How to Use the HAPS Physiology Learning Outcomes (PLOs)

This document is a brief introduction to the HAPS Physiology Learning outcomes (PLOs). A more detailed description of the organization of the PLO modules and how they were developed may be found in the peer-reviewed articles linked here (coming soon).

Introduction

The HAPS physiology learning outcomes (PLOs) are an exhaustive list of all potential topics that might be included in a one-semester introductory undergraduate physiology course.

- These learning outcomes are far more comprehensive than any student can learn in one term or semester. Instructors will need to select the topics and outcomes that are appropriate for their course and their students.
- There is no single set of learning outcomes recommended for an introductory physiology course because of the variability in teaching goals and student populations that exist at different institutions.

Select the PLOs you wish to cover in your course, knowing that not all the PLOs in a module may be suitable for your students. The PLOs are necessarily broad to allow for variability in the level of detail taught to different student populations. You must decide the appropriate modules and details for your course.

Organization of the HAPS Physiology Learning Outcomes

The Modules

The HAPS PLOs are organized into 19 modules that use a competency-based approach for student skill development as well as physiology content acquisition:

- Module 1: Skills that students should be acquiring during their undergraduate studies
- Module 2: Entering Competencies (EC) – ideally these are acquired prior to beginning physiology, but some of them may need to be addressed in the physiology course
- Module 3: Core Concepts (CC) of Physiology – the fundamental themes that appear repeatedly in different body systems
- Modules 4-19 (A-O): organ systems physiology and related concepts
Module Organization

For a graphical overview of module organization, please see the infographic in Figure 1.

Each module contains the following sections:

Introduction

- **Introduction to the module:** This section has a brief overview of the module that explains what is and is not included. Terminology notes are also included here.
- **Core concepts from Module CC,** with the annotation “Students need to understand and be able to apply these core concepts in order to be successful in this module.”
- **Skills:** a key to the skills that can be practiced with the LOs in the module.

Learning Outcomes for the Module

The physiology learning outcomes are organized into numbered sections, with the number preceded by the module letter. For example: **A-2 Movement across membranes.** LOs within that section are numbered sequentially: A.2.1, A.2.2, A.2.3, etc. Sub-sections are indicated with colored headers and continue the section numbering sequence.

- Advanced learning outcomes are indicated with an asterisk, as in D.1.12*.
  
  - Advanced PLOs address higher level skills or additional detail that may appear in some physiology texts but may not be appropriate for all introductory physiology classes.
- The two right-hand columns of the table indicate core concepts and skills related to each learning outcome.

Background Basics and Related PLOs

- **Background Basics from other modules:** These are lists of content that students should have mastered before attempting this module.
- **Related PLOs covered in other modules:** These are learning outcomes that instructors might expect to see in this module but that are covered elsewhere. For example, LOs about blood types are in Module H Blood, where most physiology courses teach them, rather than in Module O Immune System. Each topic is covered only once in the learning outcomes.

Terminology Conventions

- (e.g., ...) in an LO means *For example,* ... The examples listed after e.g., ... are not all-inclusive, and it is up to individual instructors to modify the terminology to fit their student populations.
- (i.e., ...) means *in other words,* ...
- In instances where multiple terms that refer to a single physiological process or anatomical structure, common alternatives are included in parentheses after our preferred term.
• We attempted to replace eponyms and use anatomical terminology as given in the *Terminologia Anatomica* 2e, but we recognize that certain terms are entrenched in the clinical literature and used daily in healthcare. The PLOs use the preferred physiological term, followed by historical alternative terms in parentheses.

• *Draw* and *diagram* are considered to mean the same thing: a graphical representation that may be literal or abstract, such as a concept map. We use *Diagram* in the PLOs.

![Diagram of module structure]

**Figure 1:** Infographic showing the elements and organization of each module

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