UNDERSTANDING ANATOMICAL LATIN

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Introduction and Purpose

Because of its long and storied history, the discipline of anatomy makes considerable use of the Latin language. These notes provide relevant background on the language in order that a student may

- appreciate the classical terms used in anatomy and therefore better recall them;
- pronounce classical terms in a reasonable and intelligible fashion;
- generate correct classical forms, including plurals; and
- satisfy a curiosity after the workings of the Latin language.

For maximum relevance, the guide draws primarily on many anatomical terms for its examples; it essays at every turn to be readable and interesting to readers with no experience with Latin.

The following typography is employed: classical ***words and stems*** are marked in ***blue***, classical ***word endings*** in ***green***, and English *translations* in *italics*.

We begin by discussing the contemporary pronunciation of Latin.

Pronunciation

Though largely unchanged in its grammar, today's academic and medical Latin differs greatly from classical Latin in its pronunciation. Although the pronunciation of classical Latin is known and used (as authentically as is convenient) by classicists and linguists, most languages with systematic pronunciation have traditionally applied them to Latin to produce their own "in-house" pronunciation of Latin. For instance, the word ***vici*** of Caesar's famous quotation is WEE-kee in Classical, VEE-chee in Italianate, and VEE-see in French Latin.

English, too, has a regional pronunciation system for Latin. However, the less obvious nature of English pronunciation rules, along with the influence and increasing awareness of foreign pronunciation, has led to some variance in the way Latin is pronounced. While it is not the goal of this guide to standardize or recommend a pronunciation, a few organizing observations may be helpful to the student.

Consonants

By the time post-classical Latin had begun to spawn the current Romance languages, the pronunciation of certain consonants (such as *c*) had begun to change before the two frontal vowels, *e* and *i*. This change solidified in the various languages (somewhat differently, as exemplified by the pronunciations of ***vici*** above). Interestingly, the very same change had been happening in the precursors of the English language. Therefore it became doubly natural, both by native rules and international precedent, that certain

consonants in Latin should be pronounced differently before the "**soft vowels**" *e* and *i*, despite their invariant pronunciation in classical Latin.

Therefore, it is accepted today, in English as well as Anglicized Latin, that

- *c* before *e* and *i* is pronounced like *s* (***acetabulum***), but
- *c* before *a*, *o*, and *u* is pronounced like *k* (***calcaneus***).
- *g* before *e* and *i* is pronounced like (English) *j* (***pharyngeus***) [1], but
- *g* before *a*, *o*, and *u* is pronounced like *g* in *gap* (***laryngopharynx***).

Although you should be sure to read anatomic Latin in this manner, knowing the original classical phonetics makes certain linguistic phenomena easier to understand. However, bear in mind that despite current pronunciation, in the original language *c* and *g* were always pronounced hard, as in *cat* and *go*; this information will become useful in understanding the forms of certain nouns.

Vowels

For reasons soon to be explained, words encountered in anatomical Latin often have certain vowel endings. In particular

- Terminal ***–ae*** (***palpebrae***) may be pronounced (at the speaker's choice and ideally consistently) EE, EYE, or AY. In particular, the EE is recommended by scientific Latin; the AY rarely and mainly by the British (though it has near exclusive hold of ***vertebrae***); and the EYE by the authentic classical pronunciation. The last pronunciation is perhaps due to attraction to the ending ***–i***, which, as discussed later, performs many of the same grammatical functions in different words.
- Terminal ***–i*** (***rami***) is usually pronounced EYE, but is occasionally (and authentically) pronounced EE.

It is somewhat amusing (or perhaps disconcerting) to a classicist that the most recommended scientific pronunciation of ***–ae*** and ***–i*** is the reverse of their sounds in antiquity. Also,

- Terminal ***–is*** (***indicis***) should be pronounced ISS[2].

Stress (Accent)

Regardless of the regionalized pronunciation in use, Latin stress always falls in its classical position; this position is either the second- or third-to-last syllable (**penult** or **antepenult**). The deciding rule states that "short" penults cannot take an accent and instead throw the accent back to the antepenult; however, the necessary information about syllable and vowel length unfortunately cannot be gleaned completely from the spelling.

[1] With an exception. A few English words (e.g. give) retain an irregular hard g because they were borrowed from the Viking language after the Saxon sound change occurred. The rule still applies for Anglicized Latin.
[2] In some contexts the pronunciation is instead eess, but they do not arise in anatomical Latin.

Fortunately, it happens that most anatomy terms are accented on the penult (second-to-last syllable). The following nonexhaustive groups of words, however, take the accent on the antepenult (third-to-last):

- Words where the penult ends in a vowel that is immediately followed by the vowel of the ultimate syllable. Examples include words in ***–i·us***, ***–i·a***, ***–i·um*** (e.g. ***rádius***) and ***–e·us***, ***–e·a***, ***–e·um*** (***línea***, ***gálea***). (A small group of words imported from Greek, such as ***peritonéum***, ***perinéum***, and ***glutéus*** have the penultimate *e*; however, the *e* is a contraction of an older *ae* or *ai*, and therefore these words are properly accented on the penult.)
- Diminutives (discussed later) in ***–ul*** (***língula***) or ***–ol*** (***malléolus***).
- Greek plurals in ***–mata*** (***xanthómata***, ***eczémata***)
- Other forms found in common muscle names[3]: ***fémoris***, ***póllicis***, ***hállucis***, ***índicis***, ***abdóminis***

Because mispronunciation is rank among students, the student is encouraged to consult such reputable printed sources as dictionaries when a pronunciation is uncertain.

We now turn the remainder of the discussion to written Latin forms.

[3] Though the Rule of the Penult is still the governing rule in these listed (and all other) cases, other bits of knowledge allow these conclusions to be made.

Written Anatomical Latin

Nouns

Having remarked briefly on pronunciation, this guide now chiefly discusses nouns and adjectives, as it is these two parts of speech that comprise anatomical terminology. We will begin with nouns.

Inflection

In order to reflect their grammatical role and number in a sentence, nouns in Latin change their endings, or **inflect**. For instance, observe the changing forms of ***dura mater***:

Dura mater cerebrum involvit.
A "harsh mother" envelops the brain.
Duram matrem disseca ut patefiant leptomeninges.
Cut away the "harsh mother" so the leptomeninges might be laid bare.
Margo inferior durae matris sinum sagittalem inferiorem continet.
The lower margin of the "harsh mother" contains the lower sagittal sinus.

Grammatical role is signified by a category called **case**. Though English nouns once inflected to show their case, English has pulled away from its German roots and today retains only a vestigial case system. It is revealed only in personal pronouns, where *I* is used for the speaker as grammatical subject, *me* for speaker as grammatical object, and so forth. The issue of *who* versus *whom* similarly has to do with case.

A number of modern languages, including German, Greek, Russian, and Finnish, still have a thriving case system, and others, including Korean and Japanese, have a particle system that could be construed as a case system.

Latin Cases

In Latin, there are five common cases:

- the nominative (marking the subject of a clause),
- the genitive (marking possession),
- the dative (marking the indirect object of a clause),
- the accusative (marking the object of a clause), and
- the ablative (marking instrumentality[4]).

Knowledge of two, the **nominative** and **genitive**, provides special insight into anatomical names in Latin. We shall not concern ourselves any longer with the other three cases.

[4] All of these cases have various other miscellaneous grammatical uses, especially the ablative.

Why are the nominative and genitive cases important to anatomy?

- The nominative is the default case in which terms are presented.
- The genitive (JEN-nih-tiv) or possessive case often localizes a structure within another structure (e.g. ***basis pontis***, *the base of the pons*) or shows the object upon which it acts (e.g. ***flexor digitorum***, *the flexor of the fingers*)[5]. A word in the genitive case is usually translated with the help of the English word *of*.

Even outside of anatomy, the nominative and genitive will appear whenever Latin or Latinate names are used, including:

- Names of diseases or conditions, such as
  - ***xanthelasmata palpebrarum***, *yellow plates of the eyelids*
  - ***pruritus ani***, *itching of the anus*
- Taxonomic names[6], such as
  - ***Streptococcus pneumoniae*** (*of pneumonia*)
  - ***Canthigaster smithae*** (*of the neo-Latinate scientist "Smitha"*)
  - ***Brachypelma smithi*** (*of the neo-Latinate scientist "Smithus"*).

We will begin to discuss such word forms shortly. Be sure that you understand the meaning and role of the nominative and genitive cases before proceeding!

When nouns undergo inflection through the various cases, they said to **decline**. Consequently, nouns are grouped into various **declensions** based on the particular pattern of endings they take on. A noun might be of the first declension, for instance, and assume a certain pattern of endings as it takes on various grammatical roles (i.e., cases) and quantity (i.e., number: singular or plural). The full declension of a noun, singular and plural, through its five cases requires ten forms (= 2 × 5), but as mentioned before we will concern ourselves only with the four nominative and genitive forms.

[5] Technically, the first type is called the possessive genitive and the second, the objective genitive. However, the distinction is unimportant in English, as the "of" wording serves in both cases.
[6] Specific (species) names are either a word in the genitive or an adjective.

Declensions

In Latin, there are, with some further subdivisions, five declensions (or patterns of noun declining); the largest declensions are the first, second, and third. All five declensions[7], along with their nominative and genitive singular endings for each, are listed below.

	NOM SG	GENITIVE SG	EXAMPLES
FIRST DECLENSION	-a	-ae	***fossa***
SECOND	-us	-i	***ramus***
SECOND, -UM NEUTER	-um		***cerebrum***
THIRD, S-CONTRACTS	-s	-is	***pons***, ***pharynx***
THIRD, MISCELLANEOUS	(others)		***lumen***, ***foramen***, ***viscus***
FOURTH	-us	-us	***arcus***, ***fetus***, ***sinus***
FOURTH, -U NEUTER	-u		***genu***, ***cornu***
FIFTH	-es	-ei	***facies***

The chart above highlights some useful points. Notice that one declension often encompasses multiple nominative singular endings, but only one genitive singular ending. This is because the genitive singular is especially important to Latin grammar.

The form of the genitive singular—not the nominative—is the gold standard by which the declensions are grouped; more importantly for us, it also provides the word stem that generates all the other forms. It is advisable to remember the primacy of the genitive form especially in the third declension. In this declension, the nominative form may not be immediately obvious from the genitive form, and therefore the plurals cannot be formed without knowledge of the genitive form. (Fortunately, we will show that these "irregular" nominatives are more regular than they initially appear.)

Let's look at the nominative and genitive endings in these five declensions.

First and Second Declension Nouns

By virtue of their regularity and prevalence, these declensions are the easiest. Having studied science for a long time, you are no doubt aware that nouns ending in ***–a*** (first declension) take a plural nominative ending in ***–ae***: the plural of ***fossa*** is ***fossae***. Similarly, nouns ending in ***–us*** (second declension) take a plural nominative ending in ***–i***: the plural of ***colliculus*** is ***colliculi***.

[7] A few subdeclensions have been omitted for simplicity.

Those are the nominative endings, but what about the genitive endings? It so happens that in the first and second declensions, the genitive singular happens to look like the nominative plural: that is, the ending is ***–ae*** in the first declension and ***–i*** in the second.

Let's put this knowledge into use. How would you refer to the *spine* (***spina***) *of the* ***scapula***? How would you say that a certain structure was *of the* ***hippocampus***, such as the *foot* (***pes***) *of the* ***hippocampus***? (We will discuss words like ***pes*** when we come to the third declension.)

1ST DECLENSION

	SINGULAR	PLURAL
NOMINATIVE	-a	-ae
GENITIVE	-ae	-arum

2ND DECLENSION

	SINGULAR	PLURAL
NOMINATIVE	-us	-i
GENITIVE	-i	-orum

The genitive plurals for these two conjugations (***–arum*** and ***–orum***) resemble each other; they have appeared already in two terms given in the introduction to nouns. Review the meanings of ***flexor digitorum*** and ***xanthelasmata palpebrarum***.

Not all nouns ending in ***–a*** are first declension singular nouns. Some words, like ***phenomena*** and ***viscera***, are already plural! We will discuss them now.

Neuter Nouns

Here we need to stop for a special consideration. A subpopulation of second declension nouns (which, by definition, share the genitive singular in ***–i***) have nominative singulars in not ***–us*** but ***–um***. You've probably encountered these too during your career. These are the neuter nouns of the second declension (there are more neuter nouns in the third and fourth declensions). For reasons that linguists find interesting, all **neuter nouns universally take plural nominatives in *–a***.

2ND DECLENSION NEUTERS

	SINGULAR	PLURAL
NOMINATIVE	-um	-a
GENITIVE	-i	-orum

You are probably familiar with this group of nouns too: you have probably learned at one point that ***data*** is actually a plural whose singular is ***datum***, and the same with ***errata*** and

addenda (which, unfortunately, most textbooks have!). The behavior of Greek words such as ***phenomenon*** (plural, ***phenomena***) is also related to this Latin subdeclension. Anatomical structures in this subdeclension are many and include ***cranium***, ***calvarium***, ***cerebrum***, and ***septum***.

Brachium (*arm*) and ***dorsum*** (*back*) are in this subdeclension. As an exercise, form their genitives (*of the arm*, *of the back*); consider which large muscles have your answers in their name.

As mentioned above, be careful not to confuse the neuter plural ***–a*** with the singular ***–a*** of the first declension and come up with words like ***datae*** and ***viscerae***! If you think for a moment about whether a word is already plural, you should be able to avoid this pitfall.

The Third Declension

As mentioned above, this largest declension is characterized by a genitive ending in ***–is***. The nominative singulars are irregular—the third declension has no unifying nominative singular ending across the board.

3RD DECLENSION (GENERAL)

	SINGULAR	PLURAL
NOMINATIVE	(var.)	-es
GENITIVE	-is	-um[8]

Third Declension S-Contracts

Despite the lack of a unifying ending, large groups of third declension nouns tend to form similar nominatives. One important large group has a nominative singular in ***–s***.

3RD DECLENSION –S CONTRACTS

	SINGULAR	PLURAL
NOMINATIVE	-s	-es
GENITIVE	-is	

Here is the key to the apparent irregularity of nominatives in this group: the bare ***–s*** of the nominative interacts with any trailing consonants in the stem of the word. In particular:

- *d* or *t* before *s* is absorbed into the *s*
- *c* or *g* before *s* contracts into a sound that is written as *x*.

[8] Some third declension nouns will actually take –ium instead of -um, but as the genitive plural of third declension nouns does not often appear in anatomy we include it once for completeness only.

The genitive of the word ***pons***, *bridge*, is ***pontis***. Recall that it is the genitive ending that supplies the root for all other inflected forms. By removal of the genitive ending ***–is***, the root ***pont–*** is revealed. In fact, the nominative form ***pons*** is really a respelling of "ponts," with the *t* absorbed into the *s*.[9]

From now on, for convenience we will simply write such nominative/genitive pairs out in the following manner: ***pons, pontis***, with nominative plural ***pontes***. Following similar s-contraction patterns, we have other examples in ***pharynx*** ("pharyngs"), ***pharyngis***, nominative plural ***pharynges***[10]; and ***pes*** ("peds"), ***pedis***, plural ***pedes***.

Some of these ***–s*** nouns also alter the final vowel upon forming the nominative. For instance, the stem ***pollic–*** (*thumb*) would yield "pollics" in the nominative, but it is vowel-altered and respelled as ***pollex***. That is: ***pollex, pollicis***, nominative plural ***pollices***.

Most people are familiar with the plural term ***phalanges***, meaning *the bones of the fingers or toes*. Although the dispreferred singular, reinforced by those unfamiliar with Latin, is "phalange," can you identify the stem and then arrive at the proper singular form?

Neuter Noun Patterns

Unlike the examples above, the neuter nouns of the third declension do not have ***–s*** in the nominative; nevertheless, many still follow common patterns. Recall that, being neuter, they must take their nominative plural in ***–a***.

One common class of neuter nouns ending in ***–men*** (an ending that forms an abstract noun from a verb) follows the pattern of ***foramen, foraminis***, *piercing*[11]. Note the vowel change; following the stem of the genitive form, the nominative plural is formed regularly as ***foramina***. Other nouns in this class include ***putamen***, ***lumen***, ***abdomen***[12]. As an exercise, form their plurals.

3RD DECLENSION NEUTERS

	SINGULAR	PLURAL
NOMINATIVE	(var.)	-a
GENITIVE	-is	

Another class of third declension neuters ends in ***–us***, which causes them to look like second declension nouns. They are not; accordingly, they should not be pluralized in ***–i***! (Rather, these nominatives turn out to be a less obvious contraction of genitive ending in *r*.) To form the plural of these words, take the genitive stem, as usual, and then add the

[9] More obvious if you realize that all s's were pronounced as s, never as z. Now pronounce pons and ponts.
[10] In English we would say fuh-RIN-jeez because the g precedes an e and is therefore "soft"; as in the pons/ponts example, the s-contraction is easier to appreciate if you consider the original hard pronunciation.
[11] The verb forare means to pierce. You may recognize derivatives of the related compound verb per·forare.
[12] The verb abdere means to hide. One might say that food enters the abdomen and is hidden.

universal neuter nominative plural ending ***–a***. The nominative ***viscus*** (*entrail*) turns out to be a contraction of the genitive root ***viscer–***, which then gives rise to the plural ***viscera***. Similarly, ***corpus, corporis***, and plural ***corpora***.

The non-anatomical, yet medical word ***vulnus*** follows the pattern of ***viscus***. What would be its genitive singular and nominative plural? Based on the similarity of those forms to an English derivative, can you guess what ***vulnus*** might mean?

In general, genitives with the stem *r* allow pretty squirrely things to happen in the hidden formation of the nominative. Examples are ***femur, femoris***, *thigh*; and ***crus, cruris***, *shin or support*.

Do you understand now the meaning of the term ***crus cerebri***? Of ***crus fornicis*** (*arch*)? In what case are ***fornicis*** and ***cerebri***, and what would their nominatives be? How would you form their plurals? As you answer, consider whether the genitive should be pluralized along with the nominative. Check your answer on plate 106 of Netter's 3rd.

Etymologies of English Adjectives

Since it is the genitive of nouns that provides the root, the etymologies of English words trace back not to nominative forms, but genitive forms. If we look up the word pharyngeal in Merriam-Webster, the etymology gives "from pharyng–, pharynx." You may dimly recognize the ***pharyng–*** bit from before. Why? Because it's the genitive stem. In order to explain why the English word is spelled as it is, the dictionary must resort to giving Latin stems. (All third-declension Latin derivatives are listed this way.)

Because of the masked connection between the nominative and genitive forms, it can be surprising to a chance observer that medical nouns of the third declension form such seemingly odd adjectives. But with our understanding of the genitive stem, now we understand why a ***putamen*** (*paring or shell*) is putaminal, a ***lumen*** (*light or opening*) is luminal, a ***coccyx*** is coccygeal, an ***abdomen*** is abdominal, a ***pons*** is pontine, an ***apex*** is apical, and a ***femur*** is femoral.

Starting from your knowledge of the corresponding adjectives, guess the Latin genitives of third declension nouns ***cervix*** and ***thorax***. Take the putative root you have formed, and try adding the nominative ***–s*** to see whether in fact s-contraction forms the nominative form you know.

In learning about the first, second, and third declensions, you've become acquainted with a staggering majority of the noun forms you will encounter in anatomy and biology. The rather small fourth and fifth declensions clean up with a few not uncommon words.

The Fourth Declension

The fourth declension, whose nouns all have genitive ***–us***, contains two groups of nouns having nominatives in ***–us*** and ***–u*** respectively.

The first group has ***–us*** for all the three forms in which we are most interested—nominative singular and plural, and genitive singular[13]. Outside of heavily Latin anatomical literature its true nominative plural is rarely used, since it looks identical to the singular. Instead, these words are simply pluralized with English *–es*. This can be observed in anatomy texts and atlases that carefully depart from the ubiquitous use of Latin plurals to write ***sinus***es, ***plexus***es (*braids*), and ***meatus***es (*passages*).

4TH DECLENSION

	SINGULAR	PLURAL
NOMINATIVE	-us	-us
GENITIVE	-us	-uum

The second group, ending in ***–u***, is neuter, and accordingly its plurals are in ***–a***, and more specifically ***–ua***. Form the plurals of ***genu corporis callosi***, *the knee of the callous body*, and ***cornu Ammonis***, *the horn of Ammon*.

4TH DECLENSION NEUTERS

	SINGULAR	PLURAL
NOMINATIVE	-u	-ua
GENITIVE	-us	-uum

The genitive plural ***–uum*** of this declension reveals itself in ***confluens sinuum***, the *confluence of the sinuses.*

The Fifth Declension

The primary anatomical contribution of the fifth declension seems to be the word ***facies*** (*face*). The fifth declension genitive singular ends in ***–ei***, so the vowel-laden word ***faciei*** means "*of the face*."

5TH DECLENSION

	SINGULAR	PLURAL
NOMINATIVE	-es	-es
GENITIVE	-ei	-erum

As such, some facial disorders include this word, such as ***keratosis pilaris rubra atrophicans faciei*** (*red, atrophying pilar keratosis of the face*). The form of the word ***atrophicans***, as well as the positioning of the adjectives, will be discussed shortly.

[13] The plural and genitive u's carried a longer vowel length, but this is not recorded in the spelling.

Greek Declensions

A significant number of medical terms have their origin in Greek. Being descended from the same parent language (Proto-Indoeuropean), and having evolved in parallel, Greek and Latin have uncannily similar grammars. Similarities include the following:

- The cases are present and have the same meanings (with the exception of the ablative, which is absent in Greek) and similar endings.
- The first declension is feminine and ends in ***–a(α)***, except that many also end in ***–e(η)***. An example is ***menarche*** (***μηναρχη***), where ***arche*** means *beginning*.
- The second declension is bipartite, with
    - Masculine nouns in ***–os(ος)***; compare Latin ***–us***. An rare example of the masculines is the unpaired ***azygos*** (***αζυγος***, *balanceless*) vein.
    - Neuter nouns in ***–on(ον)***; compare Latin ***–um***. The neuters yield a number of anatomical terms such as ***ganglion*** (***γαγγλιον***).
- The third is mixed gender, of irregular nominatives but many s(σ)-contracts.
- The plural neuter ***–a(α)*** rule applies.

The fourth and fifth declensions are absent from Greek.

In general, many Greek terms were imported into corresponding terms in Latin, so it is rare even to see them in the Greek nominative case, let alone the genitive. There are two significant sets of unassimilated Greek words whose nominatives are worth discussing:

- the Greek second declension neuters in ***–on(ον)***. Being neuter, they should be pluralized in ***–a***, for example ***ganglion***.
- the Greek third declension neuters in ***–ma(μα)***. Their genitive is in ***–matos***, and because of the neuter plural rule, they take their authentic Greek plural in ***–mata***. Pluralize ***soma***, ***stigma***, ***xanthoma***[14]. Because, as in Latin, it is the genitives that give rise to English derivatives, we see the ***–mat*** appear in words like *somatic* and *astigmatism*.

Even though these Greek forms are not natively Latin, they are used seamlessly and grammatically in a Latin context in phrases like ***ganglion impar*** (*unequal*, *unpaired*) and ***eczema herpeticum*** (an adjective related to ***herpes***, ***herpet–***, *snake*). Note that in the latter case, the adjective takes a neuter ending to recognize the neuter noun; this phenomenon will be discussed shortly when we discuss adjectives.

Incidentally, it is the Greek second-declension genitive ending ***–ou***(***ου***), originally pronounced like *oh*, that gives rise to the connecting *o* of many scientific terms and explains their meaning. Out of respect for its source, the infix was once attached exclusively to word fragments of Greek origin: an *encephalopathy* transliterates rather literally the phrase ***enkefalou pathos*** (***εγκεφαλου παθος***, *suffering of the brain*). Eventually the infix was applied to Latin roots as well, such as *radiculopathy* (from Latin

[14] Recall that the spoken stress of these plurals should fall on the third syllable from last.

s-contract ***radix***[15], *root*), and even to words where no strict genitive relation applies (*visuospatial*).

Adjectives

Paired with nouns, adjectives form an important part of anatomical nomenclature. Not only do they allow anatomists to refer to a structure by a distinguishing characteristic, eg. ***foramen ovale***, *the oval piercing*, but they also appear as an alternative to genitive forms: what could have been called the (***musculus***) ***frontis*** (*of the forehead*) is instead called the (***musculus***) ***frontalis*** ("*foreheady*")[16].

As in many European languages, nouns and their modifying adjectives must **agree** in

- **Number** (singular/plural). Therefore, **adjectives must be pluralized** with their nouns (important!).
- **Gender**. So far, aside from discussing neuter nouns, we have avoided discussing gender; without adjectives that change to suit the noun, there is no hint of a noun's gender. Now, however, we must be aware of its existence.
- **Case**. The Romance languages actually do not have this requirement, as there is no case system. (Other languages with case systems do impose this requirement.)

For these reasons, Latin adjectives can present problems for those not well acquainted with the language; fortunately, many anatomical terms are free from adjectives. So that the student is familiar with them when they do appear, we will discuss them only in a cursory manner.

An adjective may appear before, (typically) after, or disjoint from the noun it modifies, as in ***flexor digitorum profundus***, *the deep flexor of the digits*. This variance in word order is permitted by the aforementioned grammatical agreement, which links the adjective ***profundus*** to the noun ***flexor*** that it modifies. If there were such a thing as the *flexor of the deep digits*, the Latin would instead be ***flexor digitorum profundorum***.

Notice that there is no requirement per se that the endings of adjectives and nouns should match; matching the other three requirements may or may not cause the adjective to share the ending of the noun.

Note too that since the gender of a noun is immutable, it is the responsibility of the adjective to accommodate all three genders. For example, the adjective ***varus*** (originally *bent inwards*, understood in medical Latin as *bent medially when proceeding distally*—cf. ***valgus***) appears in all three genders in the following set of terms:

- Masculine: ***hallux varus*** (*medial deviation of the big toe*)
- Feminine: ***coxa vara*** (*a certain hip/femur deformity*)

[15] Or technically, its diminutive radicula. See the discussion on diminutives below.
[16] Probably so that the word musculus could be more readily omitted.

- Neuter: ***genu varum***[17] (*bowleg*)

Adjectives in –us (of the First and Second Declensions)

As demonstrated just now by the example of ***varus***, one very common class of adjective acquires endings

- like a first-declension ***–a*** noun to modify feminine nouns,
- like a second declension ***–us*** noun to modify masculine nouns, and
- like a second declension ***–um*** noun to modify neuter nouns.

If you understood the discussion of the first and second declensions, then you can wield these adjectives with confidence. With these adjectives you will incidentally discover the following:

- If this type of adjective is used with a noun from the first or second declensions, then agreement of gender, case, and number will certainly cause the endings to match as well. The ***chordae tendineae*** (*the tendinous strings*) or the ***septum pellucidum*** (*the transparent wall*) are a good example of this.
- If this same type of adjective is used with a noun from the other declensions, the noun will decline in its own declension while the adjective remains in its own "approved" declensions (first and second). The endings may therefore not match. Take for example ***foramen magnum*** (*great piercing*, pl. ***foramina magna***), ***corpus callosum*** (*callous body*, pl. ***corpora callosa***). For the latter example, recall that ***corpus*** is a third-declension neuter (not a second-declension masculine as are most words in ***–us***), and therefore agrees with the neuter adjective even though the endings do not match. The plural endings happen to match because of the universal ***–a*** of the neuter plural.

The adjective ***magnus*** (*great*) appears in anatomical terms modifying both ***adductor*** (masculine) and ***foramen*** (neuter). Form these phrases with regard for gender.

Adjectives of the Third Declension

However, the sizable remainder of adjectives takes on exclusively third-declension endings. If used with third declension nouns, the endings may sometimes match, but with first or second declension nouns the endings will probably not match. Because there are several complicating subcategories, these adjectives, while not uncommon, will not be discussed here. These adjectives can be best identified by endings foreign to first- and second-declension paradigms. For instance, the adjective ***superior*** appears in the genitive form in muscle names such as ***levator palpebrae superioris*** (*lifter of the upper eyelid*) and ***levator labii superioris alaeque nasi***[18] (*lifter of the upper lip and of the wing of the*

[17] Curiously, medical Latin has transposed the classical meanings of the knee disorders. The discrepancy is understandable: the knees themselves are displaced laterally because the knee angle is distorted medially.

[18] This name is a curiosity for two reasons. First, it is longest muscle name, and secondly, the –que is an odd thing known as an enclitic (which to my knowledge appears nowhere else in medical Latin). It inserts the sense of "and" before the word to which it is attached. Cf. SPQR.

nose). As review, recognize and understand why, other than the word ***levator***, all the words appear in the genitive case. In fact, why is the word ***nasi*** "doubly" genitive?

A good-faith effort to pluralize these adjectives with their nouns might involve using the third-declension plural nominative endings ***–es*** and ***–a*** (for neuters). Examples of plural formation include ***ramus communicans*** (*communicating branch*, pl. ***rami communicantes***; see Netter plate 159), ***fasciculus gracilis*** (*slender bundle*, pl. ***fasciculi graciles***), and neuter ***vas deferens*** (*carrying-away vessel*, pl. ***vasa deferentia***).

Though it is difficult to discern the gender of a noun without a dictionary, the upshot is this: if you need to pluralize a noun with an adjective, the adjective will already be present in the singular form, and, as necessary to its own declensional paradigm, should indicate the gender of its noun.

Other Brief Notes

Diminutives

Diminutives are alterations to a word that produce a sense of smallness, such as *–ito* in Spanish and *–ette* in French. Many noun roots ending in a syllable containing ***–ul*** or ***–ol*** are actually diminutives of parent nouns. A surprising number of these turn up in anatomy and biology, though perhaps this is not surprising since biology is full of little things. For instance, ***fasciculus*** is a diminutive of ***fasces***, *bundle*; ***reticulum*** of ***rete***, *net*; ***tuberculum*** of ***tuber***, *swelling*; other terms whose parents are more obscure include capsule (***capsula***) and ***patella***. And few would ever guess that a muscle (***musculus***) really is a *little mouse*—yet the same comparison is made in Greek, German, and Arabic.

The names of the chambers of the heart are amusing, but insightful if you consider their appearance and location; the *auricle* (an old name for the atrium, now referring to a specific part of it; from ***auricula***) and *ventricle* (***ventriculus***) really mean *little ear* and *little belly*.

Many diminutives can be restored to their parent forms by removal of the characteristic letters ***–ul*** or ***–ol***. You are probably familiar with the parent forms of ***nucleolus***, ***malleolus***, ***cerebellum***, ***lingula***; what are they?

Verbs

Verbs may generate noun and adjective forms relevant to anatomy.

Words ending in ***–or*** are typically **agents** (*–er*, *–or*) of a verb. They are merely nouns of the third declension, with a genitive in ***–oris*** and therefore plural in ***–ores***. Examples: ***flexor***, ***extensor*** (and ***doctor***, from ***docere***, *to teach*!). However, words in ***–or*** are often pluralized as in English.

Words ending in ***–ns*** are **present active participles** (*–ing*) of verbs. These are merely adjectives of the third-declension type (which we have covered briefly). Examples: ***ductus reuniens***, *the reuniting duct*; ***ramus communicans***, *the communicating branch*.

Like many Latin words, these present active participles entered English, as well as the Romance languages, in their genitive stem form (***–nt***): therefore ***ductus deferens*** is often translated *deferent duct* and the ***abducens*** (*leading-away*) nerve as the *abducent*, even though most students are unaware of what these words might mean! As an integrative exercise, use the agent ending ***–or*** with ***abducens*** (thus meaning *leader-away*) to discover the muscle class of the lateral rectus, which it innervates.

Words ending in ***–atus*** are **perfect passive participles** (*–ed*) of certain verbs[19]. These are merely adjectives of the familiar first-and-second declension type. Examples: ***fasciculus cuneatus***, *the wedged bundle*; ***ligamentum cruciatum***, *the crossed ligament*. Such words entered English in *–ate*, so the latter term is usually translated *cruciate ligament*.

About the Author

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[19] Specifically, a large group of verbs with thematic vowel a, termed the first conjugation and the source of –ar verbs in Spanish and similar verbs in other Romance languages. The perfect participles of other verbs, including verbs like abducere with thematic vowels e or i, is less predictable. The agentive –or ending also builds from this participle, so the answer to the preceding exercise may not be immediately obvious.