

Web-based Physiology Laboratory Simulations

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Abstract

I have devised several multimedia laboratory simulations with an intuitive user-interface, so that students can work independently (or in small groups) and learn at their own pace and depth. The simulations use a mixture of HTML, JavaScript, Flash, and digital movies to cover certain aspects of nerve, muscle, and cardiovascular physiology, as well as breathing and metabolism. Virtual instruments have been devised to present a realistic simulation of the laboratory experience. For example, in some simulations a virtual strip chart or an oscilloscope is used to play records; students then make measurements from the displayed traces just as they would in the laboratory setting. An online Journal stores data and custom-made programs are used for analysis and graphics as a first step to lab report production.

Each simulation has been written as a self-contained module. One or more simulations can be given to students prior to the scheduled time to act as a primer to the traditional laboratory. Alternatively, one or more modules can be combined with a group of traditional exercises. Under such circumstances, a simulation can augment the *wet-lab* experience by covering a topic that may be unavailable to the student, due to equipment or time constraints. Alternatively, simulations can be grouped together to replace the traditional lab when facilities are limited or in a distance learning environment.

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