

Rendering English pharmacological terms into Ukrainian: Translation and didactic dimensions

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Abstract. The research into the dependence of translation techniques choice on the term structure in the source language on the material of rendering 603 English single-word terms and terminological collocations (related to pharmacodynamics and pharmacokinetics) into Ukrainian contributed to suggesting the following preliminary conclusions. The choice of translation techniques in rendering single-word terms depends, to a certain degree, on their structure. The share of the dictionary equivalents decreases with the increase in the term complexity, falling from 82% in the case of simple terms and prefixal derivatives to 58% concerning the suffixal, 34% – prefix-suffixal and 9% – compound lexemes. The transcoding share is minimal with prefixal and simple terms, steadily growing with suffixal, prefix-suffixal and compound lexemes. Dictionary equivalents complemented by transcoding may be enough to render simple terms, prefixal derivatives may additionally require contextual substitution or addition in the case of suffixal lexemes. The growth in the terminology complexity results in the expansion of the translation procedures ranges to four or even six techniques in rendering the prefix-suffixal terms. Adjectival, participial and verbal two-word collocations are mostly translated by calquing. The addition of a noun reduces its share, increasing the role of transformations. The correlation of translation techniques depends on the nature of the added element. If it is an adjective, the impact of calquing grows; the addition of a noun contributes to the expansion of transformations.

1 Introduction

Since this paper is directly related to the future translators' training, whose aim is the development of their professional competence, it seems adequate to review the nature of the latter term. Within this paper, the understanding of the notion of 'translator's professional competence' is based on the general approaches to its interpretation in the works of various authors (see e.g. [1-6]). With the progress of research into the competence approach to translation/interpretation teaching and training, as well as with the emergence of multicomponent models of the said competence, there developed a number of contradictions between its various interpretations. Initially, *translation competence* used to be regarded (at least, at the intuitive level) as the sum total of the translation knowledge,

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skills and subskills. However, within the multicomponent models, it turned out that in addition to them, the translator/interpreter needs some further competences. Those included some evident components, such as the bilingual one, as well as the less-evident extralinguistic, instrumental, research and information mining competence, personal and the like. The multicomponent approach brought up the issue of the interrelationship among all those subcompetences, i.e. whether the bilingual competence, for example, belongs to the translation competence as a *difference* to *genus*, or are they both (as well as all other competences mentioned above) *differences* comprised in some wider concept (*genus*), and if so, what this wider concept might be.

The solution suggested in a number of works [2, 7] amounted to the proposal of maintaining the concept of *translation competence* and viewing it as the one being a *difference* notion in the same line with the other competences, all of which would be considered the components of the *genus* notion – the *professional translator's competence* (PTC). The latter is viewed as expert, predominantly procedural, knowledge, where strategies play an important role and most of the actions have been automatized [5, p. 47]. It is worth underlining the 'expert level' as the PTC's distinguishing feature. It actually means that there is no direct causative relation between the command of the two languages and the ability to translate or interpret at the professional level. In other words, the development of the PTC requires special teaching and training. Another important feature of the PTC is its definition as the 'predominantly procedural knowledge'. The latter is viewed as a certain set of practical skills and subskills (practical knowledge) as opposed to 'declarative (theoretical or descriptive) knowledge'. Basing on this assumption, it may be inferred that the effective process of the future translators/interpreters teaching and training should be mostly practically oriented.

From among the said PTC subcomponents, the subject and terminological ones are especially important for specialized translation and interpretation. The subject subcompetence, which is a component of the extralinguistic competence, is related to the knowledge required for the general understanding of the notional composition of the specific field and the relations among the various notions within it [8, p.176]. The terminological subcompetence provides for the command of the bilingual terms that mark the corresponding field-related notions. The lack of the subject knowledge has a negative impact upon the translators'/interpreters' understanding of the source text (ST), while the absence of proper terms in their lexicons exacerbate the problems in their attempts to produce the target text (TT) acceptable for the addressees, especially in oral mediation. Thus, the development of the said PTC components is an obligatory element of the future translator and interpreter teaching and training. However, the description of its content requires additional study, specifically concerning the conceptual composition of the particular sphere and its terminology. Currently, there seems to be a lack of such research, especially taking into account an extreme diversity of the human activity spheres, which provides for the relevance of our research.

Having postponed the discussion of the subject knowledge problem, let us focus on the issue of specialized terminology. In the last decades, there have been definite interest in terminology in general, as well as in the problems of its translation and teaching. The research into the global prospects of terminology and terminological work provided sufficient grounds to conclude that they are under a substantial impact on the part of political and economic considerations [9]. In relation to the said issues, the processes of the terminological systems development in the post-colonial contexts and the role of translation in them have been studied. Specifically, the problems of the Brazilian Environmental Law Dictionary elaboration [10] and Swahili terminological modernization in Tanzania [11] have been analysed, suggesting the ways of their solution. According to some authors [12], due to serious problems with the development of standard Hindi terminology, no textbook

of mining could be written in or translated into Indian languages. It is also concluded that in India, mining literature in English can be translated only by mining engineer translators who understand the systems of concepts, terms and principles of translation.

Other authors [13] studied the interlingual transfer of social media terminology. Because the latter originated in the English-language context, translators have to find ways to render it in other languages. To accomplish this task, a corpus of newspaper articles in three languages was compiled. Then the Brazilian and Spanish journalists' techniques to render the English-language terms were considered. The most frequent ones turned out to be equivalence, calque, loan and paraphrase. The study showed some linguistic preferences in the two languages.

Still other researchers [14] (on the material of translating legal texts from English into Spanish) studied the role of textual supports in the solution of terminological problems. They analysed the potential of using English and Spanish online resources as textual supports, which contain large amounts of the bilingual equivalents, to carry out the translator's information mining function. In addition, the author examined the comparative efficiency of various types of online multilingual resources and multilingual terminological resources as the sources of textual supports. The author did not limit himself to the simple statement of the said efficiency but evaluated the data in relation to the comparative suitability of the said resources to solve various terminological problems in legal translation. The research confirmed the efficiency of the sites' employment, which, in the author's [14] view, gives grounds to claim a considerable overlap between the EU and Spanish legal sublanguages, and a substantial potential of the EU linguistic resources for the translation of the Spanish-language legal texts.

The problems of machine translation did not remain idle either. The comparative analysis of the terminological entries in the machine memory and the traditional dictionaries [15] allowed concluding that the information in the machine translation system should be more elaborate as compared to the paper dictionaries. The machine translation researchers might also be interested in the idea of a translation-oriented typology of technical texts [16], as this issue is directly related to Terminology Studies and terminological databases.

Some papers are devoted to the research into the impact of various factors upon the choice of the TT equivalents for the ST terminology. It was established that the choice of the TT terminology for the specialized ST lexemes might be motivated by cognitive factors, and this motivation predetermines the selection of the TT equivalents [17].

Issues related to the equivocal specialized terms that question the essential principle of the well-defined terminology have been investigated as well [18]. The same author analysed the reasons for their emergence and the various linguistic and rhetoric factors, which contribute to the blurring of their meaning [19]. Others [20] examined the distinctions between the terminological needs of interpreters, translators and terminologists. The bulk of the research on the relationship between terminology and translation is also relevant for translator training. The idea of the translation-oriented typology of technical texts [16], which has already been mentioned earlier, may be important to select texts for translator training in a specific domain. The aim of translator training, among other things, involves the acquisition of the subject knowledge related to the widest possible range of the most frequent domains, whose progression in the actual translation course could be based on the gradual increase of their notional and linguistic complexity. The implementation of this principle automatically raises the issue of the texts typology, whose main criteria involve the distinction in the corresponding text structures in the source and target languages. According to some authors [16], the successful solution of this problem requires additional contrastive research involving specific language pairs.

Among the disciplines adjacent to pharmacology, several studies concerned medical translation. In one of them [21], the author claims that because the human body is the same all over the world, medicine has existed since times immemorial, the discipline boasts reliable reference resources, and the medical terminology has mostly Old Greek and Latin origin, there are fewer lexical problems in medicine as compared to other domains. However, taking into account the interdisciplinary terminological exchange, the author recommends analysing the ST carefully to make rational translation decisions.

In another paper, the author [22] suggests a list of knowledge and skills necessary for medical translation. It includes the sufficient amount of subject and terminological knowledge in the field, specifically the acquisition of the key terms in anatomy, diagnostics, symptoms, surgical procedures, laboratory analyses and clinical procedures, basics of the Old Greek and Latin languages, term-building techniques, current medical abbreviations, professional medical slang and jargon, the style of medical discourse in the corresponding languages and the requirements to scientific papers in medicine.

The terminological research in Ukraine has intensified as well, which is proved by a dramatic increase in the number of publications in this area and the emergence of specialized periodical journals – see [23] and [24]. The variety of the studies has considerably increased as well, with their scope ranging from metaphors in oil and gas industry [25], synonymy and variance in the Ukrainian electrical power industry terminology [26], and modern computer terms [27] to the specifics of rendering English terminology belonging to the border guards' discourse [28] and lexical and semantic aspects of ecology-oriented texts translation [29].

The said intensification fully applies to the medical and adjacent areas as well. Some authors studied medical terms in general, as a means of lexical expressions to implement the textual category of the informational content [30], others dealt with narrower issues, such as medical terms with somatic components in modern Ukrainian [31] or pharmaceutical terms-eponyms, which constitute an important element of the specialized lexicon in this sublanguage [32].

Following the analysis of the medical discourse, with a special focus on the general scientific and specialized terminology [33], the authors came up with the recommendations for taking into account the etymology and shades of meaning in choosing from among synonyms. The researchers suggested a typology of typical errors in translating medical texts from Russian into Ukrainian, as well as recommendations for the use of the most frequent lexemes and structures, characteristic of the medical discourse, to avoid the abuse of literal translation in drafting medicine-related text in Ukrainian.

Other authors carried out research into the most productive ways to render English medical terminology into Ukrainian [34], which indicated the prevalence of lexical transformation. The most frequently used translation techniques turned out to be those of calquing, transliteration and transcription, which, in the authors' view, allow maintaining the international character of medical terminology, though its expediency is questioned by other authors [35].

In another project [36], it was found that specialized abbreviations were the most problematic aspect in translating French-language texts on physical rehabilitation. Their rendering required a special search to find out their meaning, and the translation of the abbreviated notion's full form, because the equivalent abbreviations in Ukrainian typically did not exist.

Some authors [37] found a substantial share of transformations in translating the English-language texts related to medicines. In the author's opinion, it demonstrates a sufficient amount of lexical and grammatical equivalents in Ukrainian, as well as some incongruity in the structure of the English- and Ukrainian-language texts on medicines.

It was also found [38] that terminological synonymy and polysemy are the two major sources of difficulties in terminology translation. They compel to apply the contextual substitution, which requires finding out the meaning of the ST lexeme basing on the general context and selecting a contextually equivalent term in the target language. It results in separate recommendations for the translators who are non-specialists in the field, and for the field experts who are not professional translators. The former are recommended to acquire the subject knowledge related to the field, while the latter – to get insights into the theory of specialized terminology translation, word-building modes, semantics, translation techniques and their application.

Some authors [39] studied the correlation of translation techniques in respect to rendering terminological collocations. It was found that the English-language collocations, based on the ‘adjective-noun’ model, are always rendered into Ukrainian by means of calquing (which is debatable), while the ‘noun-noun’ model may be translated by either calquing or permutation. However, the author does not mention the factors that may have an impact on the said choice.

Thus, though there is a considerable amount of research into terminology in general and the translation of specialized terminology in particular, the factors that might affect the choice of translation techniques (specifically, concerning the pharmaceutical terms), as well as their correlation, remain largely unclear. To examine this issue, we undertook a special research described further.

2 Methods

The object of this research is the impact of various factors on the choice of translation techniques in rendering specialized terminology, while the subject of the analysis is the specifics of translating into Ukrainian the English-language pharmaceutical terms related to the categories of pharmacodynamics and pharmacokinetics.

The aim of the research was to outline the amount of subject knowledge and terminology necessary for the high-quality translation of the English-language texts related to pharmacology and to find out the impact of the ST terminology structure upon the choice of techniques to translate it. The achievement of this aim required the accomplishment of a number of tasks to: 1) outline the structure of the subject knowledge related to pharmacology (pharmacodynamics and pharmacokinetics); 2) find out the typical ways of term-building in this sphere; 3) analyse the translation techniques of rendering specialized terminology; 4) select the material of research; 5) distribute the selected terminology into structural groups; 6) study the dependence of the translation techniques choice on the ST terminology structure; 7) formulate the conclusions and the prospects of further research.

To complete the first task, we applied the notional analysis of the original English-language texts [40] related to clinical pharmacology; their overall size amounted to 30360 characters. The said texts reviewed the key concepts, necessary for understanding the sphere of pharmacology under consideration. The analysis results are represented in more detail further in this paper (see Research results and discussion).

Following the accomplishment of the second task, it was established that in all spheres new terminology is coined on the basis of the existing specialized lexemes [41, p. 25-26]. In the most general sense, the ways of its coining fall into morphological and non-morphological ones, where the former use affixes and the latter do not. The morphological way (prefixal – *dis-ease*, suffixal – *phys-ician* and prefix-suffixal – *anti-ang-inal* models) results in the formation of derivative terms [42]. The said modes of terminology formation were analysed on the material of some specialized areas, such as mining [43] and homoeopathy [44].

The assemblage of more than one stem or word (e.g. *hyperbilirubinemia*) results in the formation of compound words, where the relations between their components are more complicated, so the meaning of the compound is not always identical to the meaning of its elements. Some authors [45] investigated the formation of compounds in the Ukrainian language as well.

One mode, typical of specialized terminology, is related to abbreviated terms, e.g., *CYP2C9* (gene *CYP2C9*). Another way of term building is conversion, which is especially productive for English, where the change of parts of speech may not require any affixes (*sweat – to sweat*).

For the purpose of the third task accomplishment, we analysed the main approaches to the translation techniques classification. There are various views in this domain. One of the first classifications [46] included over twenty types of translation procedures. The meaning of some of them (e.g., *literal translation*) was clear without any explanation, while others (e.g. *discursive creation, modulation*) required additional clarification. In due time, more and more authors [47-54] attempted to improve the original typology, which often resulted in the introduction of new terms to mark the notions that used to be previously labelled in a different way. In other cases, different classifications used similar terms but their meanings might not be identical. For example, the term *cultural equivalent* in one classification [47] was substituted with the term *adaptation* in another one [50], while different authors suggested replacing the term *explicitation* in the primary classification [46] with alternative variants, such as *paraphrase* [47], *explicative paraphrase* [48], *addition* [54], *amplification* [51], etc.

The main problem with those and other typologies is their excessive terminological sophistication that is based on borrowed lexemes and consequently blurs the meaning of the specific terms, at least for Ukrainian recipients, because the ratio of borrowings in Ukrainian is substantially lower as compared with English, for example. In addition, most of the existing classifications have been suggested for the purpose of fiction translation analysis, which is considerably different from the specialized one.

To relieve the effect of the said factors, we suggest simplifying the existing classifications adapting them to the needs of specialized translation, on the one hand, and of the translator training in Ukrainian educational centres, on the other. Within this approach, we suggest (following other authors) viewing a translation technique as ‘any operation concerning the source text with the purpose of producing the target text’ [55]. That is, a ‘translation technique’ is a *genus* notion, which includes (as *difference* notions) both the operations involving transformations of the ST structure and those that do not involve them. For the purposes of our research, it also seems reasonable to differentiate translation techniques according to the rank they are used at – the word level or the collocation-related one.

A suitable basis for our classification seems to be the typology suggested by V.Karaban [52], with a slight modification according to the aims of our research. In this classification, at the word level, the translation techniques include, first, the selection of the dictionary equivalent, i.e. the case when a certain meaning of the term is indicated in the bilingual dictionary, irrespective of the number of meanings specified there. In case when none of the said meanings fits the specific context, other translation techniques are applied. As far as the pharmacological terms are concerned, the principal one of them (at least, theoretically) is expected to be transcoding, which falls into transcribing (the reproduction of the word pronunciation, e.g. *massage – масаж*); transliteration (the reproduction of the word graphic form, e.g. *symptom – симптом*); mixed transcoding, e.g. *supercomputer – суперкомп'ютер*, where part of the word is reproduced through transliteration (*super – супер*), and the remainder – by means of transcribing (*computer – комп'ютер*); adaptive

transcoding, when the initial part of the word is transliterated and the rest of the source language word is adapted to the norms of the target language (*placental – плацентарний*).

Contextual substitution is viewed as the use of the target language (TL) word, which is absent among the dictionary equivalents of the source language (SL) word but which suits the specific context of the TT.

The types of contextual substitution include the concretization, when the SL word of the wider semantics is substituted with the TL word of the narrower semantics (*застосування – therapy*); generalization, i.e. the opposite process (*therapy – застосування*); antonymic translation (*the outcome of drug therapy varies widely among individuals – результати фармакотерапії у різних пацієнтів не можуть не відрізнятися*); descriptive translation, i.e. rendering the meaning of the SL word with several TL words (*доба – twenty four hours*); sense development, i.e. the use of the TL word, which is the logical development of the SL word meaning (*production of these effects – досягнення цього впливу*); changing parts of speech: *appropriate* (adjective) – *доцільність* (noun); word addition, i.e. introducing into the TT additional words necessary for retaining the ST sense (*clearance – коефіцієнт очищення*).

The most widespread error in the identification of the type of translation technique used in a specific case is mixing the word and collocations levels resulting in confusion and mutual misunderstanding. Within our approach, the identification of the type of translation technique at the collocation level does not involve the said identification concerning each component of the collocation separately but is done in respect to the entire collocation as an integral lexical unit. Thus, in our proposal, the translation techniques at the collocation level include calquing, i.e. the replication of the structure of the ST compound (*blood-brain – гематоенцефалічний*) or collocation (*ambulatory patients – амбулаторні пацієнти*); word addition (*The processes... collectively termed drug disposition – Процеси... що сукупно складають зміст розподілу препарату в організмі*); word deletion (*health food supplements – харчові добавки*); word permutation (*proton pump inhibitors – інгібітори протонної помпи*), as well as their combinations, e.g. word permutation and deletion (*It is well recognized among physicians – Лікарям добре відомо*); word permutation and addition (*drug-target interaction – взаємодія між препаратом та мішенню*), word permutation, addition and deletion (*binding theory – теорія принципів і параметрів*); word addition and deletion (*strengthening by means of associations – посилення асоціативних зв'язків*).

To accomplish the fourth task of our research, we have selected 603 terms and terminological collocations from the texts (30360 characters) chosen as the source for the material of study [40]. Then we distributed the selected terminology according to its structure among different categories.

Simple terms, the smallest category in our sample, included only eight words. The prefixal group (11 terms) was equally small. The suffixal group (46 words) happened to be the largest one, while the prefix-suffixal group contained 32 items. Compound lexemes, made of two stems, which are written as one word (e.g. *pharmacologic – фармакологічний*) or through a hyphen (*self-administration – самостійний прийом лікарських препаратів*), turned out to be the most numerous category among the single-word terms (97 words). The total of the word collocations (409) in the sample is twice as large as the aggregate amount of the single-word lexemes. Below follow the results of the completion of the first, fifth, sixth and seventh tasks of our research.

3 Research results and discussion

The subject knowledge in the areas of pharmacodynamics and pharmacokinetics. The analysis of the related literature [40] showed that the subject knowledge necessary for

translating English-language texts related to pharmacodynamics and pharmacokinetics include the principal notions enumerated further.

The pharmacodynamic principles include the notions of impaired gastrointestinal absorption, induction of CYP or transporter activity, inhibition of cellular uptake or binding, of drug metabolism or drug transport, adverse and side reactions to drugs.

The principles of pharmacokinetics take into account the processes of metabolism absorption, distribution, elimination, excretion and the concentration of drug delivered to target effector molecules.

Both sets of principles include their parameters. For example, pharmacokinetic parameters involve clearance, the volume of distribution, bioavailability, as well as the rates of availability and distribution of the agent. In its turn, the drug distribution, for example, depends on the placental, blood-brain and blood-testis barriers, while a number of factors, such as metabolites, enzyme systems, genetic, environmental, and physiological aspects, etc, affect its biotransformation.

Within these *genus* categories, there were identified the *difference* notions marked by appropriate English terms. For example, within the category ‘Excretion of drugs’ we have distinguished such notions and terms as *excretion*, *excretion route*, *excretory organs*, *pulmonary excretion*, etc.

The sum total of all notions in the categories mentioned above constitutes the complete amount of the PTC subject component in the domain of pharmacodynamics and pharmacokinetics, while the aggregate amount of terms to mark those notions – its terminological component.

Dependence of the translation techniques choice on the source language term structure. At the next stage of our project, we conducted research of the PTC translation component by studying the hypothetical dependence of the translation techniques choice on the SL term structure. To achieve this aim, we analysed the correlation of translation techniques within each category and compared them among themselves. The results of the analysis are presented below.

Single-word terms. In the most general meaning, the choice of translation techniques in rendering the single-word pharmacological terms of our sample seems to depend on their structure. The frequency of the dictionary equivalent use decreases with the increase in the terms structure complexity. Its share slides down from 75%-82% in rendering the simple and prefixal terms to 58% in the case of suffixal lexemes, to 34% – concerning the prefix-suffixal terms, and to 9% in relation to the compounds. Conversely, the share of transcoding is minimal with prefixal and simple terms (9% and 25% respectively) but then it steadily rises to 38% with prefix-suffixal lexemes, and to 84% with compounds. It is worth mentioning the fact that as the term complexity increases, so does the range of the translation techniques used in respect to various categories. Only two types (dictionary equivalent and transcoding) of techniques were used to render simple terms. However, translating derivatives called for the use of additional techniques (contextual substitution for prefixal terms and word addition for the suffixal ones). The further complication of the structure resulted in expanding their range to four (dictionary equivalent, transcoding, word addition and calquing) for the prefix-suffixal terms and even six (plus the descriptive translation and contextual substitution) for the compounds.

Terminological collocations. Because our aim was to check the hypothetical dependence of the translation techniques choice on the SL term structure, we subdivided all collocations into structural groups, basing on the part of speech the first element of the collocation belonged to.

Thus, we obtained the adjectival (201 collocations), nominal (134), participial (43), verbal (27) and adverbial (4) structural groups. However, the first element in the collocation does not ultimately determine its structure, as the number of words in the collocation may

vary. To account for it, we distinguished different structural models within each structural group marked as follows: *Adj* – adjective, *N* – noun, *V* – verb, *Adv* – adverb, *Part I* – participle I, *Part II* – participle II, *Num* – numeral, *prep* – preposition, *art* – article.

In contrast to the single-word terms, the collocations require fewer translation techniques. If the amount of its elements in the TL collocation is identical to the SL collocation and they go in the same sequence, this technique was labelled as calquing [56, 57]. Provided the amount of the elements in the TL collocation was the same as in the SL, but their sequence was different, it was classified as permutation [52]. If the number of words in the TL collocation was larger or smaller as compared to the SL one, then those techniques were regarded as word addition or deletion respectively. As it was already mentioned, some combinations of those techniques (such as the simultaneous permutation and addition or deletion), are possible as well.

The results of the analysis are presented below.

Adjectival collocations. Calquing was predominantly (87%) applied in rendering the *Adj+N* collocations (*antimalarial drug* – *протималарійний препарат*), followed by the permutation (*absorptive site* – *місце усмоктування*) and addition (*stable drug* – *стабільна концентрація препарату*) or the simultaneous use of both of them (*intestinal mucosa* – *слизова оболонка кишечника*). Deletion occurred less often (*foreign substances* – *домішки*).

Conversely, permutation dominates (66%) in rendering the *Adj+N+N* collocations (*alcoholic liver disease* – *алкогольна хвороба печінки*). Calquing accounts for 17% (*active metabolite NAPA* – *активний метаболіт NAPA*), the combined application of permutation and addition is responsible for 11%, while simple addition (*prokinetic drug cisapride* – *прокінетичний лікарський препарат цизаприди*) was used in the rest of cases (6%).

The only technique used to render the *Adj+N+Prep+N* collocations was calquing, which also prevailed (85%) in translating the *Adj+Adj+N* structures (*alternative safer agents* – *альтернативні безпечні препарати*), while the rest were rendered by the combined usage of permutation and addition (10%) (*highly metabolized drugs* – *ліки з високим ступенем засвоєння*) or simple permutation (5%) (*GI mucosa* – *слизова оболонка шлунково-кишкового тракту*).

Nominal collocations. The most popular technique in translating the *N+N* collocations was permutation (*dosage form* – *форма дозування*), followed by calquing (25%) (*prescription drug* – *рецептурний препарат*) and the simultaneous application of permutation and addition (20%) (*drug accumulation* – *накопичення лікарських препаратів*).

In translating the *N+of+(art)+N* structures, the prepositions that indicated the case of the noun (as well as articles) were naturally omitted (*accumulation of drug* – *накопичення препарату*).

Permutation dominates (75%) in rendering the *N+N+N* collocations (*calcium channel blockers* – *блокатори кальцієвих каналів*), the combined use of permutation and addition accounts for 13% (*drug-receptor interaction* – *взаємодія лікарських препаратів та рецепторів*), while the shares of calquing (*kaolin-pectin suspensions* – *каолинові пектинові суспензії*) and deletion (*health food supplements* – *харчові добавки*) constitute 6% each.

Permutation also prevailed (75%) in translating the *N+Part II+N* collocations (*age-related changes* – *зміни, пов'язані з віком*), and the word addition accounted for the rest of the cases (*prolonged half-life* – *подовжений період напіврозпаду*).

In contrast to it, the *Num-N+N* structures were predominantly (67%) rendered by means of calquing (*first-pass elimination* – *пресистемна елімінація*), while the share of permutation was 33% (*first-order kinetics* – *кінетики першого порядку*).

Verbal collocations. The *V+N* collocations were translated exclusively by calquing (*cause toxicity – спричинити токсичність*), while those related to the *V+(art)+N+N* model – by means of the combined permutation and deletion (of the article) (33%) (*modulate the drug effect – модулювати ефект препарату*), permutation and addition (33%) (*enhance drug entry – посилювати надходження лікарського препарату*), calquing (12,5%) (*sequester bile acids – секвеструвати жовчні кислоти*) and deletion (12,5%) (*potentiate drug block – посилювати блокування*).

The prevailing majority (80%) of the *V+Adj+N* collocations (*facilitate viral replication – полегшувати вірусну реплікацію*), as well as those related to the *V+prep+N* model (75%), provided the prepositions indicated location, time or aim, were translated by means of calquing (*transport across membranes – переносити через мембрани*), while the combined application of permutation and addition accounted for the remaining cases (*volunteer during questioning – добровільно вказувати під час опитування*).

Participial collocations. Most of the collocations of the *Part II+N* (71%), *Part II+Adj+N* (75%) та *Part I+N* (63%) models were translated through calquing (*loading dose – ударна доза*), and the rest of the cases were accounted for by permutation (and addition) (*excreted drugs – препарати, що виводяться*). Deletion was applied in 6% of cases (*anticoagulating agents – антикоагулянти*).

The collocations of the smallest category of adverbial structures were rendered exclusively by means of calquing (*highly reactive – надзвичайно реактивний*). However, a small amount of entries in this category does not allow formulating substantiated assumptions.

4 Conclusions

The subject knowledge required for the professional translation in the areas of pharmacodynamics (the actions of the drug on the body) and pharmacokinetics (the reactions of the body on the drug) primarily include the meanings of these two terms, as well as the understanding of the notional structure of both of them. The realisation of pharmacodynamic principles requires awareness of such notions as impaired gastrointestinal absorption, induction of CYP or transporter activity, inhibition of cellular uptake or binding, of drug metabolism or drug transport, adverse and side reactions to drugs.

The most important pharmacokinetic principles that should be realized by the translator involve clearance, body's ability to eliminate drugs, the volume of distribution, the space in the body available to contain the drug, bioavailability, the rates of availability and distribution of the agent. The most important pharmacokinetic processes include drug absorption, distribution, biotransformation elimination and excretion.

Pharmacological terms are coined by morphological and non-morphological means. Most of these terms have the form of collocations (68%). Compounds prevail among the single-word terms (16%), while the shares of the other structural types are insignificant: suffixal – 8%, prefix-suffixal – 5%, prefixal – 2%, simple – 1%. The prevalence of the compounds may be explained by the high share of the names of medicines, which are often coined by joining two or more stems together.

The techniques to translate the single-word terms include the choice of dictionary equivalent, various types of transcoding (mostly transliteration and adaptive transcoding), as well as calquing (in relation to the compounds), word addition and contextual substitution. The techniques to render terminological collocations include calquing and various types of transformations (permutation, addition, deletion or the combined application of several of them).

Within the category of the single-word terms, the choice of translation techniques seems to depend on the SL term structure. The use of dictionary equivalents is a common technique only concerning the translation of the simplest and least frequent (simple and prefixal) terms, where its share amounts to 67%. When the structure of the terms gets more sophisticated, its share falls, and in the case of compounds, it accounts only for 10% of cases. Transcoding has a reverse tendency – its share is the lowest in relation to simple and prefixal terms, and then it consistently grows in line with the terms sophistication, amounting to 80% in rendering the compounds.

The range of translation techniques applied to different categories of the terms also seems to depend on their structure. Only two techniques (dictionary equivalent and transcoding) were used to translate the simple terms. However, the range of techniques expands when the term structure gets more complicated – the additional techniques of contextual substitution and word addition were used in translating the prefixal and suffixal terms respectively. The further complication of the term structure entails the expansion of the translation procedures range to six (dictionary equivalent, transcoding, word addition, contextual substitution, calquing and descriptive translation) in rendering the prefix-suffixal and compound terms.

The choice of translation techniques in respect to the English-language collocations also seems to depend on their structure, as well as on the variants of such structure. Calquing dominates within the category of the English-language adjectival collocations if the adjectives constitute at least half of their components (*Adj+N* and *Adj+Adj+N*), but its share substantially falls if the nominative components prevail (*Adj+N+N*). Thus, the share of transformations (mostly permutation and addition) goes up.

Within the category of the nominal collocations, there prevail transformations, whose share depends on the collocation structure and is the highest in translating three-word collocations, where the nominative elements predominate (*N+N+N* and *N+Part II+N*). Calquing does not play any significant role within this category and is limitedly (25%) used only in respect to the simplest two-word collocation (*N+N*).

The verbal collocations of the *V+N* model are translated exclusively by means of calquing. The choice of the translation techniques to render the verbal collocations with a larger amount of components depends on the parts of speech these additional components belong to. When they are adjectives (*V+Adj+N*), then calquing prevails, but in the case of the nouns (*V+N+N*), there is an advantage of transformations.

In the category of the participial collocations, the two-component structures of the *Part I+N* and *Part II+N* models behave like the adjectival models, i.e. calquing prevails. The expansion of these structures by means of adding adjectival elements (*Part II+Adj+N*) results in maintaining the calquing supremacy, but if a nominal element is supplemented (*Part II+N+N*), transformations gain the advantage.

In our sample, the category of adverbial collocations does not contain enough entries to formulate even preliminary conclusions.

The addition of spatial or temporal prepositions (or those indicating the purpose) into any of the adjectival, nominal or verbal collocations results in the advantage of calquing.

The suggested conclusions are preliminary; the issue requires an additional study on a wider sample, which is the prospect of further research

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