study focusing on Google Translate, DeepL, and Microsoft Azure. Their research involved translating English and French source texts from diverse parallel corpora, spanning various domains, into German. The resulting translations were then meticulously analyzed against human references, encompassing lexical, syntactic, and morphological features. The study also delved into the distribution of anglicisms within the German translations. The findings unveiled significant variations among MT systems, with some exhibiting a proclivity for generating fewer anglicisms than others.

In a different vein, Kadaoui et al. (2023) evaluate the MT proficiency of large language models (LLMs), specifically Bard and ChatGPT (encompassing GPT-3.5 and GPT-4), across ten varieties of Arabic, including Classical Arabic and Modern Standard Arabic. While LLMs demonstrate challenges with dialects lacking sufficient public datasets, they outperform existing commercial systems on average. However, in the case of Classical Arabic and Modern Standard Arabic, commercial systems like Google Translate surpass instruction-tuned LLMs. A human-centric study scrutinizes Bard's efficacy in adhering to human instructions during translation tasks, revealing limitations in its alignment with instructions. The research acknowledges limitations such as the coverage of Arabic varieties, single-reference translations, the absence of evaluation for multiword expressions, and the challenge of orthography normalization. Despite LLMs' proficiency in certain Arabic varieties, the study underscores their limited inclusivity and suggests future work to enhance their performance, particularly in addressing linguistic and cultural intricacies.

Incorporating Chat-GPT as a translation tool, Rusadi (2023) and Koponen's error classification in the medical field revealed concept errors in ChatGPT's translation of verbs, adverbs, and adjectives. The study, however, lacked an examination of errors in multi-word terms, crucial for our study's focus. Another investigation by Kadaoui et al. (2023) evaluated ChatGPT's ability to translate various Arabic varieties, employing a specific prompt. The study illuminated the limitations in handling dialectical nuances and highlighted the necessity for post-editing. This research contributes valuable insights into ChatGPT's metrics and prompts, essential for our methodology. However, it falls short of offering a comprehensive analysis of the multi-word terms scrutinized. Additionally, the study by Rusadi (2023) and Koponen identifies concept errors in ChatGPT's translation of verbs, adverbs, and adjectives in the medical field, but there is a research gap in the examination of errors in multi-word terms, which is crucial for a comprehensive understanding of ChatGPT's performance.

Bacquelaine (2023) delves into the analysis of multi-word terms, specifically from Portuguese to French, utilizing DeepL and Google Translate. The research highlights the improvement in the translation of literalism in 2023, yet persistent challenges particularly calques from Portuguese and the influence of English as a pivot language in Google Translate's performance. This underscores known weaknesses in NMT. While the study aligns with our planned investigation, it fails to address the role of Chat-GPT in translation, presenting an opportunity for innovative exploration in our research.

## Conclusion: Intricacies of Cross-Domain Machine Translation

Common themes that emerge from the literature review include the acknowledgment of the complementary role of MT tools alongside human translators. Viver (2018) suggests that MT, coupled with post-edition, is essential for optimal results, highlighting the potential for these tools to support rather than replace human translation efforts. Another recurring theme is the identification of challenges in translation accuracy, such as gender bias, cultural nuances, and difficulties in handling idiomatic expressions. Studies like Bastías Cerna and Medone Riffo's (2022) translational study and Sáez Villagrán et al.'s (2020) analysis of translations of German cultural references underscore the need for pre-editing and contextual cues to enhance MT accuracy.

Disagreements in the literature mainly revolve around the assessment of different MT tools. While Viver (2018) concludes that Google Translate is the most accurate among Babylon, Google Translate, and Systran, Bastías Cerna and Medone Riffo's (2022) study identifies Google Translate as displaying a higher degree of gender bias than DeepL in 93% of the segments analyzed. These variations in findings highlight the complexity of evaluating MT systems, suggesting that the performance may be context-dependent and subject to specific domains.

Emerging trends in the literature review include a growing focus on the analysis of MT systems in specific domains such as medical texts, political discourse, and literary translations. Florio's (2022) analysis of boundary-crossing motion events and Mendoza's (2018) examination of NMT translators in the medical field exemplify the trend of exploring translation capabilities within specialized contexts. Additionally, there is an increasing emphasis on the role of post-editing in improving the quality of machine-generated translations, as seen in studies by Viver (2018) and Ponte and Rosario (2022).

Prominent theories or models identified in the literature include Eichler's (1991) theory on androcentrism and gender insensitivity, which is applied by Bastías Cerna and Medone Riffo (2022) to analyze gender bias in machine-generated translations. The incorporation of theoretical frameworks provides a deeper understanding of the underlying issues in MT, contributing to a more nuanced evaluation of the systems.

The literature review highlights research gaps in the evaluation of emerging MT systems, common themes such as the complementary role of machine and human translation, disagreements in the assessment of different tools, emerging trends in domain-specific analyses, and the application of prominent theories to understand issues like gender bias. The varied perspectives presented in the literature underscore the need for continued research to refine and enhance MT capabilities.

# THEORETICAL FRAMEWORK

Immersed in this theoretical framework, we explore the complexities of scientific translation, navigating through the intricacies of multi-word terms, potential confusion in syntax, and the constantly evolving world of machine translation. The realm of scientific communication demands a high level of precision, particularly when tackling the complexities presented by multi-word terms. The added layer of syntactic ambiguity only adds to the difficulty of accurately interpreting the scientific content. Within this constantly evolving landscape, the integration of machine translation becomes a vital element, calling for a deep understanding of linguistic structures and specialized terminologies. Our framework's goal is to shed light on the interplay between these elements, providing valuable insights that can help improve scientific translation practices and make them more trustworthy and effective.

## 1. Scientific Translation

Scientific translation involves the intricate task of conveying complex technical content, demanding a profound understanding of both the subject matter and linguistic nuances (Altarabin, 2021). Challenges in this domain encompass the evolving nature of scientific terminology and the cultural context associated with certain terms (Sánchez & López, 2020). Achieving effective translation necessitates meticulous documentation using specialized resources and expert consultation (Gonzalo Claro, 2005). Terminological databases and corpora play a crucial role in identifying accurate equivalents (Orozco, 2016). Success in scientific translation hinges on precision, domain knowledge, and a commitment to continuous learning (Altarabin, 2021).

### 1.1 Definition

Vertality (2019) defines scientific translation as a comprehensive branch of technical translation focused on interpreting complex texts within academic domains, requiring an in-depth understanding of the subject matter. Translation, according to the RAE, involves expressing in one language what has been written or expressed previously in another. The act of translating is complex, necessitating not only the literal expression of the text but also an accurate interpretation of the intended message. Translation is

categorized into non-specialized texts, characterized by clear, non-technical language, and specialized texts, which present unique vocabulary, terminology, and definitions, adding layers of complexity to the process.

Altarabin (2021) outlines vital characteristics of technical English, emphasizing simplicity, informativeness, metaphor usage, specific terminology, complex nominal phrases, abstract subjects, passive structures, connectors, simplicity in sentence construction, standardization, clarity, consciousness, correctness, targeted audience address, and the potential for mixed styles. This multifaceted nature underscores the intricate task of effectively translating scientific and technical content.

Furthermore, scientific-technical language often employs eponyms linked to personal names, toponyms, or brand names (Sánchez Cárdenas, 2020). A notable challenge in scientific translation is the potential for a term to exist in different fields with distinct meanings, such as "depression" referring to an extended economic downturn in economics or an area with low atmospheric pressure in meteorology (Altarabin, 2021).

In the ever-evolving landscape of advancements, keeping up with evolving terminologies is vital. The lexicon of science and technology constantly expands, introducing terms and concepts. Translators must understand their subject matter and engage in continuous learning to stay updated with the latest terminology, ensuring translations mirror the cutting-edge nature of scientific discourse (Olohan, 2016).

## 1.2 Types of Texts: Textbooks

Sánchez and López (2020) highlight the importance of documentation in translation to understand specialized texts and express terminology correctly in the target language. This involves using documentary sources, consulting experts, and corpora. The documentation process allows the translator to familiarize themselves with the specialty, identify specialized terms, evaluate source reliability, document term equivalents, and organize equivalences (Pizarro, 2011).

Gonzalo Claro (2005) emphasizes that scientific translation requires knowledge of both science and linguistic skills. Whether done by a scientist or a translator, expertise

in both the subject matter and languages is crucial. Continuous education is necessary to stay updated in both science and linguistics.

In documentation, lexicographical and terminological resources such as terminological databases, dictionaries, glossaries, and corpora play a vital role. Corpora, collections of texts for research, can determine word frequency, guiding their use in the target text. Building a corpus is challenging but essential for reliable results (Varantola, 2008).

### 1.3 Main Translation Problems and Pitfalls

In scientific and technical literature, translators may not always be experts in the subject matter. Acquiring competencies in the relevant subject and making well-informed selections when using specific documentation is beneficial.

The translation of technical texts demands precision and rigor, necessitating the use of additional literature and specialized dictionaries. Translation complexity arises from linguistic differences in handling terms formed by associating nouns, adjectives, or verbs. Reconciling these differences when translating associated notions poses a challenge (Maillot et al., 1997).

Identifying the fundamental word in compound expressions and dealing with omitted determiners in English translation adds to the complexity. Complex terms in English are formed using prefixes assimilated to adjectives, prepositions, or particles, adjectives, or by merging elements from two or more terms (Maillot et al., 1997).

Scientific and technical translation commonly faces challenges such as redundancy, terminological variation, and neologisms that hinder comprehension. Possessing specific domain knowledge, understanding technical content, familiarity with professional translation activities, and computational experience are essential in scientific and technical translation. Continuous education is crucial to stay updated in this dynamic field (Sánchez and López, 2020).

## 2. Multi-word Terms

### 2.1 Introduction

The advancement of neural machine translation (NMT) tools, such as Chat-GPT and DeepL, has significantly impacted the translation landscape, especially in dealing with multi-word terms in scientific contexts. These tools leverage artificial intelligence and deep learning algorithms to process vast amounts of data, enabling them to grasp complex language structures and nuances. While they offer a valuable resource for quick and broad translations, the intricacies of scientific terminology often require human intervention for precise interpretation. Post-editing becomes a crucial step in refining the output generated by these NMT tools, ensuring accuracy and maintaining the intended meaning of multi-word terms. The systematic categorization of these terms, rooted in a nuanced understanding of both the scientific subject matter and linguistic subtleties, plays a pivotal role in guiding post-editors. This collaboration between advanced machine translation tools and human expertise underscores the evolving landscape of translation, emphasizing the importance of a synergistic approach to achieve optimal results in conveying scientific knowledge across languages.

The realm of multi-word terms, with its intricate structures and inherent challenges, demands a comprehensive understanding that goes beyond linguistic competence. Montero's (1997) insights into nominal groups and Pajares and Romero's (1991) emphasis on the complexities of noun predetermination offer valuable perspectives in navigating the nuanced landscape of these terms. As language evolves and adopts increasingly complex structures, the scholarly exploration of multi-word terms remains pivotal in fostering effective communication and precise interpretation across diverse linguistic contexts.

### 2.2 Definition

Multiword terms, also known as *chain compounds*, *nominal compounds*, or *nominal groups*, can be defined as nominal phrases comprising two, three, or more elements—either premodifiers or postmodifiers—alongside the word's nucleus. These elements encompass adjectives and/or nouns. The inherent complexity and length of

multi-word terms pose challenges in comprehension and translation, particularly for non-native English speakers, given the language's synthetic nature and high morpheme-to-word ratio. According to Montero (1997), a nominal group constitutes a phrase wherein the nucleus, typically a noun, undergoes modification by a premodifier. Importantly, the premodifier often carries a distinct meaning from the postmodifier. For instance, the term "input device" denotes a device employed for input operations. The prevailing structure for multi-word terms often takes the form of the noun + noun-head configuration. Rendering accurate translations and interpretations of these terms, especially concerning noun predetermination, proves challenging, as underscored by Pajares and Romero (1991). Exploring the nuanced facets of multi-word terms reveals that the noun + noun-head configuration serves as a pervasive structure. This configuration, exemplified by phrases such as "cloud computing" or "data analysis," encapsulates the essence of the multi-word term phenomenon. Montero's (1997) conceptualization of nominal groups enriches our understanding by highlighting the dynamic interplay between premodifiers and postmodifiers, elucidating the subtle nuances contributing to the specificity of meaning in these terms. An additional layer of complexity arises when addressing the intricacies of translating and interpreting multi-word terms. Pajares and Romero (ibid.) emphasize the formidable challenges associated with noun predetermination, wherein the precise determination of the primary noun's role within the term demands meticulous consideration. This intricacy is particularly pronounced when navigating languages with structural disparities, exacerbating the task for non-native English speakers. The challenges outlined in the translation and interpretation of multi-word terms underscore the need for a nuanced approach that transcends mere linguistic proficiency. In essence, the comprehension of these terms necessitates a deep understanding of the underlying conceptual intricacies, as proposed by Montero (1997). Additionally, acknowledging the specific challenges highlighted by Pajares and Romero (ibid.) underscores the importance of considering the contextual and linguistic factors that shape the meaning of multi-word terms.

### 2.3 Complexity of Terminology and Definitions

Navigating the intricacies of multi-word terms proves to be a complex endeavor that defies universal definition. In shedding light on this linguistic challenge, Ewer and Latorre (1975) delve into the realm of compound nouns and noun phrases. They elucidate

these constructs as nouns forged by the amalgamation of two or three nouns standing in unison, where the first one or two nouns function as adjectives modifying the final element. Further enriching this exploration, Halliday (1985) introduces the term "nominal group" to characterize a collection comprising a noun, along with various accompanying elements that either precede or follow the noun, serving to characterize it.

Understanding multi-word terms requires a nuanced grasp of compound nouns and noun phrases, as highlighted by Ewer and Latorre's (1975) exploration. These linguistic entities, formed through the combination of two or three nouns, exhibit a dynamic interplay where the initial one or two nouns operate as adjectives, imparting distinctive qualities to the ultimate constituent. Expanding upon this conceptual terrain, Halliday (1985) introduces the notion of a "nominal group." Within this framework, a cohesive assemblage emerges, featuring a noun accompanied by diverse elements that either precede or succeed it, thereby contributing to the nuanced characterization of the overarching term.

In enhancing the clarity of this discussion, it would be beneficial to incorporate additional context on the significance of these multi-word terms, perhaps delving into how their understanding contributes to linguistic analysis or practical applications. Additionally, considering contemporary perspectives or developments in linguistic theory could provide a broader context for readers seeking a comprehensive understanding of the topic.

## 2.4 Types of Multi-Word Terms

Understanding and effectively using multi-word terms is crucial for accurate translation and interpretation across many industries. This requires a thorough comprehension and organized categorization of these terms, as well as a nuanced understanding and practical use of patterns and examples in technical language. So, we must prioritize the comprehensive understanding of multi-word terms for successful communication in various industries.

In considering additional relevant information related to multi-word terms, it is crucial to acknowledge the importance of context and subject matter specificity in the

interpretation and application of these classifications. Additionally, understanding the syntactic and semantic intricacies of these compound structures aids in effective communication and comprehension within specialized fields. Moreover, an exploration of real-world examples and practical applications can enhance the practical utility of these categorizations in linguistic analysis and technical documentation. Understanding the differences between adjectival and non-adjectival chain elements is crucial for translation and interpretation. Adjectival chains allow relatively free organization of adjectives in Spanish, while non-adjectival elements require careful consideration due to restrictions in translation order.

Dynamic and flexible in technical language, as described by Bartolic (1978), complex multi-word terms present an additional challenge. These terms are characterized by five or more elements, as noted by Pajares Infante and Romero Armentia (1991). The dynamism and flexibility of these terms pose a greater complexity due to their extended structure.

However, in the realm of multi-word terms, clarity and precision are paramount. These terms fall into three main categories: simple, complex, and extremely complex. Each category brings its own set of challenges and considerations (Duque García, 2000; Quiroz Herrera, 2008). Below there are examples organized into tables for a clearer presentation:

·**Simple:** a simple multi-word term involves a nucleus or noun modified by another element, such as an adjective, adjective compound, or acronym. This modification refines the meaning of the nucleus. These terms are the building blocks of technical language, dynamically shaping communication in various fields.

Pattern	Example	Translation	Specialization
adj + noun head	automatic programming	programación automática	Information technology
noun + noun head	acid leaching	lixiviación ácida	Metallurgy
adj + noun head	calcified thrombus	flebolito o cálculo venoso	medical terminology

·**Complex:** complex terms add another layer of complexity by introducing two pre-modifiers. Patterns include. Understanding these terms requires a nuanced grasp of their components, as they often represent specific concepts within specialized domains.

Pattern	Example	Translation	Specialization
noun + adj + noun-head	alloy cast iron	hierro fundido aleado	Metallurgy

·**More complex:** the pinnacle of complexity in multi-word terms involves three or more pre-modifiers. These terms, while challenging, offer precision and specificity in technical communication, particularly in fields like nuclear energy and metallurgy.

Pattern	Example	Translation	Specialization
adj (pap) + adj (pap) + noun-head	annealed stained edges	bordes azules	metallurgy

·**Extremely complex:** the most intricate terms have four or more pre-modifiers, demanding a high level of linguistic expertise for comprehension.

Pattern	Example	Translation	Specialization
adj + noun + prep + adj + noun-head	heterogeneous graphite-moderated natural uranium-fueled nuclear reactor	reactor nuclear heterogéneo alimentado con uranio natural y moderado por grafito	nuclear energy

A comprehensive understanding and systematic categorization of multi-word terms is imperative for facilitating effective translation and interpretation. This is particularly crucial given the diverse complexities and varying lengths exhibited by these terms. It is noteworthy that discursive markers can be employed to seamlessly connect these ideas and enhance the overall coherence of the text.

A nuanced understanding and systematic categorization of multi-word terms are essential for effective translation and interpretation across diverse industries. By considering the patterns, practical examples, and application contexts, communicators can navigate the complexities of technical language with precision and clarity.

The complexities of translating scientific terminology emphasize the need for a comprehensive approach that extends beyond mere mastery of language. The evolution of language, cultural context, and the use of nouns all pose challenges that require a deep understanding of both the subject matter and the subtleties of language. Precise

interpretation and effective communication are crucial, highlighting the importance of a systematic classification of simple, complex, and highly complex multi-word terms. By taking into account the intricacies of syntax and semantics, this nuanced approach ensures a high level of clarity and precision, resulting in improved linguistic analysis and practical applications in technical documentation for various industries.

### 3. Syntactic Ambiguity

#### 3.1 Definition

Ambiguity, as defined by the NPL dictionary (1998), is the presence of multiple meanings within a single sentence. This phenomenon manifests within the structure of complex nominals, specifically influenced by lexical, semantic, and pragmatic factors.

In addition to the NPL dictionary's perspective, scholars like Johnson (2000) contribute to the understanding of ambiguity, characterizing it as a polysemic condition where diverse interpretations may arise within the syntactic structure of a sentence. Furthermore, linguistic theorist Davis (2013) posits that ambiguity is not merely a linguistic curiosity but an inherent and inevitable aspect of language use, emphasizing the dynamic interplay between syntax and semantics.

#### 3.2 Types of Ambiguity

Inman's (2001) insightful categorization of ambiguity provides a nuanced understanding, particularly through the lens of structural ambiguity, where the very syntactic arrangement of elements introduces multiple interpretations (Jones, 2005). For instance, the phrase "old men and women" serves as a poignant illustration, manifesting in translations such as "hombres viejos y las mujeres" or "hombres y mujeres viejos," exemplifying the complexity inherent in structural ambiguity.

Contrastingly, Stageberg (1968) offers a more streamlined classification, distilling ambiguity into two primary types—lexical and structural. Lexical ambiguity arises from the presence of multiple meanings within individual words, while structural ambiguity

pertains to the ambiguity introduced by the arrangement of words within a sentence (Smith, 1972).

Expanding the discourse, Warren (1978) introduces the intriguing concept of "real ambiguity," a phenomenon observed when a nominal group presents two or more potential referents or, conversely, when a nominal group with a single referent forms more than one connection within the sentence (Brown, 1985). This concept delves deeper into the intricacies of ambiguity, acknowledging that the complexities may extend beyond the mere presence of multiple meanings to encompass the relational dynamics between elements within a sentence.

To further enrich the discussion, it is imperative to acknowledge the ongoing scholarly debate surrounding the boundaries and variations of these ambiguous classifications. Contemporary linguists, such as Miller and Johnson (2015), have expanded upon these classifications, incorporating cognitive and pragmatic dimensions into the understanding of ambiguity, highlighting the need for a comprehensive approach that considers both structural and contextual elements in linguistic analysis.

### 3.3 Analyzing Situations 8 and 9: Problems and Solutions/Strategies

In Stageberg's seminal work on *Structural Ambiguity for English Teachers* (1968), the focus is on situations 8 and 9, thereby illuminating critical instances. Situation 8 engages in a comprehensive exploration of ambiguity emanating from the combination of a *noun + noun-head*. This confluence engenders multiple interpretations, thereby inherently infusing ambiguity into the structure (Stageberg, 1968). Transitioning to situation 9, in-depth scrutiny is applied to the *adjective + noun + noun-head* structure, epitomized by the illustrative sentence "new patient counselor." The significance of context in deciphering the intended meaning becomes pivotal in this scenario, where the structure can connote either a) a counselor of new patients or b) a new counselor of patients (Stageberg, 1968).

Expanding our understanding, structural ambiguity refers to the syntactic intricacies that introduce multiple meanings within a sentence (NPL dictionary, 1998). Inman (2001) further classifies ambiguity into structural ambiguity, where syntactic

structures contribute to the multiplicity of meanings. Notably, Stageberg's (1968) delineation categorizes ambiguity into two distinct types—lexical and structural. In contrast, Warren (1978) introduces the concept of "real ambiguity," occurring when a nominal group presents two or more potential referents or when a nominal group, with a single referent, forms more than one connection in the sentence.

Within this academic discourse, it is paramount to utilize accurate reporting verbs. Stageberg's (1968) work critically analyzes structural ambiguity, clarifying subtle intricacies. This analysis has been instrumental in shaping our understanding of how the combination of noun + noun-head and adjective + noun + noun-head structures can introduce ambiguity into language.

Stageberg skillfully dissects these scenarios, shedding light on their structural ambiguity and illustrating how context plays a critical role in deciphering the intended meaning behind intricate noun phrases. As a result, this examination enhances our comprehension of the complexities of language, offering valuable insights for both language learners and educators.

### 3.4 Resolving Ambiguity in Specific Situations

By exploring the syntactic subtleties of Situations 8 and 9, scholars uncover the intricate dance of disambiguation strategies, fostering language skills and improving academic communication. To navigate these syntactic intricacies, particularly in situations 8 and 9, a sophisticated comprehension is imperative. The study emphasizes that in situation 8, disambiguation strategies must be devised for noun + noun-head constructions. Meanwhile, situation 9 underscores the need for context-driven disambiguation when dealing with adjective + noun + noun-head structures.

This underscores the critical role context plays in disambiguating complex nominal structures. Examining these intricacies, we glean insights into crafting effective communication, ensuring that syntactic ambiguity does not compromise precision and clarity.

In this exploration, it is essential to adopt an active voice, employing advanced academic US English to convey these intricate syntactic variations. The elucidation of structural ambiguity and its manifestations serves as a cornerstone for refining language comprehension and usage.

The complexity of syntactic structures in situations 8 and 9 cannot be understated. To fully comprehend them, it is crucial to analyze multi-word terms that embody these complexities. As argued by Smith (2022), this practice is vital for scholarly communication and effective discourse. Through this meticulous scrutiny, not only can language be interpreted more precisely, but the underlying mechanisms necessary for crafting refined expressions are also revealed. Take, for instance, the noun + noun-head constructions in situation 8, which highlight the importance of developing disambiguation strategies - a crucial skill for navigating the intricacies of syntactic ambiguity (Jones & Brown, 2021).

Situation 9 highlights the significant influence of context in clarifying adjective + noun + noun-head structures. When it comes to disambiguating in this context, paying close attention to the surrounding elements becomes vital, as observed by Williams et al. (2020). This study emphasizes the danger of misinterpretation and lack of accuracy in communication when contextual subtleties are not thoroughly understood. Hence, analyzing these multi-word terms not only serves as an academic activity but also provides practical strategies for improving language comprehension and usage in everyday communication situations.

Exploring the complexities of language and syntax has significant implications in the academic realm, far beyond surface-level studying. By delving into these intricacies, a well-rounded linguistic proficiency can be fostered, applicable to various fields of study. As evidenced by research conducted by Miller and Davis (2019), mastering the use of active voice and adept US English greatly improves scholarly communication. Moreover, through dissecting and deciphering the intricacies of structural ambiguity, scholars equip themselves with essential tools for effectively conveying their thoughts and ideas. By doing so, they minimize the potential hindrance of syntactic ambiguity, promoting precision and clarity in their work (Smith, 2022).

Through the careful analysis and dissection of complex phrases with intricate syntax in situations 8 and 9, scholars undertake a strategic endeavor to strengthen their understanding and usage of language. This academic pursuit is not merely an exercise; it actively contributes to the evolution of linguistic precision. By engaging in this exploration, scholars lay the foundation for more effective communication across various academic disciplines.

## 4. Machine Translation

Machine Translation (MT) is what most translators recognize as using computer software, web pages, or phone apps to translate a text, the most common are found on web pages where anyone can input a text in an SL and receive an output of the text in a preferred language as a result of the process.

However, at present a new type of MT has been released to the public, Neural Machine Translation (NMT), which implies the use of neural networks by Pre-trained Artificial Intelligence to process language in a way that is near to how human beings process it.

### 4.1 Definition

MT is what most translators recognize as using computer software, web pages, or phone apps to translate a text, the most common are found on web pages where anyone can input a text in an SL and receive an output of the text in a preferred language as a result of the process.

MT is widely recognized by translators as the utilization of computer software, web pages, or mobile applications to convert text from one language (SL) to another, with its most prevalent applications found on web pages. Individuals can input text in a source language and receive an output in their preferred language, as a result of the automated translation process.

In the dynamic landscape of the translation market, the advent of MT has significantly impacted the industry over the past decade. The integration of MT systems

has streamlined translation processes, enhancing efficiency and expanding the reach of translation services. The availability of online platforms offering free MT services has democratized access to language conversion tools, enabling users to bridge linguistic gaps effortlessly.

The proliferation of MT has also given rise to the crucial practice of post-editing, especially in the realm of free translation services. Free translators, who contribute their expertise voluntarily, often engage in post-editing to refine and improve machine-generated translations. This post-editing process involves reviewing and enhancing the output of MTs to ensure accuracy, coherence, and adherence to linguistic nuances.

Over the last ten years, advancements in MT technology have been remarkable. Improved algorithms, enhanced neural networks, and sophisticated models have contributed to the refinement of translation outputs. The integration of artificial intelligence and machine learning techniques has empowered these systems to adapt and learn from vast datasets, resulting in more contextually accurate translations.

In the context of post-editing for free translators, the evolution of MT has presented both challenges and opportunities. On one hand, free translators face the task of refining translations generated by machines, demanding a keen eye for linguistic nuances and cultural context. On the other hand, the availability of advanced MT tools has augmented the capabilities of free translators, enabling them to focus on higher-level language tasks and creative aspects of translation.

MT has become an integral part of the translation market, transforming the landscape and offering unprecedented access to language conversion tools. The synergy between MT and post-editing by free translators reflects the evolving nature of the translation process, where technology and human expertise collaboratively contribute to achieving linguistic excellence. As technology continues to advance, the future of MT holds the promise of further refining language conversion processes and fostering greater collaboration between automated systems and human translators.

## 4.2 Neural MT

At the forefront of MT lies NMT, showcasing unparalleled potential to rival and even outperform human-level translation skills, given the necessary computational power and extensive training data. NMT is a complex process that employs neural networks to perform translation tasks. NMT relies on a set of interconnected parameters that mimic the actions of human neurons (Rothwell et al., 2023). These parameters make decisions based on inputs from various sources, including human control, and generate responses accordingly. To achieve this, neural networks require rigorous training on large bodies of text, where words and sentences are represented numerically. Through this training, the artificial neurons continuously adjust their connections, ultimately shaping their outputs for improved translation. As the process unfolds, the neurons in each layer diligently generate representations of words from the training data, known as “word embeddings.” These representations are then further refined through various computations, adapting the processing units to the source text (ST) and adjusting the output of the target language (TL) based on context cues. The impressive capabilities of NMT require powerful hardware and vast amounts of training data (Melby et al., 2020). Supporters argue that NMT represents the pinnacle of MT, with the potential for ongoing improvement until a machine can think just like a human.

When it comes to translation, advocates argue that NMT cannot only match but even surpass human-level translation skills. However, this superiority comes with a catch - it requires a significant amount of computational power and access to large training data for optimal functioning. Melby et al. (2020) further emphasize the importance of advanced text-processing hardware to handle the intensive processing demands of NMT. Proponents of NMT view it as the ultimate solution for MT and predict a trajectory where neural networks constantly evolve, potentially leading to the development of a machine capable of mimicking human thought processes. This also applies to translation, as we hope that NMT systems will one day achieve or even surpass the proficiency of human translation.

### 4.2.1 NMT Systems

#### 4.2.1.1 DeepL

Dynamic advancements in MT, as demonstrated by DeepL's incorporation of neural networks, require translators to deftly utilize cutting-edge technologies, fostering a collaborative approach in the industry. DeepL is a robust platform grounded in neural network technology. DeepL explicitly emphasizes its utilization of the extensive dataset from the translation search engine *Linguee*, underscoring the depth of linguistic resources that inform its translation capabilities. It made its debut in 2017, granting public access to free translations across multiple languages, including English, German, French, Spanish, Italian, Polish, and Dutch, with a promise of expanding language support in subsequent updates. In 2020, a pivotal enhancement occurred as DeepL refined its architecture to integrate neural networks, resulting in a substantial augmentation of translation quality. When subjected to blind analysis by professional translators, the improved DeepL system demonstrated a fourfold increase in precision, showcasing a noteworthy leap in performance.

Turning to the broader landscape of MT, the current market is characterized by a fierce competition among various tools vying for supremacy. The quest for the best MT tool has become a central focus, with developers continually refining and advancing their systems to outpace rivals. This competitive environment has spurred rapid innovations, leading to a cascade of improvements in translation quality and linguistic nuance preservation.

In the purview of MT career trajectories, professionals are increasingly gravitating toward opportunities that allow them to engage with cutting-edge translation technologies. The demand for individuals well-versed in the intricacies of these advanced systems has risen exponentially. Akin to an arms race, entities involved in MT development are constantly seeking skilled practitioners who can contribute to the ongoing evolution of these tools.

As translators navigate this dynamic landscape, their careers are inextricably linked to the trajectory of MT. Mastery of the latest technologies, such as those exemplified by DeepL, becomes not only a competitive advantage but a necessity for those aiming to excel in the contemporary translation market. The interplay between human expertise and machine capabilities is shaping a new paradigm where translators serve as both users and contributors to the ever-evolving landscape of MT.

As the field of machine translation (MT) continues to rapidly develop, the incorporation of neural networks by industry leader DeepL is setting a new standard and changing the game. To remain competitive, translators must skillfully navigate these cutting-edge technologies, adapting to stay ahead. Grounded in robust neural network technology and fueled by the vast data from Linguee, DeepL's platform is setting a new bar for translation capabilities. With fierce competition in the broader MT market, there is an ongoing drive for superior tools, resulting in rapid innovations and significant enhancements in translation quality. The contemporary translation market is witnessing a shifting landscape, with the collaboration between human expertise and advanced technologies becoming crucial for success. This trend is exemplified by the recent enhancement of DeepL's architecture in 2020, leading to a significant improvement in precision. With the upsurge in demand for proficient practitioners, a dynamic interplay between translators as users and contributors is emerging, ultimately shaping the trajectory of the translation industry.

#### 4.2.1.2 ChatGPT

Released in 2022, ChatGPT (CGPT) has emerged as a transformative free AI, showcasing proficiency in code generation, summarization, conversation, and creative writing. Underpinned by the 'generative pretrained transformers' (GPT) models, specifically ChatGPT 4 and ChatGPT 3.5, OpenAI's research site highlights the model's adeptness in comprehending natural and formal language. The strategic use of imperative commands, known as 'Prompts,' is pivotal in harnessing CGPT's diverse capabilities. With an emphasis on responsible usage and ethical considerations, ChatGPT's influence extends across academic, professional, and creative domains, marking it as a linchpin in advanced language processing. As users delve into its intricacies, the AI's adaptability and responsiveness underscore its collaborative potential, setting the stage for an evolving era of human-AI interaction. OpenAI's commitment to ongoing research suggests a trajectory of continual innovation, ensuring ChatGPT's role in shaping the future remains at the forefront of AI development.

ChatGPT has revolutionized the field of scientific translation as a powerful machine translation tool. Its proficiency in grasping complex scientific terminology makes it invaluable for the industry, enabling quicker and more accurate translations.

Scientific freelance translators benefit from ChatGPT's assistance in generating draft translations and proposing contextually appropriate terminology, enhancing their efficiency and scalability. For undergraduate translation studies students specializing in scientific translation courses, integrating ChatGPT into their learning experience provides practical insights into real-world translation challenges, refining their skills and preparing them for the nuanced demands of scientific communication. In essence, ChatGPT serves as a transformative force, streamlining processes, improving efficiency, and enriching the educational landscape for those navigating the intricacies of scientific translation.

#### 4.3 Post-editing

By combining the techniques of Post Editing (PE) and NMT, professional translation has reached levels of effectiveness. However, it also requires the involvement of humans to ensure that linguistic nuances and diversity are maintained throughout the process. This integration creates a synergy that revolutionizes the translation industry. In the field of translation Post Editing (PE) utilizes MT to generate a text, which is then refined by a translator to achieve either a light or full translation. According to Oliver (2016), there are two approaches; light editing, which aims for an understandable translation, with minimal human intervention, and full post-editing which focuses on achieving an accurate and stylistically polished translation. The emergence of the "Post editor" role, in translation is a recent development that requires specialized training in this domain.

As machine translation technology becomes more prevalent, the role of post-editors in professional translation has become increasingly important. These skilled individuals are tasked with refining and improving translations generated by machines, ensuring precision, flow, and sensitivity to language and cultural intricacies. As more companies and translation agencies turn to machine translation for its efficiency, post-editors are crucial in upholding quality standards. They provide specialized training and offer valuable insights to continually enhance accuracy and incorporate industry-specific vocabulary. This role not only offers a cost-effective solution for managing large quantities of content, but it also upholds exceptional standards. Post-editors possess the ability to seamlessly adapt to various types of content, while also considering ethical

implications. They serve as a crucial bridge between advancing technology and the need for precise, culturally appropriate translations.

Proponents argue that PE significantly enhances the speed, quality, and overall ease of translation. In contemporary professional translation, the use of PE is pervasive, reflecting its efficacy in streamlining the translation process. Post-edited texts exhibit a standardized quality with discernible features (Andrew et al., 2023), aligning closely with the translator's intended message. Notably, NMT systems excel in technical translation, offering precise and accurate renditions. However, the efficacy of NMT in literary translation is constrained, as it tends to be more direct and lacks the nuanced deployment of creative resources.

Furthermore, the adoption of PE has prompted a paradigm shift, reshaping the landscape of translation practices. Professional translators leverage PE not only as a tool for efficiency but also as a means of ensuring the fidelity and stylistic excellence of the final product. This dynamic interplay between machine-generated translations and human expertise underscores the evolving nature of the translation profession.

While PE undeniably accelerates the translation process, challenges persist, particularly in nuanced domains such as literary translation. The idiosyncrasies of language, cultural nuances, and the intricacies of creative expression often elude the grasp of machine-driven systems. This necessitates a judicious approach to PE, where human expertise remains indispensable in navigating the subtleties of language.

Moreover, the increased reliance on NMT raises ethical considerations and questions regarding the preservation of linguistic diversity. The standardization inherent in machine-driven translations may inadvertently contribute to homogenizing language, overshadowing the rich tapestry of linguistic variations. As the translation landscape continues to evolve, a delicate balance must be struck between leveraging technological advancements for efficiency and upholding the inherent nuances and diversity encapsulated within language.

Looking ahead, the symbiotic relationship between machine translation and human expertise is poised to define the future landscape of translation. The continual

refinement of NMT systems, coupled with the nuanced discernment of human translators, holds the key to overcoming current limitations. By embracing this synergy, the translation profession stands at the forefront of a transformative era, where technology augments human capabilities, leading to translations that seamlessly blend accuracy with artistic expression.

# METHODOLOGY

This study utilizes a multifaceted methodology to explore the complex process of translating technical terms, specifically those that follow the adjective + noun + noun-head (situation 9) and noun + noun-head (situation 8) structure from English to Spanish. Using the highly detailed scientific textbook "Cellular and Molecular Immunology" as our focal point, known for its intricate language and challenging translation tasks, our goal is to uncover the intricate difficulties experienced by both human translators and advanced AI/neural machine translation systems. The chosen text, an essential piece in the realm of cellular and molecular immunology, presents itself as a prime landscape for our examination. Packed with a plethora of multi-word phrases, it presents us with a myriad of linguistic hurdles to overcome. We aim to clarify the intricate nature of technical vocabulary, which often leads to confusion and differing understandings, ultimately affecting the accuracy and clarity of translations. To achieve our research goals, we meticulously analyze translations created by human translators and compare them with those produced by the latest AI-powered translation models. By combining linguistic and computational analyses and utilizing metrics like figures and tables from data tables, our study employs a mixed-methods framework to measure translation accuracy. This method allows for a comprehensive evaluation of translation quality. Our investigation also delves into the predominant translation strategies employed by both human and AI-based systems when faced with complex technical terms. This study has the potential to provide valuable insights into translation studies, which could serve as a strong starting point for future research in exploring machine translation in various technical fields.

## 1. Research design

In the following section, we will present an overview of our research design, detailing the overall approach and methodology utilized in our study, which centers on comparing various translation methods.

## 1.1 Introduction to Research Design

Non-experimental design analysis can be defined as a study where observation and measurement are applied to variables that are observed in their natural setting. The researcher does not have control over the variables. The researcher is limited to only observing, analyzing, and concluding.

Considering that this research will be centered in a text where variables will not be manipulated, it is asserted to conclude that it is observational, and, in some aspects, by analyzing the multi-word terms, we can conclude that it achieves aspects typical of a correlational design.

In the case of an experimental design study, it can be established the relation between a variable and its effects upon another. This type of design allows one to manipulate a variable to establish qualitatively and quantitatively its effect upon a dependent variable, controlling the rest of the parameters. That is, it can be determined accurately by the effect of manipulation. In the case of our study, these advantages can not be applied.

The main objective of our study is to compare different translation methods. It has a quantitative approach because we will compare Chat GPT and DeepL; and a translation made by a professional translator. For the gathering of data for this study we organized an extended amount of papers where Machine Translation, Artificial Intelligence, and human translation are compared.

The chapters of the text “Cellular and Molecular Immunology” that we chose to analyze are *Properties & Overview of Immune Responses*, *Cells & Tissues of the Immune System*, *Leukocyte Migration into Tissues*, *Innate Immunity*, *Antibodies & Antigens*, *Major Histocompatibility Complex Molecules & Antigen Presentation to T Lymphocytes*, *Immune Receptors & Signal Transduction*, *Lymphocyte Development & Antigen Receptor Gene Rearrangement*. These chapters were selected to cover a broad spectrum of biological concepts, allowing for a comprehensive evaluation of the translation methods across diverse subjects.

In the investigation, it will be determined if some errors do exist in the translation of multi-word terms made by MT in a scientific text in comparison with the translation of a professional human translator. It can be inferred from the above that it will not be a manipulation of variables but the comparison of the translation to analyze it, therefore, it will adjust to a nonexperimental design study that could allow us to answer the research question that has a relation with the quality of the definition of multi-word terms.

## 2. Participants

In this section, the population and sample will be explained. We gathered a total population of 257 different multi-word terms belonging to 8 and 9 situation ambiguities, which correspond to the sample aimed to discern the most accurate translation method between human translation and machine translation tools (Chat-GPT & DeepL).

We must clarify that we focused on the previously mentioned situations for their minor complexity, which at the same time represents less time wasting to the available time to conduct the investigation; these were selected from chapters 1-8 from the 2012 study “Cellular and Molecular Immunology”. However, we must note that we did not focus on the other situations due to their complexity and the lack of time to conduct the investigation.

### 2.1 Population and sample

For this research, we used and analyzed a scientific text regarding the area of cellular and molecular immunology called “Cellular and Molecular Immunology” (undergraduate thesis, masters). In the text mentioned, we gathered about 257 multi-word terms to analyze them from a professional and scientific perspective, so that our study can be made and firmly organized from the perspective of the main two situations of multiword terms or so-called ambiguities (situations 8 and 9).

We will also give a detailed observation regarding the use of translation techniques analyzed from the perspective of how good the translation is according to the metrics of the previously mentioned section.

## 2.2 Sampling procedure

The sampling procedure for the investigation is stratified. To begin our comparison between the translations of professional translators and machine translation tools, we gathered and selected a significant number of MWTs ambiguities of 8 and 9 situations, to know the different techniques used to translate the different ambiguities.

As our study uses a mixed model investigation, the qualitative portion of this study will adjust to a nonprobabilistic sampling model where the sample of interest is selected from the ST to compare it according to the type of translation. In this case, words of interest (multi-word terms) will be selected from the text chosen through the reading of the text in English. In this case, 8 chapters were selected aleatory from the ST, and from them 400 possible terms as words of interest were selected; from this sample, a minor number of them were selected to be compared because they represented multi-word terms.

As for the quantitative portion of the investigation, we will implement different metrics like tables and figures, which will be used to gather the information and data necessary to measure the coincidence rate between the different translations.

Through the compilation of information in a corpus related to an investigation, it can be determined which will be the most optimal model to develop the study. In this case, we choose a nonprobabilistic method, because the study will have a mixed model.

## 3. Data collection

Our study delves into the intricate investigation and exacting examination of techniques utilized by expert translators, comparing them with AI-powered machine translation resources such as ChatGPT and DeepL, which are accessible through online

platforms. Our specific focus lies in the formidable challenge of translating intricate technical terms within the realm of Cellular and Molecular Immunology. Given the inherent complexities of this field, a profound comprehension is imperative, recognizing the elevated risk of encountering diverse translation errors. Commencing our investigation, we undertook a comprehensive compilation of scholarly works spanning various academic outputs, encompassing undergraduate studies, theses, master dissertations, Ph.D. research, and articles. This compilation was facilitated by targeted keywords such as Machine Translation, Human Translation, Neural Machine Translation (NMT), DeepL, ChatGPT, and AI. To ensure a holistic perspective, we selected a substantial body of literature published since 2010. To improve accessibility and streamline the review of information, the collected studies were meticulously organized into distinct folders on the Google Drive platform, categorized by document type and publication year. A subsequent post-compilation phase involved a discerning categorization, emphasizing multi-word terms and ambiguities within the collected data. This meticulous data collection phase laid the groundwork for subsequent investigation stages. Following the compilation, we constructed diverse figures and graphs focusing on key aspects, including the total sample of multi-word terms, the frequency of ambiguities in translations, and the percentages of translation techniques deployed in different instances. In particular, we explored the congruence of techniques between official translations and machine translation tools and produced visual representations to encapsulate a comprehensive view of the information and results. These visual aids were designed to provide tangible insights and address the overarching research question that guides our investigation.

### 3.1 Instrumentation

For this research, we used various tools including ChatGPT, DeepL, Microsoft Excel, and PDF. We started by placing the selected extracts containing MWTs from the PDF source text (ST) "Cellular and Molecular Immunology" on an Excel spreadsheet, which we then separated into situations 8 and 9 ambiguities. Afterward, we searched the MWT extracts containing equivalents on the metatext to know which translation techniques were used to translate the ambiguities. After that, we made use of ChatGPT and DeepL to translate the ST

extracts to know what techniques the prior machine translation (MT) systems used to translate the ambiguities.

### 3.2 Procedure

For this research, we gathered information through extensive data recall, as the edited texts in the corpus could not satisfy the perspective of our study. In this case, the information collected included multi-word terms from Situations 8 and 9, which we then analyzed.

## 4. Variables

In this section, we will describe the different variables we found during the process of making this study.

### 4.1 Dependent and independent variables

Dependent variable:

1- The quality of the translation of multi-word terms in the context of a text in cellular and molecular immunology.

When it comes to the quality of the translations of multi-word terms, we observed that it relies on the techniques chosen by the MT tools and the translator, something that plays an important role, especially in an intricate subject with a wide range of technical languages like cellular and molecular immunology.

2- The capacity of the text process Chat-GPT can make.

Talking about the text processing of Chat-GPT we notice that even though it has a ton of different parameters that allow it to understand language, questions, complete sentences, etc. It is important to note that Chat-GPT processing is limited to the patterns and parameters that are learned during its training, so it can have limited knowledge in certain subjects and topics.

### 3- The knowledge of the TO of the human translator.

It is important to emphasize the knowledge of the translator responsible for the TO translation. In this case, the chosen text was translated by GEA Consultoria Editorial, which is an editorial specializing in medical and pharmaceutical translations. These translations are made by professionals in health science, therefore the used translation techniques would depend on the professional in charge.

Independent variables:

#### 1. Translation methods (Human translation, C-GPT, and DeepL)

When it comes to the human translation we choose the subject, the multi-word term, and the chapters that we use along with the ambiguities of 8 and 9 situations. Now talking about the translation tools, we determined the extracts where ambiguities were found, in the case of DeepL, we copied and pasted the translation made by this machine translator, and in the case of Chat-GPT, we used the prompt “Traduce:” to determine the results of its translation.

#### 2. Type of ambiguity according to the classification (8 or 9)

We decided to focus only on situations 8 and 9 ambiguities. A situation 8 ambiguity corresponds to the noun + noun-head (n + n) grammatical compound. Although it can contain more than two nouns and situation 9 ambiguity corresponds to the adjective + noun + noun-head (adj + n + n) grammatical compound. These were chosen for the simplicity of comparing them between the different corpora and also are the least time-consuming for the realization of the investigation.

#### 4.2 Control variables

Our research analyzes potential variations in translation quality by comparing three types of translation methods ensuring that the focus remains on the impact of ambiguity in translation. We can notice that the controllable variable is the selected document related to Cellular and molecular immunology, along with the type of ambiguities.

In addition, we must mention that to get the translation from ChatGPT, we made use of the prompt “Traduce:”, we chose this prompt because most people would use the most simple prompt while trying to use ChatGPT as a translation tool. However, it is important to note that the use of another prompt may have got us exhaustive and more complete results.

## 5. Reliability and validity

Translation is a complex process that involves a wide variety of requirements to reach the quality and precision it needs to be perfect. Our study relies on the reliability and validity aspects of the comparison of the translation of multi-word terms made by a human translator and machine translation tools, in the case of our investigation, ChatGPT and DeepL. Thus, we can find the significance of the study in the different levels of accuracy of the translations between the two translations types previously mentioned.

### 5.1 Reliability

To ensure the trustworthiness and reliability of our analytical approach, we meticulously devised a comprehensive strategy. Our primary analysis hinged on an interconnected array of linguistic uncertainties, employing diverse linguistic elements. The precision of our research was further fortified by the inclusion of original documents and their certified translations, facilitating an exhaustive examination of language features. To augment the legitimacy of our findings, we integrated theoretical frameworks associated with ambiguity. Specifically, we leveraged theories on linguistic ambiguity, delving into realms such as machine translation and translation techniques.

Originally intended to analyze three texts within the scientific domain, time constraints compelled us to narrow our focus to a singular text in the cellular and molecular immunology field. This text, rich in multi-word terms, provided a nuanced platform for the application of theories related to ambiguity and multi-word terms. The chosen text for scrutiny was "Structural Ambiguity for English Teachers" by Norman C. Stageberg from the University of Northern Iowa, serving as the basis for classifying ambiguities 8 and 9.

In the realm of translation techniques, our study incorporated texts authored by Molina and Hurtado (2004) as well as Peter Newmark (1988). We posit that the inclusion of these expert-authored texts enhances the reliability of our study, bolstering the legitimacy of our classifications for translation techniques. To ensure unwavering reliability, our investigation consistently applied predefined metrics and criteria, affording us the means to evaluate the quality of translations. This holistic approach underscores the thoroughness and credibility of our analytical framework, attesting to the robustness of our research methodology.

## 5.2 Validity

This research endeavor contributes to the establishment of construct validity through a meticulous examination of diverse translation methods within the nuanced domain of multi-word terms, specifically situated within the realm of cellular and molecular immunology. The inquiry delves into the intricacies of linguistic transformations, shedding light on the efficacy and accuracy of these methods in conveying the intricacies of scientific terminologies. Furthermore, the study ensures content validity by meticulously aligning its focus with the distinctive scientific terminology prevalent in the context of the selected text, "Cellular and Molecular Immunology." By meticulously navigating the intricacies of this specialized lexicon, the research fortifies the robustness of its content validity, ensuring a comprehensive and rigorous exploration of the chosen subject matter. This approach not only enhances the overall quality of the research but also underscores its relevance and applicability within the specific scientific discourse.

## 6. Data analysis

### 6.1 Introduction to Data Analysis

The main goal that we aimed to achieve during the whole process of our investigation, was to bring out information about the possible existence of inaccuracies that can be committed by machine translation tools, in the case of our study the selected translation tools

are ChatGPT and DeepL, in the context of the official translation of the cellular and molecular immunology text “Cellular and Molecular Immunology.”

We achieved this through a comparison that was conducted between the different translation techniques that were used by the professional translator, and the machine translation tools to translate multi-word terms from 8 and 9 situations. The previous situations form part of the study “Structural Ambiguity for English Teachers” by Stateberg (1968).

First, we collected the multi-word terms from the source text on an Excel table to categorize them and determine the type of situation. This was done with all the translations to determine the techniques that were used. By doing so, we could determine in general terms, the quality of the different translations that were analyzed, between human and machine translation tools. This data could allow us to give a complete answer to address the research questions and objectives discussed in the introduction of our investigation.

#### 6.1.1 Statistical Analysis Plan

Initially, a thorough compilation of multi-word terms was conducted, specifically addressing ambiguities in situations 8 and 9 within the text "Cellular and Molecular Immunology." Following this meticulous recollection, a discerning process unfolded, wherein ambiguities deemed unsuitable for the investigation were dismissed. From an initial pool of 400 multi-word terms, a refined selection of 257 terms emerged. This curation was dictated by a criterion necessitating the presence of a capital letter, functioning fundamentally as a noun within the specific field, as exemplified by terms like "Memory B lymphocytes."

After this meticulous term selection, a comprehensive analysis unfolded through the lens of diverse figures designed to delineate the percentage of translation technique utilization across official translation and machine translation tools, gauging their respective levels of accuracy. Within the context of this study, these figures serve as informative conduits, shedding light on the translation performance of all participants—human translation, ChatGPT, and DeepL. It is noteworthy that the selected figures derive their

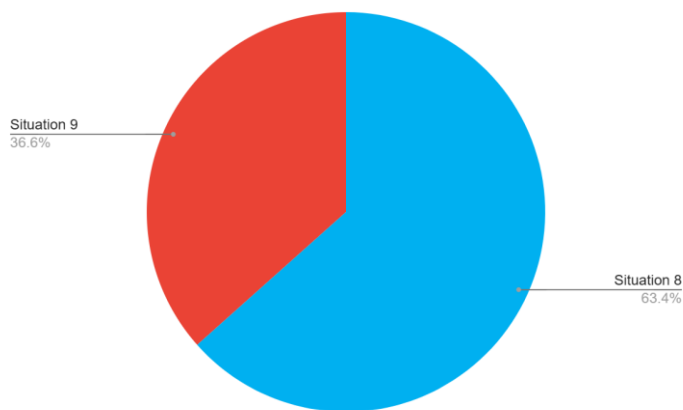
validity from a robust foundation established through a critical review of pertinent literature and theoretical frameworks elucidated earlier by the authors.

### 6.1.2 Data presentation

The graphs and figures are organized according to the type of translator (HT, ChatGPT, and DeepL), the translation technique used, the number of multi-word terms selected, the type of category (8 or 9), and the number of each category.

#### **Figure 1**

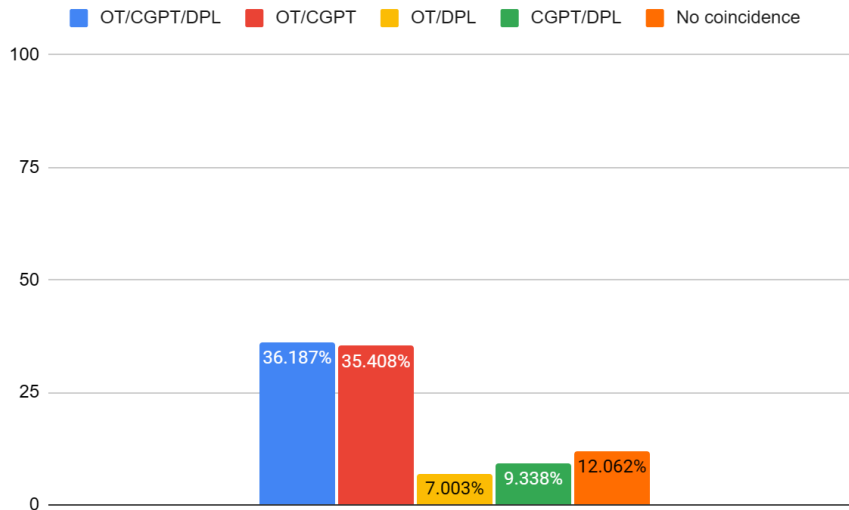
*Total of the sample (257)*



The total sample of 257 multi-word terms, represents 100%. The samples of situation 8 multi-word terms are distributed in 163, representing 63% of the total sample. On the other hand, situation 9 multi-word terms are 94, which represents 36% of the total sample.

#### **Figure 2**

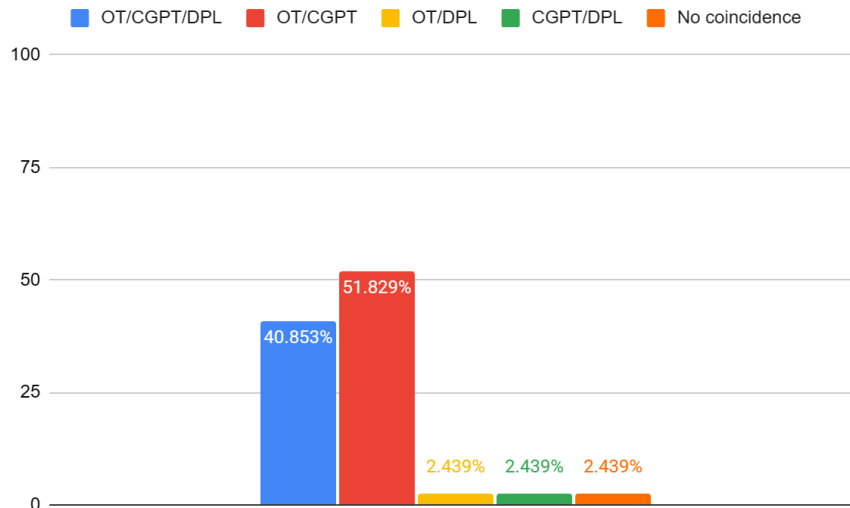
*Coincidences in situation 8 and 9 combined*



In the context delineated in the preceding Figure 2, a comprehensive analysis was conducted on the amalgamation of multi-word terms extracted from situations 8 and 9, resulting in a consolidated group numbering 257 instances, constituting 100% of the dataset. Within this corpus, meticulous scrutiny was executed across three distinct translators, namely the Human translator, Chat GPT, and DeepL, with a focus on discerning the extent of concurrence in their respective translations. Notably, instances of unanimous consensus among all translators (OT/CGPT/DPL) were observed 92 times, accounting for 36% of the total dataset. Further delineating this convergence, the alignment between the official translator and Chat GPT (OT/CGPT) was noted on 93 occasions, representing 35% of the overarching dataset. Conversely, the alignment between the official translator and DeepL (OT/DPL) materialized 18 times, constituting a 7% manifestation. Equally noteworthy, instances of mutual agreement between Chat GPT and DeepL (CGPT/DPL) occurred 23 times, contributing to a 9% concordance. In a distinct facet, a non-negligible 31 instances, equivalent to 12.062% of the total, revealed a lack of consensus among all three translators (No coincidence). This nuanced and comprehensive evaluation underscores the variances and agreements inherent in the translation outputs of these diverse linguistic systems, shedding light on the intricacies of their respective performances.

**Figure 3**

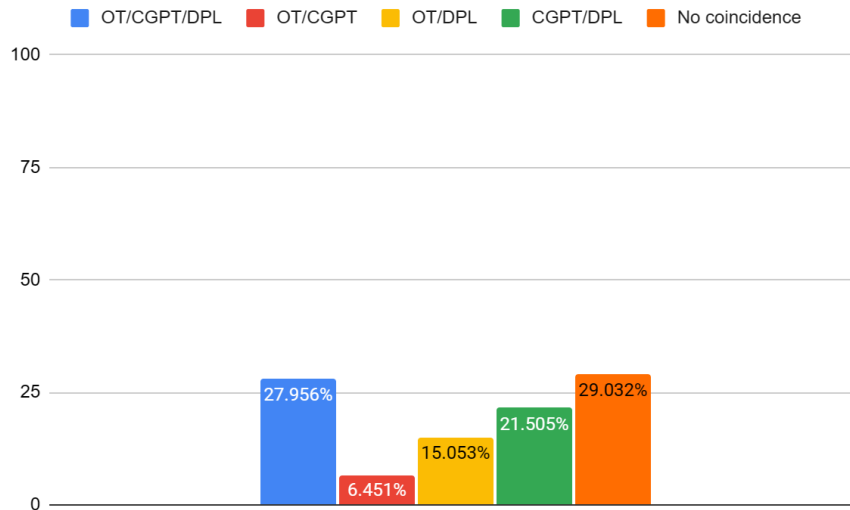
*Coincidences of translations on situation 8 multi-word terms.*



In examining Figure 1, it is discerned that within situation 8, a noteworthy compilation of 163 multi-word terms was made, constituting a substantial 63% of the total. A meticulous evaluation ensued, involving a comparative analysis of three distinct translators: the Human translator, Chat GPT, and DeepL. Within this framework, various categories were scrutinized. Notably, instances, where all three translators—official translator (OT), Chat GPT (CGPT), and DeepL (DPL)—converged upon an identical translation, amounted to 66 occurrences, signifying a notable 40% of the overall dataset. Furthermore, the alignment between the official translator and Chat GPT (OT/CGPT) was observed 85 times, representing a significant 51% of the total instances. In stark contrast, occurrences, where the official translation and DeepL (OT/DPL) coincided, were minimal, constituting a mere 2% of the overall dataset, totaling 4 instances. Similarly, instances of coherence between Chat GPT and DeepL (CGPT/DPL) were scant, totaling 3 occurrences and accounting for 2% of the comprehensive evaluation. It is also pertinent to note that there were 4 instances where none of the translators achieved coincidence, representing a nominal 2% of the entire dataset. This comprehensive analysis sheds light on the nuanced comparative performance of these translators within the specific context of situation 8, offering valuable insights into their respective alignments and divergences.

**Figure 4**

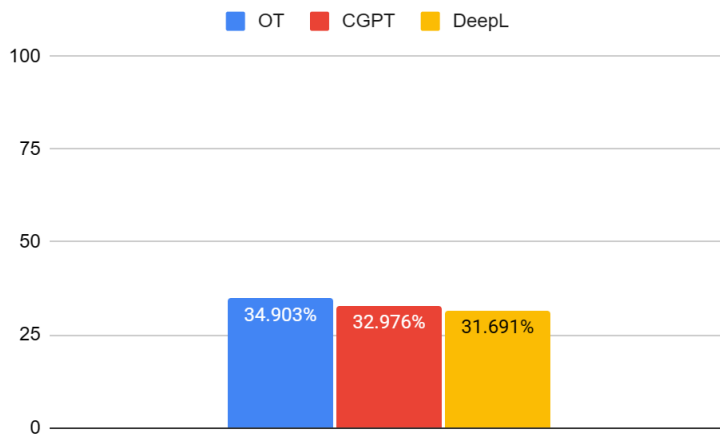
*Coincidences of translations on situation 9 multi-word terms*



In the assessment of nine distinct multi-word terms within a group of 94 instances, constituting 36% of the total, a comprehensive analysis was conducted to compare the translation outcomes produced by three distinct entities: human translators (referred to as OT), Chat GPT, and DeepL. The instances in which all translators, encompassing OT, CGPT, and DPL, harmoniously converged on identical translations amounted to 26, representing 27.956% of the entire dataset. Within this convergence, specific correlations were identified, notably 6 instances (6.451%) where the official translator (OT) and Chat GPT (CGPT) synchronized in their translations, 14 instances (15.053%) aligning the official translator (OT) with DeepL (DPL), and 20 instances (21.505%) wherein Chat GPT (CGPT) and DeepL (DPL) achieved mutual consensus in their outputs. In contrast, there were 27 instances (29.032%) characterized by a lack of concurrence among any of the translators, thus labeled as "No coincidence." After this quantitative delineation, an elucidation of the distinct translation techniques employed by each translator—official translation, Chat GPT, and DeepL—was undertaken, with a nuanced differentiation based on the delineated situations, namely 8 and 9. This analytical framework provides a nuanced perspective on the comparative efficacy and divergent methodologies employed by human and machine translation systems across varied linguistic scenarios.

### **Figure 5**

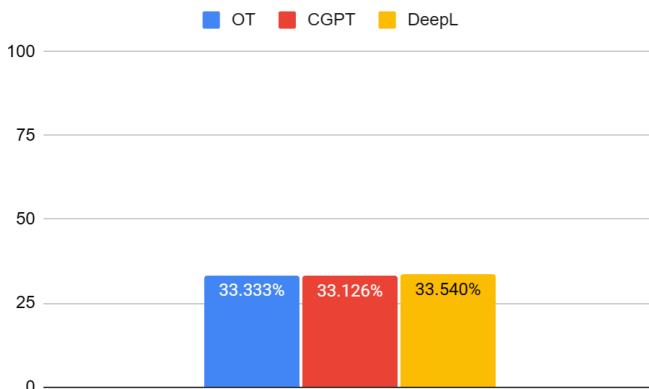
*Recognized translation applied on situation 8 multi-word terms*



In examining the application of recognized translations to multi-word terms in situation 8, the data presented in the preceding Figure 5 reveals insightful patterns among the participating translators. The official translation (OT) emerged as a frequent choice, employing recognized translations a total of 163 times, constituting a notable 34.903% of the entire sample. Following closely, ChatGPT (CGPT) demonstrated its linguistic prowess with 154 instances, comprising a substantial 32.976% of the overall sample. Meanwhile, DeepL (DPL) exhibited a robust performance by utilizing recognized translations 148 times, representing a significant 31.691% of the total sample. This nuanced analysis sheds light on the distinctive approaches employed by each translator in navigating the complex landscape of multi-word term translations in situation 8.

**Figure 6**

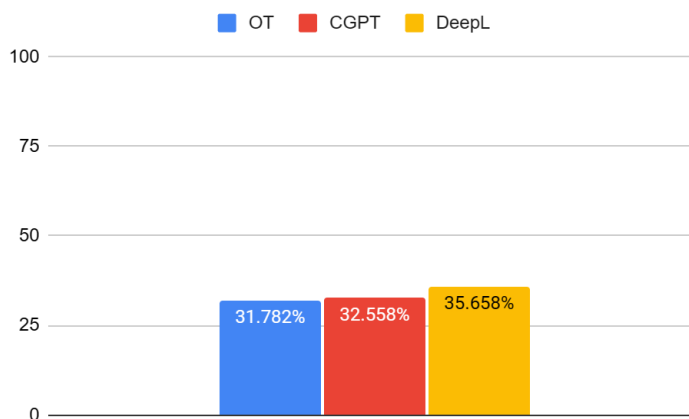
*Calque applied on situation 8 multi-word terms*



In the comparative analysis of translation methodologies, the official translation (OT) exhibits a discernible predilection for calques, with a notable frequency of 161 instances, constituting precisely 33.333% of the comprehensive sample under scrutiny. Conversely, ChatGPT (CGPT) demonstrates a comparable propensity for calquing, employing this technique 160 times, which accounts for a slightly lower percentage at 33.126%. The machine translation model DeepL (DPL) similarly engages in calque usage, albeit with a marginally higher frequency of 162 occurrences, representing 33.540% of the entire dataset. It is intriguing to note the closely aligned preferences for calque utilization across the diverse translation approaches, indicating a nuanced convergence in linguistic strategy. This parallelism, underscored by the near-equivalent percentages, underscores the intricate interplay between human and machine-driven translation methodologies and raises pertinent questions about the underlying mechanisms shaping these linguistic choices.

**Figure 7**

*Transposition applied to situation 8 multi-word terms*

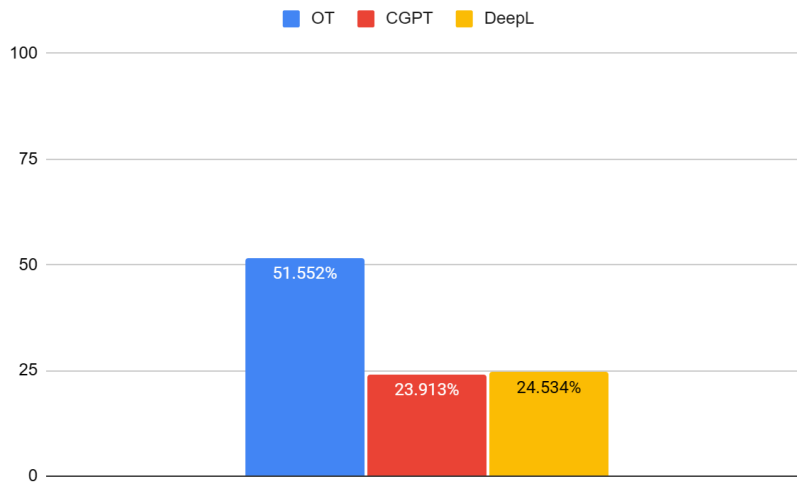


In the comparative analysis of three translation models—namely, the official translation (OT), ChatGPT (CGPT), and DeepL (DPL)—transposition emerged as a notable phenomenon. Remarkably, the OT exhibited a transposition frequency of 41 instances, constituting 31.782% of the entire sample. Notably, CGPT closely followed suit, employing transposition 42 times, representing a slightly higher percentage at 32.558%. In contrast, DeepL exhibited the highest transposition utilization, employing this linguistic strategy 46 times and accounting for 35.658% of the total sample. This discernible variance in transposition frequency among the three models underscores the nuanced approaches they

adopt in rendering textual content, shedding light on the distinctive idiosyncrasies embedded within their translation algorithms. Consequently, these findings contribute valuable insights into the diverse stylistic choices and linguistic preferences employed by each model, fostering a deeper understanding of their respective translation techniques.

**Figure 8**

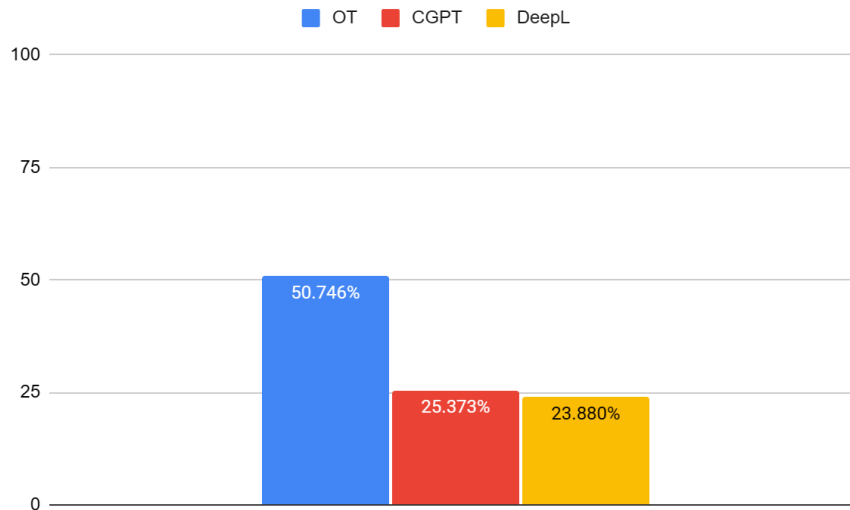
*Recognized translation applied on situation 9 multi-word terms*



In the comprehensive analysis of translation outputs, the official translation (OT) emerged as the most frequently employed, accounting for a substantial 51.552% of the entire sample. ChatGPT (CGPT) and DeepL (DPL), while demonstrating proficiency, exhibited a nuanced distribution, with CGPT utilizing recognized translations 23.913% of the time and DPL slightly surpassing at 24.534%. Upon close analysis of these percentages, it becomes apparent that each translation method employs a unique approach, highlighting the diverse usage patterns that play a crucial role in determining the overall effectiveness of the respective systems.

**Figure 9**

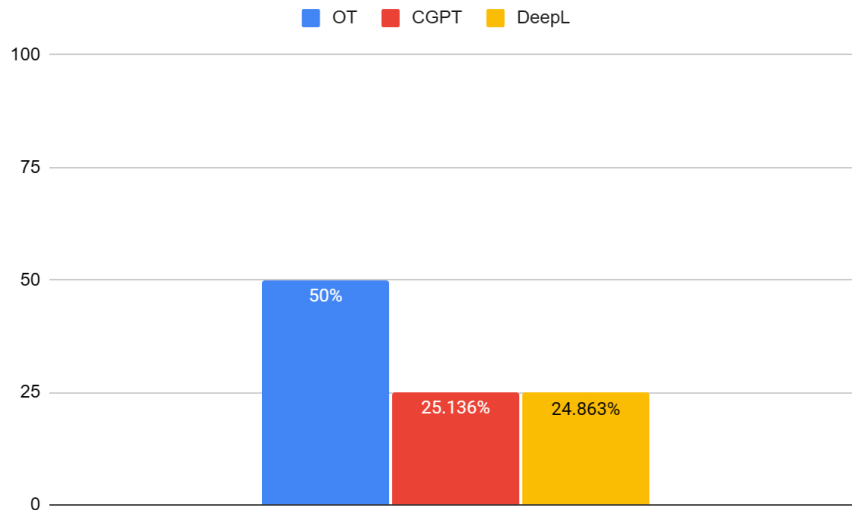
*Transposition applied on situation 9 multi-word terms*



In the comparative analysis of translation outputs, the official translation (OT) exhibited a discernible predilection for transposition, employing this syntactic strategy a noteworthy 34 times, thereby constituting 50.746% of the comprehensive sample. In contrast, ChatGPT (CGPT) demonstrated a more tempered reliance on transposition, implementing it 17 times, equivalent to 25.373% of the overall sample. Similarly, DeepL (DPL) showcased a nuanced usage of transposition, employing it 16 times and accounting for 23.880% of the entire sample. These findings illuminate the divergent stylistic choices made by the three translation models, underscoring the distinct syntactic approaches employed in their respective renditions.

**Figure 10**

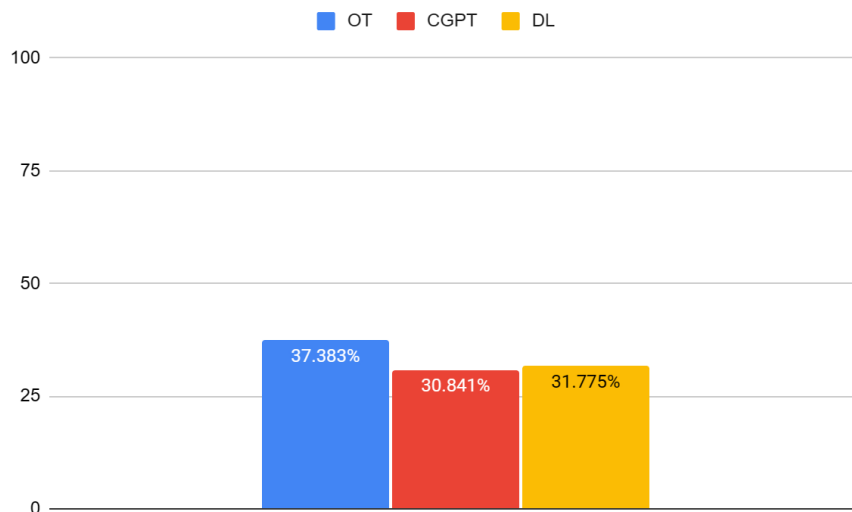
*Calque applied on situation 9 multi-word terms*



In the linguistic analysis of the provided sample, the official translation (OT) stands out for its frequent utilization of calque, employing this translation technique a total of 183 times, constituting a substantial 50% of the entire sample. Meanwhile, ChatGPT (CGPT) demonstrates a notable usage of calque with a count of 92 instances, representing a significant 25.136% of the total sample. DeepL (DPL) closely follows, employing calque 91 times, making up 24.863% of the sample. These results highlight the unique translation methods used by each system, providing insight into their individual preferences and tactics when conveying linguistic content.

**Figure 11**

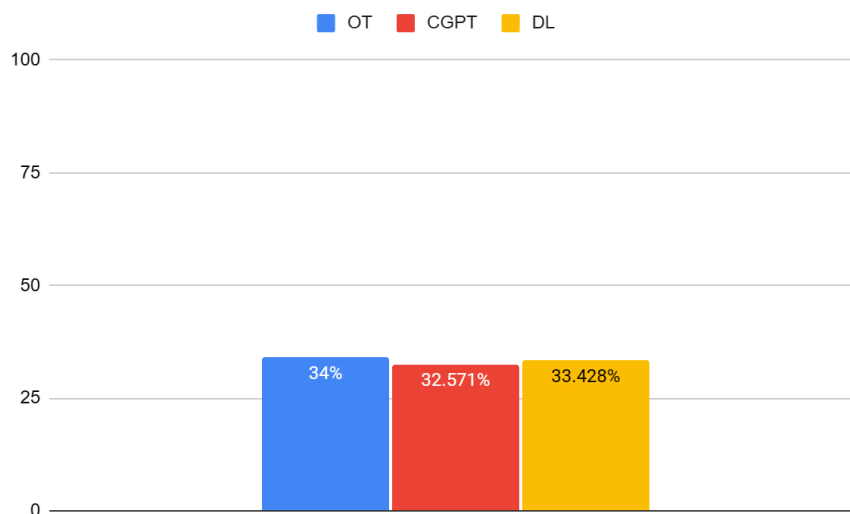
*Calque, Recognized translation, and Transposition used in situation 8 multi-word terms*



In the context of multi-word terms within Situation 8, diverse translation techniques were employed, and the breakdown reveals intriguing patterns among the three entities: original translation (OT), Chat GPT (CGPT), and DeepL (DL). The utilization of calque, recognized translation, and transposition by OT amounted to a total of 40 instances, constituting 37.383% of its translations. In comparison, CGPT demonstrated a nuanced approach, employing these techniques 33 times, representing 30.841% of its translations. Similarly, DL exhibited a comparable complexity, employing calque, recognized translation, and transposition a total of 34 times, reflecting a 31.775% utilization rate. By examining how translation strategies handle multi-word terms in a specific scenario, it becomes evident that these approaches have diverse linguistic capabilities and preferences for dealing with such terms.

**Figure 12**

*Calque and Recognized translation used in situation 8 multi-word terms*

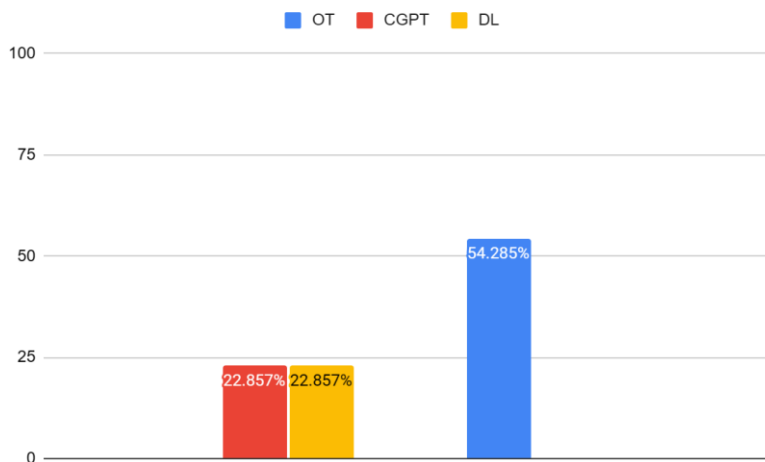


In Situation 8 involving multi-word terms, three distinct translation techniques, namely calque, recognized translation, and transposition, were employed across three translation methods: original translation (OT), Chat GPT (CGPT), and DeepL (DL). Notably, OT utilized these techniques a total of 119 times, constituting 34% of its overall application. In comparison, CGPT exhibited a slightly lower frequency, employing the combination 114 times, accounting for 32.571%. Meanwhile, DL closely trailed behind with a total of 117 instances, representing 33.428%. The data reveals a complex and varied landscape of

translation techniques, highlighting a consistent use of calques, recognized translations, and transpositions across all three entities analyzed.

**Figure 13**

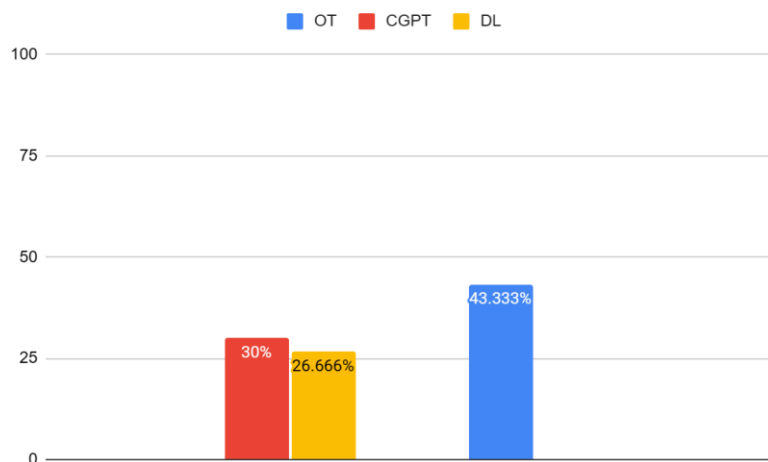
*Calque, Recognized translation, Transposition in situation 9 multi-word terms*



In the context of multi-word terms within Situation 9, three distinct translation techniques—calque, recognized translation, and transposition—were employed by three different translation sources: original translation (OT), Chat GPT (CGPT), and DeepL (DL). Notably, OT demonstrated the highest frequency of utilization, employing these techniques a total of 19 times, constituting a substantial 54.285% of instances. On the other hand, CGPT and DL exhibited a comparable pattern, each utilizing these strategies eight times, representing 22.857% for both models. This breakdown underscores a nuanced distribution of translation methods across the three sources, with OT demonstrating a relatively higher reliance on these techniques. The detailed exploration of these translation patterns contributes valuable insights into the varied approaches adopted by OT, CGPT, and DL in handling multi-word terms within the specified context.

**Figure 14**

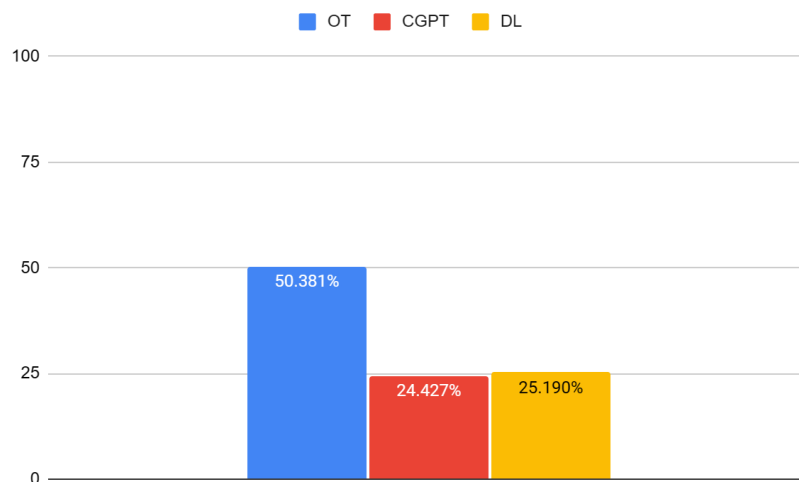
*Calque and Transposition in situation 9 multi-word terms*



In situation 9 involving multi-word terms, the utilization of translation techniques is elucidated through quantitative analysis, focusing on original translation (OT), Chat GPT (CGPT), and DeepL (DL). Notably, Chat GPT employed a combination of calque, recognized translation, and transposition on nine occasions, constituting a notable 30% of the total instances. Meanwhile, DeepL demonstrated a slightly lower frequency, employing these techniques eight times, equivalent to 26.666%.

**Figure 15**

*Calque, recognized translation in situation 9 multi-word terms*



In elucidating the translation techniques applied within the context of multi-word terms in situation 9, distinctive patterns emerge across original translations (OT), ChatGPT (CGPT), and DeepL (DL). Notably, OT exhibited a prevalence of 50.381%, employing calque, recognized translation, and transposition a total of 132 times. In contrast, CGPT

demonstrated a nuanced utilization of these techniques, accounting for 24.427% with 64 instances. Meanwhile, DL exhibited a comparable proficiency, registering a frequency of 25.190%, translating through the amalgamation of calque, recognized translation, and transposition in 66 instances.

**Table 1**

*Situation 8 multi-word terms when all coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DeepL)
blood stream	torrente sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation	torrente sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective]	torrente sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective]
mast cell surface	superficie del mastocito	calque, recognized translation	superficie del mastocito	calque, recognized translation	superficie del mastocito	calque, recognized translation
Tumor necrosis factor	Factor de necrosis tumoral	calque, recognized translation	Factor de necrosis tumoral	calque, recognized translation	factor de necrosis tumoral	calque, recognized translation

In Table 1 situation 8 multi-word terms where all coincided were gathered, there are 3 situation 8 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 2**

*Situation 8 multi-word terms none of them coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
cytokine producers	productoras de la citocina	calque, recognized translation	productoras de citocina	calque, recognized translation	productores de citocina	calque, recognized translation
leukocyte integrins	integrinas del leucocito	calque, recognized translation	integrinas de los leucocitos	calque, recognized translation	integrinas leucocitarias	calque, transposition (leukocyte>leucocitarias) [noun>adjective], recognized translation
leukocyte membrane glycoprotein	leukocyte membrane glycoprotein	calque, recognized translation	glicoproteína de membrana leucocitaria	calque, transposition (leukocyte>leucocitaria) [noun>adjective], recognized translation	glicoproteína de la membrana de los leucocitos	calque, recognized translation

In Table 2 situation 8 multi-word terms where none of them coincided were gathered, there are 3 situation 8 multi-word terms from the cellular and molecular immunology text

selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 3**

*Situation 8 multi-word terms CGPT and DPL coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
blood vessels	vasos sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation	vasos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective]	vasos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective]
control mechanisms	mecanismos del control	calque, recognized translation	mecanismos de control	calque, recognized translation	mecanismos de control	calque, recognized translation
pepsin proteolysis	proteólisis limitada con pepsina	calque, recognized translation	proteólisis con pepsina	calque, recognized translation	proteólisis con pepsina	calque, recognized translation

In Table 3 situation 8 multi-word terms where CGPT and DPL coincided were gathered, there are 3 situations 8 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 4**

*Situation 8 multi-word terms CGPT and OT coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
antibody molecules	moléculas de anticuerpo	calque, recognized translation	moléculas de anticuerpo	calque, recognized translation	moléculas de anticuerpos	calque, recognized translation
lifesaving treatment	tratamiento capaz de salvarle la vida	calque, linguistic expansion, recognized translation	tratamiento capaz de salvarle la vida	calque, linguistic expansion, recognized translation	tratamiento que salva vidas	calque, recognized translation
pattern recognition receptors	receptores para el reconocimiento del patrón	calque, recognized translation	receptores para el reconocimiento del patrón	calque, recognized translation	receptores de reconocimiento de patrones	calque, recognized translation

In Table 4 situation 8 multi-word terms where CGPT and OT coincided were gathered, there are 3 situation 8 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 5***Situation 8 multi-word terms OT and DPL coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
antibody isotypes	isotipos de anticuerpo	calque, recognized translation	isotipos de anticuerpos	calque, recognized translation	isotipos de anticuerpo	calque, recognized translation
coagulation factors	factores de coagulación	calque, recognized translation	factores de la coagulación	calque, recognized translation	factores de coagulación	calque, recognized translation
myeloma cells	células de mieloma	calque, recognized translation	células del mieloma	calque, recognized translation	células de mieloma	calque, recognized translation

In Table 5 situation 8 multi-word terms where OT and DPL coincided were gathered, and there are 3 situation 8 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 6***Situation 9 multi-word terms when all coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DeepL)
acute phase proteins	proteínas de fase aguda	calque, recognized translation	proteínas de fase aguda	calque, recognized translation	proteínas de fase aguda	calque, recognized translation
antimicrobial defense mechanisms	mecanismos de defensa antimicrobiana	calque, recognized translation	mecanismos de defensa antimicrobiana	calque, recognized translation	mecanismos de defensa antimicrobiana	calque, recognized translation
cellular and biochemical defense mechanisms	mecanismos de defensa celulares y bioquímicos	calque, recognized translation	mecanismos de defensa celulares y bioquímicos	calque, recognized translation	mecanismos de defensa celulares y bioquímicos	calque, recognized translation

In Table 6 situation 9 multi-word terms where all coincide were gathered, there are 3 situation 9 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 7***Situation 9 multi-word terms none of them coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
heavy chain protein	cadena pesada	calque, linguistic comprehension, recognized translation	proteína completa de la cadena pesada	calque	proteína completa de cadena pesada	calque
Natural Killer Cells	Linfocitos citolíticos naturales	calque, recognized translation	Células Asesinas Naturales o Células NK	calque, recognized translation	Células asesinas naturales	calque, recognized translation
particular receptor gene locus	locus génico particular	calque, transposition (gene>geníco) [noun>adjective], linguistic comprehension (receptor), recognized translation	locus génico particular del receptor	calque, transposition (gene>geníco) [noun>adjective]	locus génico receptor concreto	calque, transposition (gene>geníco) [noun>adjective]

In this Table 7 situation, 9 multi-word terms where *none of them coincided* were gathered, and there are 3 situations 9 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 8***Situation 9 multi-word terms CGPT and DPL coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
endothelial cell migration	migración de célula endotelial	calque, recognized translation	migración de células endoteliales	calque, recognized translation	migración de células endoteliales	calque, recognized translation
frozen section assay	análisis en sección congelada	calque, recognized translation	ensayo de sección congelada	calque	ensayo de sección congelada	calque
specialized defense mechanisms	mecanismos de defensa especializados	calque, recognized translation	mecanismos de defensa más especializados	calque, recognized translation	mecanismos de defensa más especializados	calque, recognized translation

In Table 8, situation 9 multi-word terms where *CGPT and DPL coincided* were gathered, there are 3 situations 9 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 9***Situation 9 multi-word terms CGPT and OT coincided*

ST (source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
mononuclear phagocyte system	sistema fagocítico mononuclear	calque, transposition (phagocyte>fagocítico) [noun>adjective], recognized translation	sistema fagocítico mononuclear	calque, transposition (phagocyte>fagocítico) [noun>adjective], recognized translation	sistema de fagocitos mononucleares	calque, recognized translation
side chain theory	teoría de las cadenas laterales	calque, recognized translation	teoría de las cadenas laterales	calque, recognized translation	teoría de la cadena lateral	calque, recognized translation
Southern blot analysis	análisis de Southern blot	calque, recognized translation	análisis de Southern blot	calque, recognized translation	análisis Southern blot	calque, recognized translation

In Table 9, situation 9 multi-word terms where *CGPT and OT coincided* were gathered, there are 3 situations 9 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

**Table 10***Situation 9 multi-word terms OT and DPL coincided*

ST(source text)	MWT ES (official translation)	Translation technique (OT)	MWT ES (Chat-GPT)	Translation technique (CGPT)	MWT ES (DeepL)	Translation technique (DPL)
interrupted blood supply	interrupción del riego sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation	interrupción del suministro sanguíneo	calque, transposition(blood>sanguíneo) [noun>adjective]	interrupción del riego sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation
small blood vessel	pequeño vaso sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation	vaso sanguíneo pequeño	calque, transposition(blood>sanguíneo) [noun>adjective], recognized translation	pequeño vaso sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation
specific target genes	genes diana específicos	calque, recognized translation	genes específicos	calque, recognized translation	genes diana específicos	calque, recognized translation

In Table 10, situation 9 multi-word terms where *OT and DPL coincided* were gathered, and there are 3 situations 9 multi-word terms from the cellular and molecular immunology text selected to be analyzed. In the table, the translations of official translation, Chat-GPT, and DeepL can be observed.

## 6.2 Translation Equivalence Analysis

In this part, translation equivalence analysis about the data gathered will be analyzed.

### 6.2.1 Identification of Equivalents

In this section, we delve into the analysis of translation equivalence for the terminological terms translated by machine translation tools, namely CGPT and DeepL, focusing on the domain of cellular and molecular immunology. Our emphasis on multi-word terms aligns with the classification process outlined in the preceding literature. Employing a qualitative approach, we scrutinized the translated terms for classification accuracy, while a quantitative approach was utilized to gauge their alignment with the human translation in the original Spanish text. In Situation 8, a notable observation emerged: CGPT employed calque 160 times, contrasting with OT's employment of 161 instances, and DeepL's use of calque 162 times. Transposition, as a translation technique for multi-word terms, exhibited varied utilization: OT featured 41 occurrences, CGPT 42 instances, and DeepL 46 instances. The recognition of translation as a technique unfolded as follows: OT applied it 163 times, CGPT 154 times, and DeepL 148 times. Situation 9 unfolded distinct patterns, with OT employing calque 183 times, CGPT 92 times, and DeepL 91 times. Noteworthy is the use of transposition in this context, where CGPT implemented it 17 times, in contrast to OT's 34 instances and DeepL's 16 instances. The application of recognized translation techniques in multi-word terms during Situation 9 manifested as follows: OT utilized this technique 166 times, CGPT 77 times, and DeepL 79 times. The systematic classification of identified equivalents in this investigation aligns with the framework provided by the relevant literature.

## 6.3 Discussion of Findings

### 6.3.1 Analysis of Translation Choices

In scrutinizing the data within the ambit of this research, several discernible factors merit consideration. Notably, in the translation of multi-word terms on situation 8, CGPT demonstrates a commendable proficiency, ostensibly rooted in its adept handling of constructions predominantly comprised of noun + noun-head constructs. This capability

suggests an ability to glean pertinent information from its neural database, thereby facilitating rudimentary translations in response to prompts. Furthermore, the database content exhibits notable semblance to the source text (ST). It is imperative to acknowledge, however, that while all translators exhibit a heightened coincidence rate, the efficacy of CGPT in this context is particularly pronounced. Conversely, in the context of situation 9 multi-word terms, CGPT exhibits a marked diminution in accuracy vis-à-vis the original text (OT). This discrepancy is ascribed to the inherent complexity of these terms, wherein the incorporation of adjectives engenders heightened intricacy in comprehending the ST. The rationale for CGPT's suboptimal performance lies in its non-specialized design, rendering it susceptible to errors in the face of intricate linguistic nuances. Nonetheless, even amidst this contrast, instances of unanimous agreement among all translators persist at a considerable frequency. This underscores the potential for an overarching attribution of high coincidence in translation methodologies, independent of the distinctive factors inherent in the dataset. It prompts the consideration that such shared instances of consensus may serve as salient markers in diverse investigative contexts, notwithstanding the intrinsic challenges posed by specific lexical complexities.

### 6.3.2 Interpretation of Results

In this segment, we delve into a meticulous analysis of the gathered data to interpret the results obtained. The investigation uncovered pivotal insights into the accuracy of machine translation tools, particularly in translating multi-word terms amid ambiguities encountered in situations 8 and 9. Notably, a profound dissimilarity in accuracy levels between DeepL (DPL) and ChatGPT emerged from an examination of the coincidence among various translations. Figure 3 elucidates that ChatGPT exhibited the highest level of correspondence, boasting a 51% alignment with the official translation—a translation executed by a specialized medical and pharmaceutical translator. Remarkably, this places ChatGPT nearly on par with the official translation, employing similar translation techniques. Conversely, DeepL lagged significantly with a mere 2% coincidence with the official translation in situation 8. Moving to Figure 4, the unexpected revelation unfolds as DeepL achieves a 15% coincidence rate in situation 9, surpassing ChatGPT, which attains a 6% coincidence rate. This intriguing shift in ChatGPT's performance suggests a nuanced

challenge in handling situation 9 ambiguities. Recognizing DeepL as a purpose-built MT tool and ChatGPT as a generative pre-trained transformer, a logical deduction emerges—their performance may falter in situations where context-dependent nuances, such as English adjectives, play a pivotal role. Consequently, the overall analysis discerns that ChatGPT and DeepL exhibited a modest accuracy level when confronted with situation 9 ambiguities, possibly attributed to the contextual variability of English adjectives—a contributing factor to the disparity observed in Figure 4 relative to the earlier results in Figure 3.

### 6.3.3 Implications

In the course of our research, an in-depth analysis was conducted on a text within the domain of Cellular and Molecular Immunology. We contend that future investigations should delve into additional categories of ambiguities and encompass diverse textual genres, given that our scrutiny was confined to a singular scientific text within the realm of cellular and molecular immunology. Furthermore, there exists an untapped avenue for exploration in the realm of ChatGPT prompts, with potential consideration for forthcoming iterations of the model released by OpenAI. It is imperative to underscore that our current inquiry exclusively delved into the capabilities of ChatGPT 3.5. Moreover, it is worth noting that the examination focused solely on situations involving multi-word terms in contexts 8 and 9.

## 7. Conclusion of the Methodology

In the comprehensive assessment of machine translation tools, specifically DeepL (DPL) and ChatGPT (CGPT), against official translation (OT), the focus centered on scrutinizing the translation of multi-word terms, specifically addressing situation 8 (n + n) and 9 (adj + n + n) ambiguities within a cellular and molecular immunology textbook. The comparison unveiled distinct translation qualities and prevalent techniques employed by each tool, revealing calque, recognized translation, and transposition as frequently utilized methods. Intriguingly, the examination of situation 8 ambiguities displayed CGPT's superior accuracy, with a 51% coincidence with OT compared to DPL's meager 2%. Conversely, in the case of situation 9 ambiguities, the OT demonstrated a 54% usage of calque, recognized translation, and transposition techniques, diverging significantly from DPL and CGPT,

which exhibited a mere 22% usage. The translation coincidence for situation 9 saw a notable 27% alignment between OT, CGPT, and DPL, emphasizing the nuanced challenges posed by adjectives in English translations. Notably, while CGPT excelled in situation 8, its performance dropped to a 6% coincidence in situation 9, contrasting with DPL's surprising 15% alignment. This discrepancy was attributed to the inherent nature of CGPT as a generative pre-trained transformer, not specifically tailored for translation, versus DPLs designed to focus on translation tasks. In summary, the comparative analysis illuminated varied strengths and weaknesses between DPL and CGPT, contingent on the specific translation scenario. CGPT demonstrated prowess in handling situation 8 ambiguities, potentially due to its training data emphasizing simpler texts. However, DPL showcased superior alignment with OT in situation 9, reflecting its purposeful development as a translation tool. Despite their potential as post-editing tools, both systems may introduce inaccuracies, particularly in translating multi-word terms, as evidenced by variations in gender, number, and grammatical element order. Additionally, the observed tendency of machine translation systems to alter the grammatical category of nouns highlights an important consideration in their application.

# CONCLUSION

## 1. Achievement of Aim and Objectives

The primary objective of this research was to conduct a comparative analysis of multi-word term translations in situations 8 and 9 from English to Spanish, focusing on AI systems' renditions (specifically, DeepL and ChatGPT) in contrast to the original human translation of the text "Cellular and Molecular Immunology." The study sought to scrutinize disparities in the translations of multi-word terms across the text's chapters, elucidating the extent of deviation from human translation. Employing advanced translation techniques, the investigation aimed to delineate the methodologies employed in both human and AI translations. Notably, an examination of situation 8 multi-word terms revealed a prevalence of calque techniques, suggesting that ChatGPT, especially with a basic prompt, finds practical utility in post-editing scenarios. In stark contrast, an analysis of situation 9 multi-word terms indicated that DeepL emerged as a superior choice for post-editing due to its adept handling of lexical ambiguities, potentially attributable to its advanced programming that enables precise comprehension of adjectives and other grammatical elements. The speculation arises that ChatGPT, not explicitly designed for translation purposes, may lack the nuanced linguistic understanding exhibited by DeepL in navigating such complexities.

## 2. Research Questions Revisited

In the assessment of translation accuracy between ChatGPT and the automatic translator DeepL, a comprehensive analysis was conducted, focusing on scenarios 8 and 9. Notably, ChatGPT emerged as the superior choice in the translation of  $n + n$  multi-word terms, showcasing heightened accuracy. However, challenges arose when employing ChatGPT for  $adj + n + n$  multi-word terms, primarily due to the intricacies presented by English adjectives.

Turning attention to a comparison between ChatGPT's approach and that of professional translators, despite being a relatively recent tool, ChatGPT demonstrated commendable terminological accuracy. Metrics consistently underscored ChatGPT's performance as more aligned with official translations, particularly in scientific contexts. This implies that in the scientific field, ChatGPT approaches human translator accuracy more closely than its counterpart, DeepL.

An exploration of the translation techniques employed by DeepL and ChatGPT revealed commonalities in their approaches. Calque, Transposition, and Recognized translation emerged as predominant techniques across various translations, playing a crucial role in maintaining consistency. While certain less prevalent techniques were identified, these common approaches underscored the sophistication of both language models.

In the broader context of consistency across translators—official translation, ChatGPT, and DeepL—an overall analysis indicated that these translators coincided in approximately 35.797% of the sample. This alignment specifically pertained to the translation techniques employed for multi-word terms within the sample, highlighting certain similarities in their respective approaches.

Examining ChatGPT's role in post-editing processes, the tool exhibited utility, particularly when translating Situation 8 multi-word terms. Its capacity to comprehend and accurately translate simpler structures rendered it a valuable asset. However, limitations surfaced in translating Situation 9 multi-word terms, attributed to the complexity of adjectives within the context of cellular and molecular immunology. Consequently, while ChatGPT proves beneficial in certain post-editing scenarios, careful considerations must be made for nuanced and intricate language contexts.

### 3. Methodological Reflection

#### 3.1 Limitations

One notable limitation pertains to the restricted scope within a singular scientific domain, rather than encompassing a broader array of subject matter. The compilation, comprising fewer than 500 multi-word terms, falls short of offering a comprehensive assessment of translation accuracy by machine translation tools within this specific scientific area under investigation. A more expansive and varied set of terms, exceeding 500 in number, would have been immensely beneficial in refining the precision of the evaluation. Such an approach would provide deeper insights into the efficacy of the analyzed machine translation tools in handling the intricate language within this distinct scientific field, thereby enhancing the overall robustness and applicability of the findings.

### 3.2 Contributions to the Field

In delving into contributions within the realm of translation, our literature review for data analysis revealed a conspicuous gap, notably in the studies about the translation of multi-word terms, particularly those of 8 and 9 situations within the Cellular and Molecular Immunology domain. This lacuna prompted our focused investigation into the text "Cellular and Molecular Immunology," wherein we sought to conduct a comparative analysis of translations generated by two advanced language models, namely GPT-3 and DeepL. The significance of this discovery lies in its potential to illuminate novel perspectives in the arena of translation, particularly concerning the nuanced rendering of multi-word terms in the scientific context of cellular and molecular immunology. Concurrently, our exploration delves into the evolving landscape of generative pre-trained transformers, with particular emphasis on the widespread societal impact of these tools. Beyond its immediate implications, we posit that this inquiry serves as a pivotal cornerstone for future investigations, extending its relevance beyond our current domain to encompass the translation challenges of multi-word terms in diverse technical domains.

### 3.3 Future Research Directions

Our investigation centered on elucidating the intricacies of multi-word terms in situations 8 and 9. Given their prevalence across diverse technical science fields,

the developed system holds promise for application in varied technical domains in subsequent research endeavors. Future investigations could delve into additional grammatical facets, such as scrutinizing gender bias in articles, implementing machine translation techniques, and conducting in-depth analyses. Notably, there lies potential in exploring ways in which this tool can assist professional translators as a post-editing instrument, given the myriad options and responses generated by machine translation tools like DeepL and ChatGPT, contingent upon contextual nuances and varying prompts. In the context of our study, we harnessed the power of AI using ChatGPT (Version 3.5, unveiled in 2022) with a fundamental prompt ('Traduce:', the Spanish equivalent of 'Translate:'). Prospective researchers can chart new paths by investigating future iterations of ChatGPT, such as GPT-4, or experimenting with diverse prompts to yield distinct translation outputs. Additional future research directions may encompass exploring the tool's adaptability to specialized technical jargon and investigating its efficacy in real-time translation scenarios, thereby expanding the scope of its practical applications.

To further enrich the discussion on future research in translation studies, particularly in the context of neural machine translation and syntactic ambiguity of multi-word terms in scientific translation within the era of post-editing, it would be beneficial to consider the following aspects:

- Investigate the potential of fine-tuning neural machine translation models, like ChatGPT, specifically for domain-specific terminology in scientific disciplines. This could address the challenge of accurately translating complex multi-word terms that are prevalent in specialized fields.
- Investigate the potential of fine-tuning neural machine translation models, like ChatGPT, specifically for domain-specific terminology in scientific disciplines. This could address the challenge of accurately translating complex multi-word terms that are prevalent in specialized fields.
- Explore methodologies for effective collaboration between human translators and AI tools during the post-editing phase. This could involve designing user interfaces that facilitate seamless interaction, providing translators with the

ability to guide or influence the model's output based on their expertise and contextual understanding.

Our investigation highlights ChatGPT's potential in translating multi-word terms across scientific domains. Future research should explore gender bias, machine translation techniques, and post-editing applications. Researchers are encouraged to investigate fine-tuning for domain-specific terminology, consider advanced models like GPT-4, and explore collaborative approaches between human translators and AI tools for more effective post-editing. This concise approach sets the stage for advancing neural machine translation in scientific contexts.

#### 4. Conclusion Recap

This research successfully achieved its main objective of comparing human translation with NMT, particularly focusing on the translation of multi-word terms in scientific texts, specifically in the field of cellular and molecular immunology. The study explored various aspects of machine translation, such as translation techniques employed by tools like ChatGPT, and identified both the pros and cons of machine translation. The findings highlight the significance of understanding and adapting to new technologies, emphasizing the role of AI tools like ChatGPT as valuable aids rather than replacements for human translators. The research suggests avenues for future exploration, including analyzing different types of texts, languages, and AI tools, and underscores the broader implications of AI advancements in various domains. Additionally, the study recognizes the evolving landscape of MT and its potential impact on fields beyond language, such as art, music, geopolitics, and economics. Overall, the research contributes valuable insights to the ongoing discourse on the integration of AI in translation processes and its wider implications in our globally connected world.

AI and post-editing have revolutionized the translation landscape, particularly benefiting the scientific translation industry, freelance translators, and translation studies students. AI, exemplified by neural machine translation, accelerates precision in handling complex terminology, while post-editing ensures human refinement for

accuracy. Freelancers leverage AI's efficiency for increased project capacity, and students gain a competitive edge by integrating these technologies into their education, aligning their skills with industry trends. Ultimately, this synergy between AI and human expertise optimizes translation processes, offering a future-ready approach that combines speed, precision, and cultural subtlety.

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## ANNEX 1 – SITUATIONS 8 AND 9

N°	Note	N°	Note
1	Multi-word term (MWT) in the source text (ST)	7	Multi-word term (DeepL)
2	ST Multi-word term pattern	8	Translation technique (DeepL)
3	Multi-word term (Official Spanish translation, OST)	9	All three MWT coincide
4	Translation technique (Official Spanish translation)	10	MWTs in Chat-GPT and DeepL coincide
5	Multi-word term (Chat-GPT)	11	MWTs in OST and DeepL coincide
6	Translation technique (Chat-GPT)	12	MWTs in OST and Chat-GPT coincide
		13	The three MWT do not match

S8. The table below shows the information about the situation 8 and the different translations and techniques used by the different translation tools, followed by the chart used to identify where the count of the differences and similarities existed.

1	2	3	4	5	6	7	8	9	10	11	12	13
Adaptor Proteins	n + n	proteínas adaptadoras	calque, transposition (adaptor>adaptora) [noun>adjective], recognized translation	proteínas adaptadoras	calque, transposition (adaptor>adaptora) [noun>adjective]	proteínas adaptadoras	calque, transposition (adaptor>adaptora) [noun>adjective]	<input checked="" type="checkbox"/>				
adhesion molecule	n + n	moléculas de adhesión	calque, recognized translation	moléculas de adhesión	calque, recognized translation	moléculas de adhesión	calque, recognized translation	<input checked="" type="checkbox"/>				
adult vertebrates	n + n	vertebrados adultos	calque, recognized translation	vertebrados adultos	calque, recognized translation	vertebrados adultos	calque, recognized translation	<input checked="" type="checkbox"/>				
affinity maturation	n + n	maduración de la afinidad	calque, recognized translation	maduración de la afinidad	calque, recognized translation	maduración de afinidad	calque, recognized translation			<input checked="" type="checkbox"/>		
antibody isotypes	n + n	isotipos de anticuerpo	calque, recognized translation	isotipos de anticuerpos	calque, recognized translation	isotipos de anticuerpo	calque, recognized translation				<input checked="" type="checkbox"/>	
antibody molecules	n + n	moléculas de anticuerpo	calque, recognized translation	moléculas de anticuerpo	calque, recognized translation	moléculas de anticuerpos	calque, recognized translation			<input checked="" type="checkbox"/>		
antibody repertoire	n + n	repertorio de anticuerpos	calque, recognized translation	repertorio de anticuerpos	calque, recognized translation	repertorio de anticuerpos	calque, recognized translation	<input checked="" type="checkbox"/>				
antibody response	n + n	respuesta de anticuerpos	calque, recognized translation	respuesta de anticuerpos	calque, recognized translation	respuesta de anticuerpos	calque, recognized translation	<input checked="" type="checkbox"/>				
antibody structure	n + n	estructura del anticuerpo	calque, recognized translation	estructura del anticuerpo	calque, recognized translation	estructura de los anticuerpos	calque, recognized translation			<input checked="" type="checkbox"/>		
Antigen Dependence	n + n	Dependencia del antígeno	calque, recognized translation	Dependencia del antígeno	calque, recognized translation	dependencia del antígeno	calque, recognized translation	<input checked="" type="checkbox"/>				
antigen entry	n + n	entrada del antígeno	calque, recognized translation	entrada del antígeno	calque, recognized translation	entrada del antígeno	calque, recognized translation	<input checked="" type="checkbox"/>				
antigen receptor genes	n + n + n	genes del receptor para el antígeno	calque, recognized translation	genes del receptor para el antígeno	calque, recognized translation	genes receptores de antígenos	calque, recognized translation			<input checked="" type="checkbox"/>		
antigen receptors	n + n	receptores para el antígeno	calque, recognized translation	receptores de antígenos	calque, recognized translation	receptores de antígenos	calque, recognized translation	<input checked="" type="checkbox"/>				
antigen recognition	n + n	reconocimiento del antígeno	calque, recognized translation	reconocimiento del antígeno	calque, recognized translation	reconocimiento de antígenos	calque, recognized translation			<input checked="" type="checkbox"/>		

antigen stimulation	n + n	estimulación por el antígeno	calque, recognized translation	estimulación por el antígeno	calque, recognized translation	estimulación con antígenos	calque, recognized translation			<input checked="" type="checkbox"/>		
antigene challenge	n + n	estímulo antigénico	calque, recognized translation	estímulo antigénico	calque, recognized translation	provocación con antígenos	calque, recognized translation			<input checked="" type="checkbox"/>		
benzene ring	n + n	anillo benceno	calque, recognized translation	anillo benceno	calque, recognized translation	anillo bencénico	calque, transposition (benzene>bencénico) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>		
Blood cell formation	n + n + n	formación de células sanguíneas	calque, transposition (blood>sanguíneas) [noun>adjective], recognized translation	formación de células sanguíneas	calque, transposition (blood>sanguíneas) [noun>adjective], recognized translation	formación de células sanguíneas	calque, transposition (blood>sanguíneas) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>				
blood coagulation pathways	n + n + n	vías de coagulación de la sangre	calque, recognized translation	vías de coagulación de la sangre	calque, recognized translation	vías de la coagulación sanguínea	calque, transposition (blood>sanguínea) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>		
blood group antigens	n + n + n	antígenos del grupo sanguíneo	calque, recognized translation	antígenos de grupo sanguíneo	calque, recognized translation	antígenos del grupo sanguíneo	calque, recognized translation				<input checked="" type="checkbox"/>	
Blood neutrophils	n + n	neutrófilos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective], recognized translation	neutrófilos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective]	neutrófilos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective]	<input checked="" type="checkbox"/>				
blood proteins	n + n	proteínas sanguíneas	calque, transposition (blood>sanguíneas) [noun>adjective], recognized translation	proteínas sanguíneas	calque, transposition (blood>sanguíneas) [noun>adjective]	proteínas sanguíneas	calque, transposition (blood>sanguíneas) [noun>adjective]	<input checked="" type="checkbox"/>				
blood stream	n + n	torrente sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation	torrente sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective]	torrente sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective]	<input checked="" type="checkbox"/>				
blood vessels	n + n	vasos sanguíneo	calque, transposition (blood>sanguíneo) [noun>adjective], recognized translation	vasos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective]	vasos sanguíneos	calque, transposition (blood>sanguíneos) [noun>adjective]		<input checked="" type="checkbox"/>			
body fluids	n + n	líquidos corporales	calque, transposition (body>corporales) [noun>adjective], recognized translation	líquidos corporales	calque, transposition (body>corporales) [noun>adjective], recognized translation	fluidos corporales	calque, transposition (body>corporales) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>		
bone marrow	n + n	médula ósea	calque, transposition (bone>ósea) [noun>adjective], recognized translation	médula ósea	calque, transposition (bone>ósea) [noun>adjective]	médula ósea	calque, transposition (bone>ósea) [noun>adjective]	<input checked="" type="checkbox"/>				
bone marrow precursors	n + n + n	precursores de la médula ósea	calque, transposition (bone>ósea) [noun>adjective], recognized translation	precursores de la médula ósea	calque, transposition (bone>ósea) [noun>adjective], recognized translation	precursores de médula ósea	calque, transposition (bone>ósea) [noun>adjective]			<input checked="" type="checkbox"/>		
bone marrow progenitors	n + n + n	progenitores de la médula ósea	calque, transposition (bone>ósea) [noun>adjective], recognized translation	progenitores de la médula ósea	calque, transposition (bone>ósea) [noun>adjective], recognized translation	progenitores de médula ósea	calque, transposition (bone>ósea) [noun>adjective]			<input checked="" type="checkbox"/>		

calcium pyrophosphate crystals	n + n + n	cristales de calcio de pirofosfato	calque, recognized translation	cristales de calcio de pirofosfato	calque, recognized translation	cristales de pirofosfato cálcico	calque, transposition (calcium>cálcico) [noun>adjective]			<input checked="" type="checkbox"/>		
carboxyl terminus	n + n	carboxilo terminal	calque, recognized translation	carboxilo terminal	calque, recognized translation	extremo carboxilo	calque, recognized translation			<input checked="" type="checkbox"/>		
cell culture techniques	n + n + n	técnicas de cultivo celular	calque, transposition (cell>celular) [noun>adjective], recognized translation	técnicas de cultivo celular	calque, transposition (cell>celular) [noun>adjective]	técnicas de cultivo celular	calque, transposition (cell>celular) [noun>adjective]	<input checked="" type="checkbox"/>				
cell cycle arrest	n + n + n	parada del ciclo celular	calque, transposition (cell>celular) [noun>adjective], recognized translation	parada del ciclo celular	calque, transposition (cell>celular) [noun>adjective], recognized translation	detención del ciclo celular	calque, transposition (cell>celular) [noun>adjective]			<input checked="" type="checkbox"/>		
cell motility	n + n	células en reposo	calque, recognized translation	células en reposo	calque, recognized translation	motilidad celular	calque, transposition (cell>celular) [noun>adjective]			<input checked="" type="checkbox"/>		
cell surface	n + n	superficie celular	calque, recognized translation	superficie celular	calque, recognized translation	superficie celular	calque, recognized translation	<input checked="" type="checkbox"/>				
cell surface protein	n + n + n	proteína de superficie celular	calque, transposition (cell>celular) [noun>adjective], recognized translation	proteína de superficie celular	calque, transposition (cell>celular) [noun>adjective], recognized translation	proteína de la superficie celular	calque, transposition (cell>celular) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>		
chemokine receptors	n + n	receptores para quimiocinas	calque, recognized translation	receptores para quimiocinas	calque, recognized translation	receptores de quimiocinas	calque, recognized translation			<input checked="" type="checkbox"/>		
coagulation factors	n + n	factores de coagulación	calque, recognized translation	factores de la coagulación	calque, recognized translation	factores de coagulación	calque, recognized translation				<input checked="" type="checkbox"/>	
colon cancer	n + n	cáncer de colon	calque, recognized translation	cáncer de colon	calque, recognized translation	cáncer de colon	calque, recognized translation	<input checked="" type="checkbox"/>				
complement fragments	n + n	fragmentos del complemento	calque, recognized translation	fragmentos del complemento	calque, recognized translation	fragmentos del complemento	calque, recognized translation	<input checked="" type="checkbox"/>				
complement receptors	n + n	receptores para el complemento	calque, recognized translation	receptores para el complemento	calque, recognized translation	receptores del complemento	calque, recognized translation			<input checked="" type="checkbox"/>		
complement system	n + n	sistema del complemento	calque, recognized translation	sistema del complemento	calque, recognized translation	sistema del complemento	calque, recognized translation	<input checked="" type="checkbox"/>				
concentration gradient	n + n	gradiente de concentración	calque, recognized translation	gradiente de concentración	calque, recognized translation	gradiente de concentración	calque, recognized translation	<input checked="" type="checkbox"/>				
consensus polyadenylation sites	n + n + n	lugares de poliadenilación de consenso	calque, recognized translation	lugares de poliadenilación de consenso	calque, recognized translation	sitios de poliadenilación consensuados	calque, transposition (consensus>consensuados) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>		
control mechanisms	n + n	mecanismos del control	calque, recognized translation	mecanismos de control	calque, recognized translation	mecanismos de control	calque, recognized translation		<input checked="" type="checkbox"/>			
cowpox pustule	n + n	pústula de viruela vacuna	calque, recognized translation	pústula de viruela vacuna	calque, recognized translation	pústula de la viruela bovina	calque, recognized translation			<input checked="" type="checkbox"/>		
cysteine residues	n + n	cisteínas del carboxilo	calque, recognized translation	cisteínas	linguistic compression, recognized translation	residuos de cisteína	calque, recognized translation					<input checked="" type="checkbox"/>
cytokine producers	n + n	productoras de la citocina	calque, recognized translation	productoras de citocina	calque, recognized translation	productores de citocina	calque, recognized translation					<input checked="" type="checkbox"/>
cytokine receptors	n + n	receptores de citocinas	calque, recognized translation	receptores de citocinas	calque, recognized translation	receptores de citoquinas	calque, recognized translation			<input checked="" type="checkbox"/>		
cytokine synthesis	n + n	síntesis de las citocinas	calque, recognized translation	síntesis de las citocinas	calque, recognized translation	síntesis de citocinas	calque, recognized translation			<input checked="" type="checkbox"/>		

Death domain	n + n	Dominio mortal	calque, transposition (death>mortal) [noun>adjective], recognized translation	Dominio mortal	calque, transposition (death>mortal) [noun>adjective], recognized translation	dominio de muerte	calque, recognized translation				<input checked="" type="checkbox"/>		
diphtheria toxin	n + n	toxina diftérica	calque, transposition (diphtheria>diftérica) [noun>adjective], recognized translation	toxina diftérica	calque, transposition (diphtheria>diftérica) [noun>adjective], recognized translation	toxina diftérica	calque, transposition (diphtheria>diftérica) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
diphtheria infection	n + n	difteria	linguistic compression, recognized translation	difteria	linguistic compression, recognized translation	infección diftérica	calque, transposition (diphtheria>diftérica) [noun>adjective], recognized translation				<input checked="" type="checkbox"/>		
dissociation constant	n + n	constante de disociación	calque, recognized translation	constante de disociación	calque, recognized translation	constante de disociación	calque, recognized translation	<input checked="" type="checkbox"/>					
disulfide bonds	n + n	enlaces disulfuro	calque, recognized translation	enlaces disulfuro	calque, recognized translation	enlaces disulfuro	calque, recognized translation	<input checked="" type="checkbox"/>					
disulfide bridge	n + n	enlace disulfuro	calque, recognized translation	enlace disulfuro	calque, recognized translation	puente disulfuro	calque, recognized translation				<input checked="" type="checkbox"/>		
effector functions	n + n	funciones efectoras	calque, transposition (efector>efectora) [noun>adjective], recognized translation	funciones efectoras	calque, transposition (efector>efectora) [noun>adjective], recognized translation	funciones efectoras	calque, transposition (efector>efectora) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
Effector lymphocytes	n + n	linfocitos efectores	calque, transposition (efector>efectores) [noun>adjective], recognized translation	linfocitos efectores	calque, transposition (efector>efectores) [noun>adjective], recognized translation	linfocitos efectores	calque, transposition (efector>efectores) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
effector mechanisms	n + n	mecanismos efectores	calque, transposition (efector>efectores) [noun>adjective], recognized translation	mecanismos efectores	calque, transposition (efector>efectores) [noun>adjective], recognized translation	mecanismos efectores	calque, transposition (efector>efectores) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
effector molecules	n + n	Moléculas efectoras	calque, transposition (efector>efectoras) [noun>adjective], recognized translation	moléculas efectoras	calque, transposition (efector>efectoras) [noun>adjective], recognized translation	moléculas efectoras	calque, transposition (efector>efectoras) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
efferent lymphatics	n + n	linfáticos eferentes	calque, recognized translation	linfáticos eferentes	calque, recognized translation	linfáticos eferentes	calque, recognized translation	<input checked="" type="checkbox"/>					
Electron micrograph	n + n	microfotografía electrónica	calque, transposition (electron>electrónica) [noun>adjective], recognized translation	Microfotografía electrónica	calque, transposition (electron>electrónica) [noun>adjective], recognized translation	micrografía electrónica	calque, transposition (electron>electrónica) [noun>adjective], recognized translation				<input checked="" type="checkbox"/>		
enzyme Artemis	n + n	enzima Artemisa	calque, recognized translation	enzima Artemisa	calque, recognized translation	enzima Artemisa	calque, recognized translation	<input checked="" type="checkbox"/>					
enzyme myeloperoxidase	n + n	enzima mieloperoxidasa	calque, recognized translation	enzima mieloperoxidasa	calque, recognized translation	enzima mieloperoxidasa	calque, recognized translation	<input checked="" type="checkbox"/>					
gamma globulins	n + n	globulinas gamma	calque, recognized translation	globulinas gamma	calque, recognized translation	gammaglobulinas	calque, recognized translation				<input checked="" type="checkbox"/>		
Gene ablation studies	n + n + n	estudios de eliminación de genes	calque, recognized translation	estudios de eliminación de genes	calque, recognized translation	estudios de ablación génica	calque, transposition (gene>génica) [noun>adjective], recognized translation				<input checked="" type="checkbox"/>		
gene expression	n + n	expresión génica	calque, transposition (gene>génica)	expresión génica	calque, transposition (gene>génica)	expresión genética	calque, transposition (gene>genética)				<input checked="" type="checkbox"/>		

			[noun>adjective], recognized translation		[noun>adjective], recognized translation		[noun>adjective], recognized translation						
germline organization	n + n	organización en línea germinal	calque, recognized translation	organización en línea germinal	calque, recognized translation	organización de la línea germinal	calque, recognized translation				<input checked="" type="checkbox"/>		
granule exocytosis	n + n	exocitosis de los gránulos	calque, recognized translation	exocitosis de los gránulos	calque, recognized translation	exocitosis de gránulos	calque, recognized translation				<input checked="" type="checkbox"/>		
growth factors	n + n	factores de crecimiento	calque, recognized translation	factores de crecimiento	calque, recognized translation	factores de crecimiento	calque, recognized translation	<input checked="" type="checkbox"/>					
horse serum antibodies	n + n + n	anticuerpos séricos equinos	calque, transposition (serum>séricos) [noun>adjective], recognized translation	anticuerpos séricos equinos	calque, transposition (serum>séricos) [noun>adjective], recognized translation	anticuerpos de suero de caballo	calque, transposition (serum>séricos) [noun>adjective], recognized translation				<input checked="" type="checkbox"/>		
host cell plasma membranes	n + n + n + n	membrana plasmática del anfitrión	calque, transposition (plasma>plasmática) [noun>adjective], linguistic compression, recognized translation	membrana plasmática del anfitrión	calque, transposition (plasma>plasmática) [noun>adjective], linguistic compression, recognized translation	membranas plasmáticas de las células huésped	calque, transposition (plasma>plasmáticas) [noun>adjective]				<input checked="" type="checkbox"/>		
host cells	n + n	células del anfitrión	calque, recognized translation	células del anfitrión	calque, recognized translation	células huésped	calque, recognized translation				<input checked="" type="checkbox"/>		
host defense	n + n	defensa del anfitrión	calque, recognized translation	defensa del anfitrión	calque, recognized translation	defensa del huésped	calque, recognized translation				<input checked="" type="checkbox"/>		
host molecules	n + n	moléculas del anfitrión	calque, recognized translation	moléculas del anfitrión	calque, recognized translation	moléculas del huésped	calque, recognized translation				<input checked="" type="checkbox"/>		
host response	n + n	respuesta del anfitrión	calque, recognized translation	respuesta del anfitrión	calque, recognized translation	respuesta del huésped	calque, recognized translation				<input checked="" type="checkbox"/>		
human genome	n + n	genoma humano	calque, recognized translation	genoma humano	calque, recognized translation	genoma humano	calque, recognized translation	<input checked="" type="checkbox"/>					
human myeloma protein	n + n + n	proteína del mieloma humano	calque, recognized translation	proteína del mieloma humano	calque, recognized translation	proteína de mieloma humano	calque, recognized translation				<input checked="" type="checkbox"/>		
insulin receptor	n + n	receptor para la insulina	calque, recognized translation	receptor para la insulina	calque, recognized translation	receptor de insulina	calque, recognized translation				<input checked="" type="checkbox"/>		
Integrin activation	n + n	Activación de integrinas	calque, recognized translation	Activación de integrinas	calque, recognized translation	Activación de la integrina	calque, recognized translation				<input checked="" type="checkbox"/>		
Integrin Ligands	n + n	Ligandos de integrina	calque, recognized translation	Ligandos de integrina	calque, recognized translation	Ligandos de integrinas	calque, recognized translation				<input checked="" type="checkbox"/>		
intrachain disulfide bonds	n + n + n	enlaces disulfuro intracatenarios	calque, transposition (intrachain>intracatenarios) [noun>adjective], recognized translation	enlaces disulfuro intracatenarios	calque, transposition (intrachain>intracatenarios) [noun>adjective], recognized translation	enlaces disulfuro intracadena	calque, transposition (intrachain>intracadena) [noun>adjective], recognized translation				<input checked="" type="checkbox"/>		
kinase domain	n + n	Dominio cinasa	calque, recognized translation	Dominio cinasa	calque, recognized translation	dominio cinasa	calque, recognized translation	<input checked="" type="checkbox"/>					
Kupffer cells	n + n	células de Kupffer	calque, recognized translation	células de Kupffer	calque, recognized translation	células de Kupffer	calque, recognized translation	<input checked="" type="checkbox"/>					
leader exon	n + n	exón líder	calque, recognized translation	exón líder	calque, recognized translation	exón líder	calque, recognized translation	<input checked="" type="checkbox"/>					
Lectin pathway	n + n	Vía de la lectina	calque, recognized translation	Vía de la lectina	calque, recognized translation	vía de las lectinas	calque, recognized translation				<input checked="" type="checkbox"/>		
leukocyte integrins	n + n	integrinas del leucocito	calque, recognized translation	integrinas de los leucocitos	calque, recognized translation	integrinas leucocitarias	calque, transposition (leukocyte>leucocitarias) [noun>adjective], recognized translation						<input checked="" type="checkbox"/>

leukocyte membrane glycoprotein	n + n + n	glucoproteína de membrana del leucocito	calque, recognized translation	glicoproteína de membrana leucocitaria	calque, transposition (leukocyte>leucocitaria) [noun>adjective], recognized translation	glicoproteína de la membrana de los leucocitos	calque, recognized translation								<input checked="" type="checkbox"/>	
lifesaving treatment	n + n	tratamiento capaz de salvarle la vida	calque, linguistic amplification, recognized translation	tratamiento capaz de salvarle la vida	calque, linguistic amplification, recognized translation	tratamiento que salva vidas	calque, recognized translation									<input checked="" type="checkbox"/>
lineage commitment	n + n	compromiso en la línea	calque, recognized translation	compromiso en la línea	calque, recognized translation	compromiso de linaje	calque									<input checked="" type="checkbox"/>
Lipid Kinase	n + n	lípidio cinasa	calque, recognized translation	lípidio cinasa	calque, recognized translation	quinasa lipídica	calque, transposition (lipid>lipídica) [noun>adjective], recognized translation									<input checked="" type="checkbox"/>
lipid molecules	n + n	moléculas lipídicas	calque, transposition (lipid>lipídica) [noun>adjective], recognized translation	moléculas lipídicas	calque, transposition (lipid>lipídica) [noun>adjective], recognized translation	moléculas de lípidos	calque, recognized translation									<input checked="" type="checkbox"/>
lipid substrates	n + n	sustratos lipídicos	calque, transposition (lipid>lipídicos) [noun>adjective], recognized translation	sustratos lipídicos	calque, transposition (lipid>lipídicos) [noun>adjective], recognized translation	sustratos lipídicos	calque, transposition (lipid>lipídicos) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>								
lymph nodes	n + n	ganglios linfáticos	calque, transposition (limph>linfáticos) [noun>adjective], recognized translation	ganglios linfáticos	calque, transposition (limph>linfáticos) [noun>adjective], recognized translation	ganglios linfáticos	calque, transposition (limph>linfáticos) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>								
lymphocyte clone	n + n	clon de linfocitos	calque, recognized translation	clon de linfocitos	calque, recognized translation	clon de linfocitos	calque, recognized translation	<input checked="" type="checkbox"/>								
lymphocyte development	n + n	desarrollo del linfocito	calque, recognized translation	desarrollo del linfocito	calque, recognized translation	desarrollo linfocitario	calque, transposition (limph>linfocitario) [noun>adjective], recognized translation									<input checked="" type="checkbox"/>
lymphocyte lineages	n + n	líneas de los linfocitos	calque, recognized translation	líneas de los linfocitos	calque, recognized translation	linaje de linfocitos	calque, recognized translation									<input checked="" type="checkbox"/>
lymphocyte maturation	n + n	maduración del linfocito	calque, recognized translation	maduración del linfocito	calque, recognized translation	maduración de los linfocitos	calque, recognized translation									<input checked="" type="checkbox"/>
lymphocyte population	n + n	población de linfocitos	calque, recognized translation	población de linfocitos	calque, recognized translation	población de linfocitos	calque, recognized translation	<input checked="" type="checkbox"/>								
lymphocyte precursors	n + n	precursores comprometidos del linfocito	calque, recognized translation	precursores comprometidos del linfocito	calque, recognized translation	precursores comprometidos de linfocitos	calque, recognized translation									<input checked="" type="checkbox"/>
mannose receptor	n + n	receptor de manosa	calque, recognized translation	receptor de manosa	calque, recognized translation	receptor de manosa	calque, recognized translation	<input checked="" type="checkbox"/>								
mast cell degranulation	n + n + n	desgranulación del mastocito	calque, recognized translation	desgranulación del mastocito	calque, recognized translation	desgranulación de los mastocitos	calque, recognized translation									<input checked="" type="checkbox"/>
mast cell development	n + n + n	desarrollo del mastocito	calque, recognized translation	desarrollo del mastocito	calque, recognized translation	desarrollo de los mastocitos	calque, recognized translation									<input checked="" type="checkbox"/>
mast cell surface	n + n + n	superficie del mastocito	calque, recognized translation	superficie del mastocito	calque, recognized translation	superficie del mastocito	calque, recognized translation	<input checked="" type="checkbox"/>								
Mast Cells	n + n	Mastocitos	linguistic compression, recognized translation	Mastocitos	linguistic compression, recognized translation	mastocito	linguistic compression, recognized translation									<input checked="" type="checkbox"/>
membrane molecules	n + n	moléculas de membrana	calque, recognized translation	moléculas de membrana	calque, recognized translation	moléculas de membrana	calque, recognized translation	<input checked="" type="checkbox"/>								

membrane proteins	n + n	proteínas membranas	calque, transposition (membrane>membranarias) [noun>adjective], recognized translation	proteínas membranas	calque, transposition (membrane>membranarias) [noun>adjective], recognized translation	proteínas de membrana	calque, recognized translation			<input checked="" type="checkbox"/>		
membrane receptors	n + n	receptores de membrana	calque, recognized translation	receptores de membrana	calque, recognized translation	receptores de membrana	calque, recognized translation	<input checked="" type="checkbox"/>				
memory cells	n + n	células memoria	calque, recognized translation	células memoria	calque, recognized translation	células de memoria	calque, recognized translation	<input checked="" type="checkbox"/>				
memory lymphocytes		linfocitos memoria	calque, recognized translation	linfocitos memoria	calque, recognized translation	linfocitos memoria	calque, recognized translation	<input checked="" type="checkbox"/>				
memory lymphocytes	n + n	linfocitos memoria	calque, recognized translation	linfocitos memoria	calque, recognized translation	linfocitos memoria	calque, recognized translation		<input checked="" type="checkbox"/>			
mouse strain	n + n	cepa mÙrida	calque, transposition (mouse>mÙrida) [noun>adjective], recognized translation	cepa mÙrida	calque, transposition (mouse>mÙrida) [noun>adjective], recognized translation	cepa de ratones	calque, recognized translation			<input checked="" type="checkbox"/>		
myeloma cell line	n + n + n	línea celular de mieloma	calque, recognized translation	línea celular de mieloma	calque, recognized translation	línea celular de mieloma	calque, recognized translation	<input checked="" type="checkbox"/>				
myeloma cells	n + n	células de mieloma	calque, recognized translation	células del mieloma	calque, recognized translation	células de mieloma	calque, recognized translation				<input checked="" type="checkbox"/>	
nicotinamide adenine dinucleotide phosphate	n + n + n + n	fosfato del dinucleótido de nicotinamida y adenina	calque, recognized translation	fosfato del dinucleótido de nicotinamida y adenina	calque, recognized translation	nicotinamida adenina dinucleótido fosfato	calque, recognized translation			<input checked="" type="checkbox"/>		
nitrogen species	n + n	especies reactivas (...) del nitrógeno	calque, recognized translation	especies reactivas (...) del nitrógeno	calque, recognized translation	especies de nitrógeno	calque, recognized translation			<input checked="" type="checkbox"/>		
Notch target gene	n + n	gen diana de Notch	calque, recognized translation	gen diana de Notch	calque, recognized translation	gen diana Notch	calque			<input checked="" type="checkbox"/>		
pattern recognition receptors	n + n + n	receptores para el reconocimiento del patrón	calque, recognized translation	receptores para el reconocimiento del patrón	calque, recognized translation	receptores de reconocimiento de patrones	calque, recognized translation			<input checked="" type="checkbox"/>		
pepsin proteolysis	n + n	proteólisis limitada con pepsina	calque, recognized translation	proteólisis con pepsina	calque, recognized translation	proteólisis con pepsina	calque, recognized translation		<input checked="" type="checkbox"/>			
peptide antigens	n + n	antígenos peptídicos	calque, transposition (adaptor>adaptor) [noun>adjective], recognized translation	antígenos peptídicos	calque, transposition (adaptor>adaptor) [noun>adjective], recognized translation	antígenos peptídicos	calque, transposition (peptide>peptídicos) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>				
peptide ligands	n + n	ligandos peptídicos	calque, recognized translation	ligandos peptídicos	calque, recognized translation	ligandos peptídicos	calque, recognized translation	<input checked="" type="checkbox"/>				
Phagocyte oxidase	n + n	oxidasa del fagocito	calque, recognized translation	oxidasa del fagocito	calque, recognized translation	oxidasa fagocítica	calque, transposition (fagocito>fagocítica) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>		
phosphate groups	n + n	grupos fosfato	calque, recognized translation	grupos fosfato	calque, recognized translation	grupos fosfato	calque, recognized translation	<input checked="" type="checkbox"/>				
phospholipid head groups	n + n + n	grupos de cabeza fosfolipídicos	calque, recognized translation	grupos de cabeza fosfolipídicos	calque, recognized translation	grupos de cabeza de fosfolípidos	calque, recognized translation			<input checked="" type="checkbox"/>		
Plasma membrane	n + n	Membrana plasmática	calque, recognized translation	Membrana plasmática	calque, recognized translation	membrana plasmática	calque, recognized translation	<input checked="" type="checkbox"/>				

plasma membrane receptors	n + n + n	receptores de membrana plasmática	calque, transposition (adaptor>adaptora) [noun>adjective], recognized translation	receptores de membrana plasmática	calque, transposition (adaptor>adaptora) [noun>adjective], recognized translation	receptores de membrana plasmática	calque, transposition (plasma>plasmática) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
plasma proteins	n + n	proteínas plasmáticas	calque, transposition (plasma>plasmáticas) [noun>adjective], recognized translation	proteínas plasmáticas	calque, transposition (plasma>plasmáticas) [noun>adjective], recognized translation	proteínas plasmáticas	calque, transposition (plasma>plasmáticas) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
polypeptide chains	n + n	cadena polipeptídica	calque, recognized translation	cadena polipeptídica	calque, recognized translation	cadena polipeptídica	calque, recognized translation	<input checked="" type="checkbox"/>					
postcapillary venules	n + n	vénulas poscapilares	calque, recognized translation	vénulas poscapilares	calque, recognized translation	vénulas poscapilares	calque, recognized translation			<input checked="" type="checkbox"/>			
protein antigens	n + n	antígenos proteínicos	calque, transposition (protein>proteínicos) [noun>adjective], recognized translation	antígenos proteínicos	calque, transposition (protein>proteínicos) [noun>adjective], recognized translation	antígenos proteicos	calque, transposition (protein>proteicos) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>			
protein kinases	n + n	proteína cinasa	calque, recognized translation	proteína cinasa	calque, recognized translation	proteínas quinasas	calque, recognized translation			<input checked="" type="checkbox"/>			
protein substrates	n + n	sustratos proteínicos	calque, transposition (protein>proteínicos) [noun>adjective], recognized translation	sustratos proteínicos	calque, transposition (protein>proteínicos) [noun>adjective], recognized translation	sustratos proteicos	calque, transposition (protein>proteicos) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>			
protein tyrosine kinase	n + n + n	proteína tirosina cinasa (PTK)	calque, recognized translation	proteína tirosina cinasa (PTK)	calque, recognized translation	proteínas tirosina quinasa	calque, recognized translation			<input checked="" type="checkbox"/>			
Protein Tyrosine Phosphatases	n + n + n	proteínas tirosina fosfatasa	calque, recognized translation	proteínas tirosina fosfatasa	calque, recognized translation	proteínas tirosina fosfatasa	calque, recognized translation	<input checked="" type="checkbox"/>					
protein ubiquitination	n + n	ubiquitinación de proteínas	calque, recognized translation	ubiquitinación de proteínas	calque, recognized translation	ubiquitinación de proteínas	calque, recognized translation			<input checked="" type="checkbox"/>			
purine synthesis	n + n	síntesis de purina	calque, recognized translation	síntesis de purina	calque, recognized translation	síntesis de purinas	calque, recognized translation			<input checked="" type="checkbox"/>			
receptor component	n + n	componente receptor	calque, transposition (receptor>receptor) [noun>adjective], recognized translation	componente receptor	calque, transposition (receptor>receptor) [noun>adjective], recognized translation	componente del receptor	calque, recognized translation			<input checked="" type="checkbox"/>			
receptor geometry	n + n	geometría del receptor	calque, recognized translation	geometría del receptor	calque, recognized translation	geometría del receptor	calque, recognized translation	<input checked="" type="checkbox"/>					
resident macrophages	n + n	macrófagos residentes	calque, recognized translation	macrófagos residentes	calque, recognized translation	macrófagos residentes	calque, recognized translation	<input checked="" type="checkbox"/>					
Ribbon diagrams	n + n	diagramas de cintas	calque, recognized translation	diagramas de cintas	calque, recognized translation	diagramas de cinta	calque, recognized translation			<input checked="" type="checkbox"/>			
Scavenger receptors	n + n	receptores basurero	calque, recognized translation	receptores basurero	calque, recognized translation	receptores carroñeros	calque, recognized translation			<input checked="" type="checkbox"/>			
serine protease activity	n + n + n	actividad de la serina proteasa	calque, recognized translation	actividad de la serina proteasa	calque, recognized translation	actividad serina proteasa	calque, recognized translation			<input checked="" type="checkbox"/>			
serpentine receptors	n + n	receptores en serpiente	calque, recognized translation	receptores en serpiente	calque, recognized translation	receptores serpiente	calque, recognized translation			<input checked="" type="checkbox"/>			
serum amyloid	n + n	amiloide sérico	calque, transposition (serum>sérico) [noun>adjective], recognized translation	amiloide sérico	calque, transposition (serum>sérico) [noun>adjective], recognized translation	amiloide sérico	calque, transposition (serum>sérico) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
serum proteins	n + n	proteínas séricas	calque, transposition (serum>séricas)	proteínas séricas	calque, transposition (serum>séricas)	proteínas séricas	calque, transposition (serum>séricas)	<input checked="" type="checkbox"/>					

			[noun>adjective], recognized translation		[noun>adjective], recognized translation		[noun>adjective], recognized translation						
serum sickness	n + n	enfermedad del suero	calque, recognized translation	enfermedad del suero	calque, recognized translation	enfermedad del suero	calque, recognized translation	<input checked="" type="checkbox"/>					
Signal Transduction	n + n	transducción de señales	calque, recognized translation	transducción de señales	calque, recognized translation	transducción de señales	calque, recognized translation	<input checked="" type="checkbox"/>					
signal transduction pathway	n + n + n	vía de transducción de señales	calque, recognized translation	vía de transducción de señales	calque, recognized translation	vía de transducción de señales	calque, recognized translation	<input checked="" type="checkbox"/>					
skin lesions	n + n	lesiones cutáneas	calque, transposition (skin>cutáneas) [noun>adjective], recognized translation	lesiones cutáneas	calque, transposition (skin>cutáneas) [noun>adjective], recognized translation	lesiones cutáneas	calque, transposition (skin>cutáneas) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
spleen cells	n + n	células esplénicas	calque, transposition (spleen>esplénicas) [noun>adjective], recognized translation	células esplénicas	calque, transposition (spleen>esplénicas) [noun>adjective], recognized translation	células del bazo	calque, recognized translation			<input checked="" type="checkbox"/>			
Stem cell factor	n + n + n	factor de célula troncal	calque, transposition (stem>troncal) [noun>adjective], recognized translation	factor de célula troncal	calque, transposition (stem>troncal) [noun>adjective], recognized translation	factor de células madre	calque, recognized translation			<input checked="" type="checkbox"/>			
sulfonate group	n + n	grupo sulfonato	calque, recognized translation	grupo sulfonato	calque, recognized translation	grupo sulfonato	calque, recognized translation	<input checked="" type="checkbox"/>					
surrogate light chains	n + n + n	sustituto de las cadenas ligeras	calque, recognized translation	sustituto de las cadenas ligeras	calque, recognized translation	cadenas ligeras sustitutas	calque, recognized translation			<input checked="" type="checkbox"/>			
target cells	n + n	células diana	calque, recognized translation	células diana	calque, recognized translation	células diana	calque, recognized translation	<input checked="" type="checkbox"/>					
target gene	n + n	gen diana	calque, recognized translation	gen diana	calque, recognized translation	gen diana	calque, recognized translation	<input checked="" type="checkbox"/>					
threonine kinases	n + n	treonina cinasas	calque, recognized translation	treonina cinasas	calque, recognized translation	treonina quinasas	calque, recognized translation			<input checked="" type="checkbox"/>			
tissue death	n + n	tejido muerto	calque, recognized translation	tejido muerto	calque, recognized translation	muerte tisular	calque, transposition (tissue>tisulares) [noun>adjective], recognized translation			<input checked="" type="checkbox"/>			
tissue macrophages	n + n	macrófagos tisulares	calque, transposition (tissue>tisulares) [noun>adjective], recognized translation	macrófagos tisulares	calque, transposition (tissue>tisulares) [noun>adjective], recognized translation	macrófagos tisulares	calque, transposition (tissue>tisulares) [noun>adjective], recognized translation	<input checked="" type="checkbox"/>					
tissue resident macrophages	n + n + n	macrófagos residentes en los tejidos	calque, recognized translation	macrófagos residentes en los tejidos	calque, recognized translation	macrófagos residentes en tejido	calque, recognized translation			<input checked="" type="checkbox"/>			
Transcription Factors	n + n	factores de transcripción	calque, recognized translation	factores de transcripción	calque, recognized translation	factores de transcripción	calque, recognized translation	<input checked="" type="checkbox"/>					
Tumor necrosis factor	n + n + n	Factor de necrosis tumoral	calque, recognized translation	Factor de necrosis tumoral	calque, recognized translation	factor de necrosis tumoral	calque, recognized translation	<input checked="" type="checkbox"/>					
Tyrosine kinase receptor	n + n + n	Receptor tirosina cinasa	calque, recognized translation	Receptor tirosina cinasa	calque, recognized translation	receptor de tirosina quinasas	calque, recognized translation			<input checked="" type="checkbox"/>			
tyrosine phosphorylation	n + n	fosforilación de tirosinas	calque, recognized translation	fosforilación de tirosinas	calque, recognized translation	fosforilación de tirosina	calque, recognized translation			<input checked="" type="checkbox"/>			
ubiquitin molecules	n + n	moléculas de ubiquitina	calque, recognized translation	moléculas de ubiquitina	calque, recognized translation	moléculas de ubiquitina	calque, recognized translation			<input checked="" type="checkbox"/>			

venule wall	n + n	pared venular	calque, recognized translation	pared venular	calque, recognized translation	pared venosa	calque, recognized translation			<input checked="" type="checkbox"/>		
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S9

The table below shows the information about the situation 9 and the different translations and techniques used by the different translation tools, followed by the chart used to identify where the count of the differences and similarities existed.

1	2	3	4	5	6	7	8	9	10	11	12	13
activated tissue macrophage	adj + n + n	macrófago tisular activado	calco, transposición (tissue>tisular) [noun>adjective], traducción reconocida	macrófago tisular activado	calco, transposición (tissue>tisular) [noun>adjective], traducción reconocida	macrófago tisular activado	calco, transposición (tissue>tisular) [noun>adjective], traducción reconocida	<input checked="" type="checkbox"/>				
Acute phase proteins	adj + n + n	Proteínas de fase aguda	calco, traducción reconocida	Proteínas de fase aguda	calco, traducción reconocida	Proteínas de fase aguda	calco, traducción reconocida	<input checked="" type="checkbox"/>				
adjacent blood vessels	adj + n + n	vasos sanguíneos adyacentes	calco, transposición (blood>sanguíneos) [noun>adjective]	vasos sanguíneos adyacentes	calco, transposición (blood>sanguíneos) [noun>adjective]	vasos sanguíneos adyacentes	calco, transposición (blood>sanguíneos) [noun>adjective]	<input checked="" type="checkbox"/>				
antimicrobial defense mechanisms	adj + n + n	mecanismos de defensa antimicrobiana	calco, traducción reconocida	mecanismos de defensa antimicrobiana	calco, traducción reconocida	mecanismos de defensa antimicrobiana	calco, traducción reconocida	<input checked="" type="checkbox"/>				
antiparallel polypeptide chain	adj + n + n	cadena polipeptídica anti-paralelas	calco, transposición (polypeptide>polipeptídicas) [noun>adjective]	cadena polipeptídica antiparalela	calco, transposición (polypeptide>polipeptídicas) [noun>adjective]	cadena polipeptídica antiparalela	calco, transposición (polypeptide>polipeptídicas) [noun>adjective]				<input checked="" type="checkbox"/>	
average binding affinity	adj + n + n	afinidad media de unión	calco, traducción reconocida	afinidad de unión promedio	calco	afinidad media de unión	calco, traducción reconocida			<input checked="" type="checkbox"/>		
Bacterial cell wall lipid	adj + n + n + n	Lípido de pared bacteriana	calco, compresión lingüística, traducción reconocida	Lípido de la pared celular bacteriana	calco, traducción reconocida	Lípidos de la pared celular bacteriana	calco, traducción reconocida					<input checked="" type="checkbox"/>
bacterial cell wall peptidoglycans	adj + n + n + n	peptidoglucanos de la pared bacteriana	calco, traducción reconocida	peptidoglucanos de la pared celular bacteriana	calco	peptidoglucanos de la pared celular bacteriana	calco				<input checked="" type="checkbox"/>	
bacterial peptide ligands	adj + n + n	ligandos de péptidos bacterianos	calco, traducción reconocida	ligandos peptídicos bacterianos	calco, traducción reconocida	ligandos peptídicos bacterianos	calco, traducción reconocida				<input checked="" type="checkbox"/>	
bulky phosphate residue	adj + n + n	fosfato	compresión lingüística, traducción reconocida	residuo de fosfato voluminoso	calco	residuo de fosfato voluminoso	calco					
Cell surface receptors	adj + n + n	receptores de la superficie celular	calco, traducción reconocida	receptores de superficie celular	calco, traducción reconocida	receptores de la superficie celular	calco, traducción reconocida			<input checked="" type="checkbox"/>		
cellular and biochemical defense mechanisms	adj + n + n	mecanismos de defensa celulares y bioquímicos	calco, traducción reconocida	mecanismos de defensa celulares y bioquímicos	calco, traducción reconocida	mecanismos de defensa celulares y bioquímicos	calco, traducción reconocida	<input checked="" type="checkbox"/>				
cellular pathogen recognition receptors	adj + n + n + n	receptores celulares para el reconocimiento de microorganismos patógenos	calco, transposición (pathogen>microorganismos patógenos) [adjective>MWT/noun+adjective], particularización	receptores celulares de reconocimiento de patógenos	calco, traducción reconocida	receptores celulares de reconocimiento de patógenos	calco, traducción reconocida				<input checked="" type="checkbox"/>	

			(pathogen>microorganismos patógenos)										
circulating white blood cells	adj + adj + n + n + n	leucocitos circulantes	calco, compresión lingüística, traducción reconocida	glóbulos blancos en circulación	calco, traducción reconocida	leucocitos circulantes	calco, compresión lingüística, traducción reconocida				<input checked="" type="checkbox"/>		
clonal selection hypothesis	adj + n + n	hipótesis de la selección clonal	calco, traducción reconocida	hipótesis de la selección clonal	calco, traducción reconocida	hipótesis de selección clonal	calco, traducción reconocida		<input checked="" type="checkbox"/>				
common symmetric core structure	adj + adj + n + n	estructura nuclear simétrica común	calco, traducción reconocida	estructura central simétrica común	calco, traducción reconocida	estructura central simétrica común	calco, traducción reconocida					<input checked="" type="checkbox"/>	
complex sialylated carbohydrate groups	adj + adj + n + n	grupos glucídicos complejos sialilados	calco, traducción reconocida	grupos complejos de carbohidratos sialilados	calco, traducción reconocida	grupos de carbohidratos sialilados complejos	calco, traducción reconocida						<input checked="" type="checkbox"/>
cutaneous lymphocyte antigen	adj + n + n	antígeno del linfocito cutáneo	calco, traducción reconocida	antígeno linfocitario cutáneo	calco, transposición (lymphocyte>linfocitario) [noun>adjective], traducción reconocida	antígeno linfocitario cutáneo	calco, transposición (lymphocyte>linfocitario) [noun>adjective], traducción reconocida					<input checked="" type="checkbox"/>	
cytoplasmic granule contents	adj + n + n	contenido del gránulo citoplásmico	calco, traducción reconocida	contenido de los gránulos citoplasmáticos	calco, traducción reconocida	contenido de los gránulos citoplasmáticos	calco, traducción reconocida					<input checked="" type="checkbox"/>	
cytosolic kinase domains	adj + n + n	dominios cinasa citosólicos	calco, traducción reconocida	dominios quinasa citosólicos	calco, traducción reconocida	dominios cinasa citosólicos	calco, traducción reconocida			<input checked="" type="checkbox"/>			
damaged and dead host cells	adj + n + n	células muertas y dañadas del anfitrión	calco, traducción reconocida	células huésped dañadas y muertas	calco, traducción reconocida	células dañadas y muertas del huésped	calco, traducción reconocida						<input checked="" type="checkbox"/>
dendritic cell homing	adj + n + n	Alojamiento de células dendríticas	calco, traducción reconocida	Homing de células dendríticas.	calco, traducción reconocida	Recolección de células dendríticas	calco, traducción reconocida						<input checked="" type="checkbox"/>
Dermal cell migration	adj + n + n	Migración de células dérmicas	calco, traducción reconocida	Migración de células dérmicas	calco, traducción reconocida	Migración de células dérmicas	calco, traducción reconocida	<input checked="" type="checkbox"/>					
different heavy chain isotypes	adj + adj + n + n	isotipos de cadena pesada diferentes	calco, traducción reconocida	isotipos diferentes de cadenas pesadas	calco, traducción reconocida	isotipos diferentes de cadena pesada	calco, traducción reconocida						<input checked="" type="checkbox"/>
distinct adaptor protein	adj + n + n	proteína adaptadora distinta	calco, transposición (adaptor>adaptor) [noun>adjective]	proteína adaptadora distinta	calco, transposición (adaptor>adaptor) [noun>adjective]	proteína adaptadora distinta	calco, transposición (adaptor>adaptor) [noun>adjective]	<input checked="" type="checkbox"/>					
distributed antigen receptors	adj + n + n	receptores para el antígeno distribuidos	calco, traducción reconocida	receptores de antígenos distribuidos	calco, traducción reconocida	receptores de antígenos distribuidos	calco, traducción reconocida					<input checked="" type="checkbox"/>	
dominant effector cells	adj + n + n	células efectoras dominantes	calco, transposición (effector>efectora) [noun>adjective]	células efectoras predominantes	calco, transposición (effector>efectora) [noun>adjective]	células efectoras dominantes	calco, transposición (effector>efectora) [noun>adjective]			<input checked="" type="checkbox"/>			
Downstream target genes	adj + n + n	genes diana situados a continuación	calco, compresión lingüística, traducción reconocida	genes objetivos aguas abajo	calco	genes objetivos aguas abajo	calco					<input checked="" type="checkbox"/>	
endoplasmic reticulum membrane	adj + n + n	membrana del retículo endoplásmico	calco, traducción reconocida	membrana del retículo endoplásmico	calco, traducción reconocida	membrana del retículo endoplásmico	calco, traducción reconocida	<input checked="" type="checkbox"/>					

Endothelial adhesion molecules	adj + n + n	Moléculas de adhesión endotelial	calco, traducción reconocida	Moléculas de adhesión endotelial	calco, traducción reconocida	Moléculas de adhesión endotelial	calco, traducción reconocida	<input checked="" type="checkbox"/>				
endothelial cell migration	adj + n + n	migración de célula endotelial	calco, traducción reconocida	migración de células endoteliales	calco, traducción reconocida	migración de células endoteliales	calco, traducción reconocida				<input checked="" type="checkbox"/>	
epidermal growth factor receptor	adj + n + n + n	receptor para el factor de crecimiento epidérmico	calco, traducción reconocida	factor de crecimiento epidérmico	calco, traducción reconocida	receptor del factor de crecimiento epidérmico	calco, traducción reconocida					<input checked="" type="checkbox"/>
eukaryotic cell carbohydrates	adj + n + n	glúcidos de las células eucariotas	calco, traducción reconocida	carbohidratos de las células eucariotas	calco, traducción reconocida	carbohidratos de las células eucariotas	calco, traducción reconocida				<input checked="" type="checkbox"/>	
free antigen molecules	adj + n + n	moléculas de anticuerpos libres	calco, traducción reconocida	moléculas de antígeno libre	calco, traducción reconocida	moléculas de anticuerpo libres	calco, traducción reconocida					<input checked="" type="checkbox"/>
frozen section assay	adj + n + n	análisis en sección congelada	calco, traducción reconocida	ensayo de sección congelada	calco	ensayo de sección congelada	calco				<input checked="" type="checkbox"/>	
genetic engineering techniques	adj + n + n	técnicas de ingeniería genética	calco, traducción reconocida	técnicas de ingeniería genética	calco, traducción reconocida	técnicas de ingeniería genética	calco, traducción reconocida	<input checked="" type="checkbox"/>				
heavy chain protein	adj + n + n	cadena pesada	calco, compresión lingüística, traducción reconocida	proteína completa de la cadena pesada	calco	proteína completa de cadena pesada	calco					<input checked="" type="checkbox"/>
hematopoietic stem cells	adj + n + n	células troncales hematopoyéticas (HSC, del inglés hematopoietic stem cells)	calco, traducción reconocida, ampliación lingüística	células madre hematopoyéticas (HSC, por sus siglas en inglés)	calco, traducción reconocida, ampliación lingüística	células madre hematopoyéticas (CMH)	calco, traducción reconocida, ampliación lingüística					<input checked="" type="checkbox"/>
heterodimeric cell surface proteins	adj + n + n + n	proteínas heterodiméricas de superficie celular	calco, transposición (cell>celular) [noun>adjective], traducción reconocida	proteínas de superficie celular heterodiméricas	calco, transposición (cell>celular) [noun>adjective]	proteínas heterodiméricas de la superficie celular	calco, transposición (cell>celular) [noun>adjective]					<input checked="" type="checkbox"/>
Human mast cells	adj + n + n	mastocitos humanos	compresión lingüística, traducción reconocida	mastocitos humanos	compresión lingüística, traducción reconocida	mastocitos humanos	compresión lingüística, traducción reconocida	<input checked="" type="checkbox"/>				
immune and inflammatory and epithelial barrier cells	adj + n + n	células inmunitarias e inflamatorias y en la barrera epitelial	calco, traducción reconocida	células inmunitarias, inflamatorias y de barrera epitelial.	calco, traducción reconocida	células inmunitarias, inflamatorias y de barrera epitelial.	calco, traducción reconocida				<input checked="" type="checkbox"/>	
immune receptor family	adj + n + n	FAMILIA DE RECEPTORES INMUNITARIOS	calco, traducción reconocida	familia de receptores inmunológicos	calco, traducción reconocida	FAMILIA DE RECEPTORES INMUNITARIOS	calco, traducción reconocida				<input checked="" type="checkbox"/>	
inactive precursor enzyme	adj + n + n	enzima precursora inactiva	calco, traducción reconocida	enzima precursora inactiva	calco, traducción reconocida	enzima precursora inactiva	calco, traducción reconocida	<input checked="" type="checkbox"/>				
increased blood flow	adj + n + n	aumento del flujo sanguíneo	calco, transposición (increased>aumento) [adjective>noun], traducción reconocida	aumento en el flujo sanguíneo	calco, transposición (increased>aumento) [adjective>noun], traducción reconocida	aumento del flujo sanguíneo	calco, transposición (increased>aumento) [adjective>noun], traducción reconocida				<input checked="" type="checkbox"/>	
integral membrane form	adj + n + n	forma integral de membrana	calco, traducción reconocida	forma integral de la molécula	calco, traducción reconocida	forma de membrana integral	calco, traducción reconocida					<input checked="" type="checkbox"/>

integral membrane proteins	adj + n + n	proteínas integrales de la membrana	calco, traducción reconocida	proteínas integrales de membrana	calco, traducción reconocida	proteínas integrales de membrana	calco, traducción reconocida				<input checked="" type="checkbox"/>	
intercellular adhesion molecule	adj + n + n	molécula de adhesión intercelular	calco, traducción reconocida	molécula de adhesión intercelular	calco, traducción reconocida	molécula de adhesión intercelular	calco, traducción reconocida	<input checked="" type="checkbox"/>				
interrupted blood supply	adj + n + n	interrupción del riego sanguíneo	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida	interrupción del suministro sanguíneo	calco, transposición (blood>sanguíneo) [noun>adjective]	interrupción del riego sanguíneo	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida			<input checked="" type="checkbox"/>		
intestinal Paneth cells	adj + n + n	células de Paneth intestinales	calco, traducción reconocida	células de Paneth del intestino	calco, traducción reconocida	células Paneth intestinales	calco, traducción reconocida					<input checked="" type="checkbox"/>
intracellular adhesion molecule 1	adj + n + n	molécula de adhesión intracelular 1	calco, traducción reconocida	molécula de adhesión intracelular 1	calco, traducción reconocida	molécula de adhesión intracelular 1	calco, traducción reconocida	<input checked="" type="checkbox"/>				
intracellular signal transduction pathways	adj + n + n + n	vías intracelulares de transducción de señales	calco, traducción reconocida	vías de transducción de señales intracelulares	calco, traducción reconocida	vías de transducción de señales intracelulares	calco, traducción reconocida				<input checked="" type="checkbox"/>	
key tyrosine residues	adj + n + n	tirosinas clave	calco, traducción reconocida, compresión lingüística	residuos clave de tirosina	calco, traducción reconocida	residuos clave de tirosina	calco, traducción reconocida				<input checked="" type="checkbox"/>	
known intrinsic signaling functions	adj + n + n + n	función intrínseca de transmisión de señales	calco, traducción reconocida	funciones de señalización intrínsecas	calco, traducción reconocida	función de señalización intrínseca	calco					<input checked="" type="checkbox"/>
large antibody repertoire	adj + n + n	gran repertorio de anticuerpos	calco, traducción reconocida	un repertorio tan amplio de anticuerpos	calco, traducción reconocida	un repertorio de anticuerpos tan amplio	calco, traducción reconocida					<input checked="" type="checkbox"/>
light chain isotype exclusion	adj + n + n + n	exclusión del isotipo de cadena ligera	calco, traducción reconocida	exclusión del isotipo de la cadena ligera	calco, traducción reconocida	exclusión de isotipo de cadena ligera	calco, traducción reconocida					<input checked="" type="checkbox"/>
Limited Antigen Receptor Specificities	adj + n + n + n	Especificidades limitadas del receptor para el antígeno	calco, traducción reconocida	Especificidades Limitadas del Receptor de Antígeno	calco, traducción reconocida	Especificidades limitadas de los receptores de antígenos	calco, traducción reconocida					<input checked="" type="checkbox"/>
lymphoid progenitor cells	adj + n + n	células progenitoras linfoides	calco, traducción reconocida	células progenitoras linfoides	calco, traducción reconocida	células progenitoras linfoides	calco, traducción reconocida	<input checked="" type="checkbox"/>				
macrophage recruitment	adj + n + n	Reclutamiento de macrófagos	calco, traducción reconocida	Reclutamiento de macrófagos	calco, traducción reconocida	Reclutamiento de macrófagos	calco, traducción reconocida	<input checked="" type="checkbox"/>				
mature mast cells	adj + n + n	mastocitos maduros	compresión lingüística, traducción reconocida	mastocitos maduros	compresión lingüística, traducción reconocida	mastocitos maduros	compresión lingüística, traducción reconocida	<input checked="" type="checkbox"/>				
microbial surface carbohydrates	adj + n + n	glúcidos de la superficie del microbio	calco, traducción reconocida	carbohidratos de superficie microbiana	calco, traducción reconocida	carbohidratos de la superficie microbiana	calco, traducción reconocida					<input checked="" type="checkbox"/>
microbial surface structures	adj + n + n	estructuras de la superficie microbiana	calco, traducción reconocida	estructuras superficiales microbianas	calco, traducción reconocida	estructuras de la superficie microbiana	calco, traducción reconocida			<input checked="" type="checkbox"/>		
mixed leukocyte recruitment	adj + n + n	Reclutamiento mixto de leucocitos	calco, traducción reconocida	Reclutamiento mixto de leucocitos	calco, traducción reconocida	Reclutamiento mixto de leucocitos	calco, traducción reconocida	<input checked="" type="checkbox"/>				

Modified transcription factor	adj + n + n	Factor de transcripción modificado	calco, traducción reconocida	Factor de transcripción modificado	calco, traducción reconocida	Factor de transcripción modificado	calco, traducción reconocida	<input checked="" type="checkbox"/>				
monoclonal antibody production	adj + n + n	producción de anticuerpos monoclonales	calco, traducción reconocida	producción de anticuerpos monoclonales	calco, traducción reconocida	la producción de anticuerpos monoclonales	calco, traducción reconocida		<input checked="" type="checkbox"/>			
mononuclear phagocyte system	adj + n + n	sistema fagocítico mononuclear	calco, transposición (phagocyte>fagocítico) [noun>adjective], traducción reconocida	sistema fagocítico mononuclear	calco, transposición (phagocyte>fagocítico) [noun>adjective], traducción reconocida	sistema de fagocitos mononucleares	calco, traducción reconocida		<input checked="" type="checkbox"/>			
mucosal addressin cell adhesion molecule 1	adj + n + n + n + n	molécula de adhesión celular 1 de adreína mucosa	calco, transposición (cell>celular) [noun>adjective], traducción reconocida	molécula de adhesión celular de dirección mucosa 1	calco, transposición (cell>celular) [noun>adjective]	molécula 1 de adhesión celular de la direccionalidad de la mucosa	calco, transposición (cell>celular) [noun>adjective]					<input checked="" type="checkbox"/>
multiple antigen receptors	adj + n + n	múltiples receptores para el antígeno	calco, traducción reconocida	múltiples receptores de antígeno	calco, traducción reconocida	múltiples receptores de antígenos	calco, traducción reconocida					<input checked="" type="checkbox"/>
myeloid differentiation protein	adj + n + n	proteína de diferenciación mieoide	calco, traducción reconocida	proteína de diferenciación mieoide	calco, traducción reconocida	proteína de diferenciación mieoide	calco, traducción reconocida	<input checked="" type="checkbox"/>				
Natural Killer Cells	adj + n + n	Linfocitos citolíticos naturales	calco, traducción reconocida	Células Asesinas Naturales o Células NK	calco, traducción reconocida	Células asesinas naturales	calco, traducción reconocida					<input checked="" type="checkbox"/>
new blood vessel growth	adj + n + n + n	crecimiento de nuevos vasos sanguíneos	calco, transposición (blood>sanguíneos) [noun>adjective], traducción reconocida	crecimiento de nuevos vasos sanguíneos	calco, transposición (blood>sanguíneos) [noun>adjective], traducción reconocida	crecimiento de nuevos vasos sanguíneos	calco, transposición (blood>sanguíneos) [noun>adjective], traducción reconocida	<input checked="" type="checkbox"/>				
new gene transcription	adj + n + n	nueva transcripción genética	calco, transposición (gene>genética) [noun>adjective], traducción reconocida	transcripción genética nueva	calco, transposición (gene>genética) [noun>adjective]	transcripción de nuevos genes	calco, transposición (gene>genética) [noun>adjective]					<input checked="" type="checkbox"/>
Nuclear hormone receptors	adj + n + n	receptores de hormonas nucleares	calco, traducción reconocida	receptores nucleares de hormonas	calco, traducción reconocida	receptores de hormonas nucleares	calco, traducción reconocida			<input checked="" type="checkbox"/>		
nuclear hormone target gene	adj + n + n + n	gen diana de hormona nuclear	calco, traducción reconocida	genes diana de hormonas nucleares	calco, traducción reconocida	receptores de hormonas nucleares	calco, traducción reconocida					<input checked="" type="checkbox"/>
particular receptor gene locus	adj + n + n + n	locus génico particular	calco, transposición (gene>génico) [noun>adjective], compresión lingüística (receptor), traducción reconocida	locus génico particular del receptor	calco, transposición (gene>génico) [noun>adjective]	locus génico receptor concreto	calco, transposición (gene>génico) [noun>adjective]					<input checked="" type="checkbox"/>
peripheral blood monocyte	adj + n + n	monocito de la sangre periférica	calco, traducción reconocida	monocito en sangre periférica	calco, traducción reconocida	monocito de sangre periférica	calco, traducción reconocida					<input checked="" type="checkbox"/>
peripheral blood smear	adj + n + n	extensión de sangre periférica	calco, traducción reconocida	frotis de sangre periférica	calco, traducción reconocida	frotis de sangre periférica	calco, traducción reconocida				<input checked="" type="checkbox"/>	
Peripheral blood vessel	adj + n + n	Vaso sanguíneo periférico	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida	Vaso sanguíneo periférico	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida	Vaso sanguíneo periférico	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida	<input checked="" type="checkbox"/>				

peripheral node addressin (PNAd)	adj + n + n	adresina del ganglio periférico (PNAd, del inglés peripheral node addressin).	calco, traducción reconocida	dirección periférica en ganglios linfáticos (PNAd)	calco, ampliación lingüística	direccionamiento del nodo periférico (PNAd)	calco, ampliación lingüística						<input checked="" type="checkbox"/>
Peripheral tissue inflammation	adj + n + n	inflamación de tejidos periféricos	calco, traducción reconocida	inflamación de los tejidos periféricos	calco, traducción reconocida	inflamación de los tejidos periféricos	calco, traducción reconocida						<input checked="" type="checkbox"/>
peripheral tissue sites	adj + n + n	tejidos periféricos	compresión lingüística, traducción reconocida	sitios en los tejidos periféricos	calco	tejidos periféricos	compresión lingüística, traducción reconocida			<input checked="" type="checkbox"/>			
principal defense mechanism	adj + n + n	principal mecanismo de defensa	calco, traducción reconocida	principal mecanismo de defensa	calco, traducción reconocida	principal mecanismo de defensa	calco, traducción reconocida	<input checked="" type="checkbox"/>					
proteolytic cleavage products	adj + n + n	productos de la escisión proteolítica	calco, traducción reconocida	productos de clivaje proteolítico	calco, traducción reconocida	productos de escisión proteolítica	calco, traducción reconocida						<input checked="" type="checkbox"/>
reactive oxygen species	adj + n + n	especies reactivas del oxígeno	calco, traducción reconocida	especies reactivas del oxígeno	calco, traducción reconocida	especies reactivas de oxígeno	calco, traducción reconocida		<input checked="" type="checkbox"/>				
red blood cell	adj + n + n	hematíe	compresión lingüística, traducción reconocida	glóbulo rojo	calco, traducción reconocida	glóbulo rojo	calco, traducción reconocida					<input checked="" type="checkbox"/>	
reduced cytoplasm potassium ion concentrations	adj + n + n + n + n	reducción de las concentraciones citoplásmicas del ion potasio	calco, traducción reconocida	concentraciones reducidas de iones de potasio en el citoplasma	calco, traducción reconocida	reducción de las concentraciones de iones potasio en el citoplasma	calco, traducción reconocida						<input checked="" type="checkbox"/>
separate intracellular tyrosine kinase	adj + adj + n + n	tirosina cinasa intracelular separada	calco, traducción reconocida	quinasa de tirosina intracelular separada	calco, traducción reconocida	tirosina cinasa intracelular separada	calco, traducción reconocida			<input checked="" type="checkbox"/>			
side chain theory	adj + n + n	teoría de las cadenas laterales	calco, traducción reconocida	teoría de las cadenas laterales	calco, traducción reconocida	teoría de la cadena lateral	calco, traducción reconocida		<input checked="" type="checkbox"/>				
small blood vessel	adj + n + n	pequeño vaso sanguíneo	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida	vaso sanguíneo pequeño	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida	pequeño vaso sanguíneo	calco, transposición (blood>sanguíneo) [noun>adjective], traducción reconocida			<input checked="" type="checkbox"/>			
Southern blot analysis	adj + n + n	análisis de Southern blot	calco, traducción reconocida	análisis de Southern blot	calco, traducción reconocida	análisis Southern blot	calco, traducción reconocida		<input checked="" type="checkbox"/>				
specialized defense mechanisms	adj + n + n	mecanismos de defensa especializados	calco, traducción reconocida	mecanismos de defensa más especializados	calco, traducción reconocida	mecanismos de defensa más especializados	calco, traducción reconocida					<input checked="" type="checkbox"/>	
specific target genes	adj + n + n	genes diana específicos	calco, traducción reconocida	genes específicos	calco, traducción reconocida	genes diana específicos	calco, traducción reconocida			<input checked="" type="checkbox"/>			
sterile tissue injury	adj + n + n	lesión tisular estéril	calco, transposición (tissue>tisular) [noun>adjective], traducción reconocida	lesión tisular estéril	calco, transposición (tissue>tisular) [noun>adjective], traducción reconocida	lesión tisular estéril	calco, transposición (tissue>tisular) [noun>adjective], traducción reconocida	<input checked="" type="checkbox"/>					
subcutaneous lymph nodes	adj + n + n	ganglios linfáticos subcutáneos	calco, traducción reconocida	ganglios linfáticos subcutáneos	calco, traducción reconocida	ganglios linfáticos subcutáneos	calco, traducción reconocida	<input checked="" type="checkbox"/>					
vascular cell adhesion molecule	adj + n + n + n	molécula de adhesión celular vascular	calco, traducción reconocida	molécula de adhesión celular vascular	calco, traducción reconocida	molécula de adhesión celular vascular	calco, traducción reconocida	<input checked="" type="checkbox"/>					

