

# The translation into French of adjectives formed with a noun and a past participle in English-language medical articles

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**Abstract:** In this article, we study the translation into French of compound adjectives consisting of a past participle preceded by a noun phrase. Such adjectives are frequently used in scientific English, and while many of them are part of terms for which there is a stable translation equivalent, some remain a challenge for translators in Romance languages, as head modification in English noun phrases often has to be rendered by less economic syntactic structures in those languages. We attempt to determine the range of coverage of compound adjectives in a well-known terminology database and find out to what extent consultation of online parallel or comparable corpora can help translators deal with compound adjectives that are part of expressions which are not lexicalized. Our results show that the consultation of well-established online terminology databases can be usefully complemented by the use of online parallel corpora and (in the case of a medical subspecialty, that of nuclear medicine) the compilation of *ad hoc* comparable corpora.

**Key words:** compound adjectives, comparable corpora, corpus linguistics, medical English, parallel corpora, terminology database, translation.

## Traducción al francés de adjetivos compuestos por un nombre y un participio pasado en los artículos médicos en inglés

**Resumen:** En el presente artículo estudiamos la traducción al francés de adjetivos compuestos que constan de un participio pasado al que antecede una frase nominal. Estos adjetivos se utilizan con frecuencia en el inglés científico, y aunque muchos de ellos forman parte de términos que cuentan con un equivalente estable en la lengua meta, algunos siguen planteando dificultades para los traductores a lenguas románicas, ya que, en muchos casos, para verter la modificación del núcleo de las frases nominales del inglés hay que recurrir a estructuras sintácticas que en dichas lenguas son menos escuetas. Intentamos evaluar la presencia de adjetivos compuestos en una conocida base de datos terminológica y determinar en qué medida la consulta de corpus paralelos o comparables puede ayudar a los traductores a verter adjetivos compuestos integrantes de expresiones no lexicalizadas. Nuestros resultados demuestran que la consulta de bases de datos terminológicas en línea de probada calidad puede complementarse eficientemente con el empleo de corpus paralelos en línea y (en el caso de la especialidad de medicina nuclear) con la compilación de corpus *ad hoc* comparables.

**Palabras clave:** adjetivos compuestos, corpus comparables, corpus lingüísticos, inglés médico, corpus paralelos, base de datos terminológica, traducción.

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### 1. Introduction

While the problems posed by the translation of denominal adjectives from French into English and vice-versa is well-documented (see for instance Maniez, 2009), the translation into Romance languages of compound adjectives consisting of a past participle preceded by a noun phrase (e.g. *decay-corrected*, *receptor-mediated* or *technetium-99m-labeled*) seems to have received little attention thus far. Van Hoof (1998) mentions the tendency to use more compound adjectives in French than in English, but only in reference to the fusion of two adjectival forms such as *hémato-encéphalique* or *termino-latérale*. Compound adjectives are more frequently used in scientific English than in general

language (Maniez and Thoiron, 2004), and very often are a challenge for translators in Romance languages, where the equivalent of head modification in a noun phrase cannot be expressed with such economy. Moreover, even some very frequently encountered adjectives of this type are absent from the most commonly used terminological databases, whose entries are mostly terms consisting of a noun or a complex noun phrase. The productivity of the compounding mechanism in English obviously makes it impossible to record all the forms that are used, let alone all those that can be created and are not yet part of the language. The aim of our study is to determine the range of coverage of such compound adjectives in a well-known terminology

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database (the Grand Dictionnaire Terminologique, created and maintained by the Office québécois de la langue française) and find out to what extent consultation of online parallel or comparable corpora can help translators deal with compound adjectives that are part of expressions which are not lexicalized.

**2. Identification of the most productive past participle forms used in compound adjectives ending in -ed in the medical part of the Corpus of Contemporary American English**

We used a list of the 500 most frequently used compound adjectives ending in *-ed* in the medical part (ACAD:MED) of the Academic sub-section of the Corpus of Contemporary American English (henceforth COCA) as a basis for our study (see Davies, 2008, for an introduction to the corpus). We selected the 464 forms which were used five times or more in the corpus. Table 1 shows the 30 most frequently used compound adjectives with their respective frequencies.

The regular expression used in our query (*\*-\*ed*) did not allow for the selection of specific syntactic patterns, since the components of compound adjectives are not individually part-of-speech-tagged. Consequently, a wide variety of word formation patterns is to be observed in our list: while it seems possible to paraphrase the meaning of most adjectives by developing an underlying prepositional phrase attached to the head noun (community-based = based in the community, health-related = related to health), some of the items listed in the table clearly do not fit that pattern. Here are some examples:

- the first component of the compound adjective is a prefix or an adverb: pre-formatted, so-called, well-defined
- the compound adjective is not formed with a past participle, but by adding the *-ed* suffix to a noun phrase considered as a whole: left-sided, open-ended, middle-aged, able-bodied.

Since we assume that such forms are lexicalized and are generally assigned stable translation equivalents in Romance languages, we will consider them to be outside the scope of our study, and we will focus instead on compound adjectives that are formed with a past participle, whether they express an objective relation (computer-aided = aided by a computer, physician-assisted = assisted by a physician) or any other relation that can be expressed through the use of a prepositional phrase.

Since several of the adjectives shown in Table 1 were formed with the same past participle (six on *based* and five on *related*), we attempted to isolate the most productive past participles by computing their frequencies separately. Table 2 shows the total number of distinct compound adjectives formed with the 20 most productive past participles and the aggregate frequency for all of those forms combined.

Table 1. Most frequently used compound adjectives ending in -ed in the medical part of the Academic sub-section of the COCA Corpus (ACAD:MED)	
Compound adjective	Frequency
pre-formatted	519
self-reported	325
community-based	266
evidence-based	224
population-based	204
school-based	168
health-related	138
work-related	136
left-sided	86
placebo-controlled	86
age-adjusted	84
HIV-infected	77
right-sided	76
T2-weighted	76
hospital-based	72
computer-based	71
age-related	69
open-ended	68
so-called	61
self-contained	60
middle-aged	60
able-bodied	57
well-defined	56
liver-related	55
community-acquired	54
contrast-enhanced	54
fall-related	54
computer-aided	53
physician-assisted	53
patient-centered	49

**Table 2. Twenty most productive past participles in the formation of compound adjectives in the medical part of the Academic sub-section of the COCA Corpus (ACAD:MED)**

Past participle	Number of compound adjectives	Aggregate frequency
based	78	4941
related	68	4406
induced	17	999
treated	10	812
associated	9	788
reported	7	734
controlled	7	452
infected	7	398
weighted	7	332
assisted	7	294
centred	7	266
sided	6	235
mediated	6	145
shaped	5	113
directed	4	102
limited	4	72
oriented	4	131
linked	4	171
tested	4	179

### 3. Study of compound adjectives formed with the past participle based

We chose to study compound adjectives formed with the most productive past participle, i.e. *based* (see Table 2 above). For each of the four adjectives we studied, we checked for inclusion in the Grand Dictionnaire Terminologique (henceforth GDT) as its search module allows for queries using wild cards (\*-based), unlike some other such terminology databases. We also checked for the presence of French and Spanish translation equivalents of expressions using those four compound adjectives on the Linguee search engine, which uses online translations to create a virtual parallel corpus.

The GDT lists 33 items corresponding to the query <\*-based>. They cover a variety of domains (17), but mostly concern items listed under INFORMATIQUE (computer science/information technology). The past participle *based* is itself an entry, in which the translation *architecturé autour de* is provided in relation to the INFORMATIQUE domain.

The most commonly used compound adjectives formed with *based* in our corpus are *community-based*

(266 occurrences), *evidence-based* (224), *population-based* (204) and *school-based* (168). None of them are present in the GDT as adjectival forms, but a query using several wildcards (\*-based \*) reveals no fewer than 577 items, including 11 terms starting with the adjective *community-based*, 4 with *evidence-based*, 1 with *population-based* (population-based approach) and 3 with *school-based*. In some cases, alternative spellings of the same adjectival form — hyphenated (*school-based*) and non-hyphenated (*school based*) — are listed as separate items, even though they eventually link to the same terminological record.

#### 3.1. Community-based

##### 3.1.1. Translation of the adjective community-based in the GDT

If we turn to the 100 most frequently used adjective-noun expressions in the ACAD:MED section of COCA, we find that three of them start with the adjective *community-based*: *community-based services* (26 occurrences), *community-based health* (12) and *community-based programs* (8), the sequence *community-based health* being actually part of longer noun phrases such as *community-based health programs* or *community-based health services*.

It turns out that none of those expressions are part of the items listed as a result of our GDT query, which are the following:

- community based distribution of contraceptives
- community-based family planning project
- community-based grocery store
- community-based literacy program
- community-based mentoring
- community based primary health care
- community-based program
- community-based social marketing
- community based tourism
- community based tree plantation

Suggested translations range from the use of the relational adjective *communautaire* (community-based literacy program → programme d'alphabétisation communautaire, community-based mentoring → mentorat communautaire, community-based program → programme communautaire, community-based social marketing → marketing social communautaire, community based tourism → tourisme communautaire, community grocery store → épicerie communautaire) to the use of prepositional phrases built around the noun *collectivité* (community based family planning project → projet de planification de la famille à l'échelon de la collectivité, community based primary health care → soins de santé primaires axés sur la collectivité).

##### 3.1.2. Translation of the adjective community-based on the Linguee search engine

A query on the Linguee search engine provides a translation for the expression *community-based health services* that makes use of the adjective *communautaire*:

(1) Twelve per cent of the groups surveyed were involved in the arts; organizations that serve ethnocultural communities and **community-based health services** each made up 10.0% of respondents. [Source: <http://www.ccsd.ca/pubs/2003/fm/chapter4.pdf>].

Douze pour cent des organismes participants sont engagés dans le domaine des arts, 10 % sont des organisations au service de communautés ethnoculturelles et 10 % des **organismes de santé communautaire**.

[Source: <http://www.ccsd.ca/francais/pubs/2003/fm/chapter4.pdf>].

However, the other expressions for which translations are available (community based health advocacy groups, community based health care, community-based health and social service organizations, community-based health clinics, community-based health insurance schemes) do not match those that are most frequently used in ACAD:MED. Still, in this particular instance, using the Linguee search engine seems a useful option for translators, even though the various meanings of the word *community* and the wide variety of head nouns modified by the adjective *community-based* make it difficult to readily select one particular translation that will fit all of its uses. Incidentally, the number of examples in which no translation is provided for the adjective is an indication of the difficulty such adjectives represent for translators, as shown by example 2:

(2) UNICEF has been supporting the health system in these districts in training **community-based health workers**, midwives and emergency obstetric care facility staff while at the same time upgrading facilities aimed at round-the-clock delivery services in all 11 district centre hospitals.

[Source: [http://www.unicef.org/about/execboard/files/Pakistan\\_final\\_approved\\_CPD.pdf](http://www.unicef.org/about/execboard/files/Pakistan_final_approved_CPD.pdf)].

L'UNICEF apporte son appui au système de santé dans ces districts en formant des **travailleurs de la santé**, des sages-femmes et des centres pour le personnel des soins obstétricaux et aide en même temps à la rénovation de maternités chargées d'accouchements dans tous les 11 districts.

[Source: [http://www.unicef.org/french/about/exec-board/files/08-PL11-Pakistan-ODS-French\(1\).pdf](http://www.unicef.org/french/about/exec-board/files/08-PL11-Pakistan-ODS-French(1).pdf)].

It is to be noted that even though the adjective *communautaire* is widely used, a few translations resort to French expressions which express the notion of a geographically restricted area, such as *au niveau local* or *de proximité*:

(3) In 40 countries, Save the Children's **community-based health and nutrition programmes** ensure access for families to effective health care.

[Source: [http://csonet.org/ngocommittee/content/documents/EC220102Add46\\_English.pdf](http://csonet.org/ngocommittee/content/documents/EC220102Add46_English.pdf)].

Dans 40 pays, les **programmes relatifs à la santé et à la nutrition réalisés au niveau local** permettent aux familles d'accéder à des soins efficaces.

[Source: [http://csonet.org/ngocommittee/content/documents/EC220102Add46\\_French.pdf](http://csonet.org/ngocommittee/content/documents/EC220102Add46_French.pdf)].)

(4) The objective of access for all European citizens to **high-quality and community-based health care** cannot under any circumstances be achieved by a European directive based on the case-law of the European Court of Justice, ruling on a few contentious cross-border issues.

[Source: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+CRE+20070523+ITEMS+DOC+XML+V0//EN&language=EN>].

L'objectif de l'accès, pour tous les citoyens européens, à des **soins de qualité et de proximité** ne peut en aucun cas être atteint par une directive européenne fondée sur la jurisprudence de la Cour de Justice européenne statuant sur quelques cas litigieux transfrontaliers.

[Source: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+CRE+20070523+ITEMS+DOC+XML+V0//FR>].

A query conducted on the English/Spanish version of the search engine reveals that Spanish translations for the adjective *community-based* are about equally divided between uses of the relational adjective *comunitario* which may be preceded by the noun *base* (community-based organizations → organizaciones de base comunitaria, community-based rural tourism → turismo rural comunitario) and uses of the noun *comunidad* (community-based approaches → planteamientos basados en la comunidad).

### 3.2. Evidence-based

#### 3.2.1. Translation of the adjective evidence-based in the GDT

The GDT lists two terminological records whose main entry starts with the adjective *evidence-based*: *evidence-based medicine* and *evidence-based care*. As both components of the compound adjective *evidence-based* can be translated in several ways, a comprehensive list of all the variations for the French equivalent is given in the terminological record that is devoted to *evidence-based medicine*, which can be synthesized in the following manner (parentheses indicate words that can be dispensed with; slashes indicate alternatives): *médecine basée/fondée sur les/des preuves/données probantes/faits (prouvés)*. A much shorter translation, *médecine factuelle* is mentioned as the term that has been most currently used in the past few years. The same type of variation is mentioned in the terminological record that is devoted to *evidence-based care*.

#### 3.2.2. Translation of the adjective evidence-based on the Linguee search engine

A query on the Linguee search engine provides examples of translations for *evidence-based medicine*, as well as the other expression used in ACAD:MED, *evidence-based practice*. The result of our query also shows translations for

expressions in which *evidence-based* is followed by the nouns *approach*, *decision-making*, *information*, *policy*, *policy-making* and *research*.

The examples provided by Linguee reveal that while *médecine factuelle* and its longer synonyms are widely used, some other expressions (*médecine fondée sur l'expérience clinique*, *médecine scientifique*) can occasionally be found. As far as the expression *evidence-based practice* is concerned, the two most commonly found translation equivalents are *médecine fondée sur l'expérience clinique* and *médecine fondée sur des données probantes*.

A query conducted on the English/Spanish version of the search engine shows that Spanish translations for the adjective *evidence-based* are mostly literal, since the forms *basada en la evidencia* and *basada en evidencias* account for over 60% of all translations of the adjective used in translations for the expression *evidence-based medicine*. Other more rarely used translations include such expressions as *medicina basada en pruebas* or (more rarely) *medicina basada en los hechos*. Even though a web search shows a few results for “*medicina factual*”, none of the results available on Linguee mention that expression as a translation equivalent.

### 3.3. Population-based

#### 3.3.1. Translation of the adjective population-based in the GDT

Only one terminological record concerns a term which includes the adjective *population-based*, the record for the term *population-based approach*. The suggested French translation is *approche en population générale*, and the English definition, coined by the World Health Organization in 1995, suggests that use of the term is restricted to the context of prevention measures against alcohol-related problems, although web evidence suggests otherwise (see below). Judging by the variety of expressions in which the adjective is used, some of them, notably *population-based study* (see below), probably deserve to be added to the terminological database.

#### 3.3.2. Translation of the adjective population-based on the Linguee search engine

A query on the Linguee search engine provides a translation for expressions in which the adjective *population-based* precedes a great number of nouns, including *approach*, *data*, *measures*, *prevention*, *surveillance*, *strategy*, *(cohort) study* and *survey*. Various French translations are recorded for the most commonly used expression (*population-based study*): *étude en population (générale)* and *étude de population* are the most frequently encountered, and there are two occurrences of use of the relational adjective *populationnel*. Example 4 shows that use of the term *population-based approach* does not necessarily follow the sense restrictions mentioned in the GDT.

(5) (a) offer evidence-based cancer screening through a systematic **population-based approach** with quality assurance at all appropriate levels.

[Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:327:0034:0038:EN:PDF>].

a) d'offrir un dépistage du cancer reposant sur des données probantes, grâce à une **approche** systématique **s'adressant à la population** et avec une assurance de qualité à tous les niveaux appropriés.

[Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:327:0034:0038:FR:PDF>].

A query conducted on the English/Spanish version of the search engine reveals that the most commonly used Spanish translation for the expression *population-based study* is *estudio basado en la población* (over 60% of all translations). Use of *estudio basado en población* or *estudio de población* is marginal, but 5 occurrences of the relational adjective *poblacional* are recorded (a query on the Google Books search engine reveals several uses of the term *estudio poblacional* prior to 1960, and visualization of the currency graph on the Ngram Viewer [<https://books.google.com/ngrams>]) shows a steep increase in its use from that period on).

### 3.4. School-based

#### 3.4.1. Translation of the adjective school-based in the GDT

Only two terminological records concern terms which include the adjective *school-based*: *school-based budgeting* and *school-based management*. The suggested French translations are respectively *établissement du budget sur la base école* and *gestion par l'école*. A few variants are suggested for the first term, which was coined by the Office québécois de la langue française in 1986 (*établissement du budget sur la base école*, (technique du) budget (à) base école). However, a web search shows no sign of use of the French term or of its variants. The term *gestion par l'école* is rarely used, but a few examples of its use (most of them specifically as a translation for *school-based management*) are recorded.

#### 3.4.2. Translation of the adjective school-based on the Linguee search engine

A query on the Linguee search engine provides a translation for expressions in which the adjective *school-based* precedes fifteen nouns, including *management*, *program*, *learning*, *training*, and *education*. The most commonly used French translation for *school-based management* is *gestion autonome des écoles* (over 60% of all translations), for which the acronym GAE also appears. However, a web search for the expression yields barely over 30 results. Two contexts are available for translations of *school-based budgeting*, but the corresponding French expressions, used in examples 6 and 7, were apparently coined for the occasion and no other uses of those expressions are recorded on the web. Example 6 incidentally mentions one of the reasons why the expression *school-based budgeting*, although it is absent from such a sizeable corpus as COCA, is present in the GDT, since it was once the object of terminology planning decisions in Canada. Web counts confirm the success of the intervention, since uses of the expression *school-based decision-making* outnumber uses of *school-based budgeting* by a ratio of 5 to 1.

(6) Here there is a focus on finance and resource allocations to schools, just as there has been in Edmonton, Canada, where the former term ‘**School-Based Budgeting**’ has been replaced by ‘School-Based Decision-Making’.

[Source: <http://unesdoc.unesco.org/images/0011/001184/118487e.pdf>].

Dans ce cas, l’accent est mis sur le financement des écoles et la répartition de leurs moyens, comme à Edmonton, au Canada, où l’ancienne formule « **Budgétisation au niveau de l’école** » a été remplacée par « **Prise de décisions au niveau de l’école** ».

[Source: <http://unesdoc.unesco.org/images/0011/001184/118487f.pdf>].

(7) Decentralized **school-based budgeting** is replacing the centralized, relatively uniform approach to allocating resources to schools which was assumed to be equitable in the past.

[Source: <http://unesdoc.unesco.org/images/0011/001184/118487e.pdf>].

La **budgétisation décentralisée à l’école** est en passe de se substituer à la budgétisation centralisée, approche relativement uniforme d’affectation des ressources [...]

[Source: <http://unesdoc.unesco.org/images/0011/001184/118487f.pdf>].

A query conducted on the English/Spanish version of the search engine reveals that the most commonly used Spanish translation for the expression *school-based management* is *gestión basada en la escuela* (over 80% of all translations), a term for which over 100,000 hits are obtained through a query on the Google search engine. A total of fifteen expressions using the adjective *school-based* are listed, but *school-based budgeting* is not one of them.

**4. Use of a parallel corpus for the study of compound adjectives formed with the past participle induced**

Access to a terminological database such as the Grand Dictionnaire is a precious tool for translators, and a wide variety of terms including compound adjectives are consigned in terminological records (577 hits were obtained for those formed with the past participle *based* alone). Using the Linguee search engine will occasionally help translators to find translation equivalents that were not mentioned in the Grand Dictionnaire and check the currency of those that are listed in that very useful terminological database. This mode of operation, with which translators all over the world are presumed to be familiar, will now be compared to the use of a comparable corpus in a specialized field of medicine, that of nuclear medicine. Our approach involves a comparison of two corpora each consisting of over 700 scientific articles published in the field of nuclear medicine (the total number of words is over 3 million words for the English corpus and over 2.5 million words for the French corpus).

For this part of our study, we considered it necessary to focus on adjectives formed with a past participle that is more

specifically productive in the field of medicine than *based* (out of the 577 records returned by the query <\*-based \*> in the GDT, only 20 belonged to the Medicine field). We chose the past participle *induced*, which was used in 13 distinct <Compound adjective-Noun> expressions in the English corpus, for a total of 85 forms (as a comparison, out of the 211 records returned by the query <\*-induced \*> in the GDT, 38 belonged to the Medicine field).

Table 3 shows the 12 complex terms listed in the GDT that include an adjective formed with the past participle *induced*, (unhyphenated versions are included in the results of queries in which hyphens are used). The adjective *drug-induced* is also an entry in itself, for which the translation *d’origine médicamenteuse* is given.

Table 3. Terms including a compound adjective formed with <i>induced</i> in the GDT	
acetylcholine-induced spasm	spasme acétylcholinique
digitalis-induced bradycardia	bradycardie digitalique
drug-induced hepatitis	hépatite médicamenteuse
drug-induced parkinsonism	syndrome parkinsonien neuroleptique
exercise-induced asthma	asthme d’effort
heparin-induced thrombocytopenia	thrombocytopénie induite par l’héparine
leukocytopenia-induced	leucopéniant
medication-induced headache	céphalée d’origine médicamenteuse
platelet-induced cerebral thrombosis	thrombose cérébrale par agrégation plaquettaire
pregnancy-induced hypertension	hypertension gravidique
radiation induced malignancy	altération maligne causée par les rayonnements
trans urethral laser induced prostatectomy	TULIP

It is worth remarking that the causal relation expressed by the verb *induce* is translated with a verb form only twice, through use of the verbs *causer* (altération maligne causée par les rayonnements) and *induire* (thrombocytopénie induite par l’héparine). Other ways in which this relation is expressed include use of prepositions (asthme d’effort, thrombose cérébrale par agrégation plaquettaire) or modification by a relational adjective (spasme acétylcholinique, bradycardie digitalique, hépatite médicamenteuse, hypertension gravidique). Note that in the case of the term *syndrome parkinsonien neuroleptique*, the class of drugs is actually specified, so that the adjective *neuroleptique* actually means neuroleptic-induced (both *neuroleptic-induced* and *antipsychotic-induced* are widely used adjectives in the literature). As to the translation of

*leukocytopenia-induced* by leucopéniant, it seems to be an error as the causal relation is apparently inverted (leucopéniant actually means *leukocytopenia-inducing*).

Table 4 lists the 13 distinct expressions starting with a compound adjective used at least five times in the English part of the comparable corpus. None of those expressions are listed in the GDT, and three of them include the adjective *radiation-induced*. It should also be noted that some of these expressions are incomplete noun clauses which refer to the following expressions in the English corpus: turpentine-induced inflammatory **tissue**, radiation-induced DNA **damage/double strand break**, hypoxia-induced gene **expression**, TPA-induced ear **edema** and cycloheximide-induced liver **injury**.

Table 4. Expressions including a compound adjective formed with <i>induced</i> in the English part of the Nuclear Medicine comparable corpus	
13	turpentine-induced inflammation
11	turpentine-induced inflammatory
7	LPS-induced inflammation
6	proton-induced reactions
6	radiation-induced apoptosis
6	radiation-induced DNA
6	treatment-induced changes
5	hypoxia-induced gene
5	TPA-induced ear
5	5FU-induced increase
5	MPTP-induced parkinsonism
5	cycloheximide-induced liver
5	radiation-induced cleavage

For evaluation of the potential added value of comparable corpus use, we chose to focus more specifically on the translation of the most frequently used compound adjective in Table 4, *radiation-induced*. The GDT contains five records in which the adjective is used, which are listed in Table 5.

Table 5. Terms including the compound adjective <i>radiation-induced</i> in the GDT	
radiation induced colouration	coloration induite par irradiation
radiation-induced gelation	gélification par radiation
radiation induced malignancy	altération maligne causée par les rayonnements
radiation induced mutagenic/carcinogenic properties	propriétés mutagènes/cancérigènes induites par les rayonnements
radiation induced Pyc cracking	fissuration du pyrocarbone sous l'effet des rayonnements

Here again, the translations in Table 5 show that the same mechanisms are at work for translation of the causal relation expressed by the verb *induce* as for the terms listed in Table 3, *i.e.* use of the verbs *causer* (propriétés mutagènes/cancérigènes induites par les rayonnements) and *induire* (coloration induite par irradiation) as well as prepositions or prepositional phrases (gélification par radiation, fissuration du pyrocarbone sous l'effet des rayonnements).

For this part of our study, we chose to consult the French part of our comparable corpus in order to check for possible existing alternatives to the translations suggested by the GDT—for a discussion of the advantages of comparable corpora over parallel corpora, see Teubert (1996), Zanettin (1998) and McEnery & Ziao (2008)—. Since the words used for the translation of the word radiation in French either contain part of the Latin formant *radio* (radiation, irradiation) or are formed with the French word for *radius* (rayon, rayonnement), we searched the corpus for words containing the sequences *rayon* or *radi* and studied their lexical environment. Our search yielded some interesting results. Wide use of the verb *induire* was confirmed by corpus data, as in example 8, but the use of the verb *lier* was even more frequently recorded (example 9), with many uses of expressions that seem to be potential translation equivalents for *radiation-induced*, such as *lié(e)s à l'irradiation* and *lié(e)s aux rayonnements*. Examples 10 and 11 show other contexts in which the causal relation is expressed through the use of prepositional phrases (*à la suite de*, *résultant de*). In the latter example, *résultant de l'irradiation par le TDM* appears to be a possible equivalent for the complex adjectival phrase *CT-scan-radiation induced*, which is often used in the field of oncology.

(8) En revanche, pour les oxystérols, le lien entre la variation du marqueur considéré et les pathologies possibles du système physiologique considéré **induites par les rayonnements ionisants** n'est pas toujours suffisamment établi.

(9) Enfin, pour les patients souhaitant plus d'information sur les risques **liés aux rayonnements ionisants**, il serait souhaitable de pouvoir disposer d'un document général plus détaillé sans être alarmiste sur les **risques liés à l'irradiation**.

(10) Ce cas constitue finalement la première description d'un syndrome de défaillance multi-organes (SDMO) **à la suite d'une irradiation** accidentelle.

(11) La dose efficace totale de l'examen TEP/TDM tient compte de l'irradiation résultant de l'administration de l'activité de FNa et de celle **résultant de l'irradiation** par le TDM.

Even more interesting, consultation of the French part of the comparable corpus through queries using the *radio* formant also reveals wide use of an adjective which was not mentioned in the terminological records of the GDT (*radio-*

*induit*). Table 6 lists the words and expressions which are qualified by the various forms of that adjective in the corpus.

Table 6. Terms modified by the compound adjective <i>radio-induit</i> in the French part of the Nuclear Medicine parallel corpus	
Term	Frequency
cancer(s)	16
dommages	14
toxicités	4
apoptose	2
sarcome	2
fibrose	2
SDMO	2
atteinte hépatique	2
complications	2
syndrome de défaillance multi-organes (SDMO)	2

### 5. Conclusion

This brief study of the coverage of compound adjectives ending in *-ed* confirms that the Grand Dictionnaire Terminologique includes a large number of such adjectives (over 500 for such productive past participles as *based* and *controlled*, for instance). Very often, wide variation in the translation of those adjectives justifies the fact that no translation is provided for the adjective alone (e.g. *evidence-based* or *radiation-induced*) but instead only for the complex noun phrases that include them. Coverage of such forms in other well-established terminology databases (Termium Plus, IATE) will be the object of future publications.

The respective merits of the other two types of lexical resources that were used also need to be researched further. The Linguee search engine is a powerful tool that can be put to good use by confirmed translators who can accurately rate the reliability of its translations, and it is likely that use of the Word Wide Web as a parallel corpus (Kilgarriff, 2001; Resnick & Smith, 2003) will continue to gain in accuracy in years to come. As to comparable corpora, while their compilation and use can prove time-consuming, they afford access to examples of language use unaltered by the translation process (Baker, 1998) and remain a very useful tool for tracking variation of translation equivalents in specialized language.

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