

## About web-HUMAN 6

A welcome to first time users!

(version 6/08/05 a)

[Note: adjust your Adobe Reader to 100% display size to avoid distortion]

### What is web-HUMAN?

Web-HUMAN is a systems physiology teaching simulation that presents educators and students with full web access to Tom Coleman's classic physiology simulation program HUMAN. While developed originally for "in-house" use as a physiological teaching tool at Skidmore it has become increasingly used for simulation labs, as a lecture demonstration tool and as a vehicle for independent study by a variety of other colleges, universities and medically interested students.

### How do I run an experiment in web-HUMAN?

To run a simulated experiment the user changes one or more of the some 67 available variables thus forcing the model 's physiology to respond to the changed conditions. The values of variables are changed by simply mousing the desired variable(s), eyeballing their displayed current value and then typing in your new desired value.

### What type of simulated experiments can I run in web-HUMAN?

Simulated experiments can be done in a wide variety of subcategories including but not at all limited to the following.

- **Challenges to standard physiology**- e.g. *exercising* the model at different levels of intensity (O<sub>2</sub> consumption) and monitoring the resulting cardiac, respiratory, salt and water balance responses.
- **Comparative and environmental challenges** – e.g. one might move the model to *high altitude* (decreased barometric pressure) or thermally challenge the model by moving it into a high or low temperature environment and observe the related integrated responses to the hypoxia or thermal challenge.
- **Clinical challenges** – one might simulate *emphysema* by decreasing available lung surface area for exchange or *renal failure* by removing a selected proportion of the renal mass from functioning.
- Testing ones understanding of the normal physiology by attempting to run an **artificial organ** so as to maintain normal systems function. *Web-HUMAN* contains an *artificial heart*, the ability to *artificially ventilate*, a kidney *dialysis* module, the ability to *infuse* electrolytes, *transfuse* and more.

- Testing ones understanding of basic **pharmacologic intervention** – the *web-HUMAN Pharmacy* contains a standard arsenal of vasoactive, cardio active, renal and certain other drugs and the ability to adjust their level and frequency of administration.

### How is the physiological response monitored in *web-HUMAN*?

*Web-HUMAN* outputs can be both tabular and graphic in format. The default *web-HUMAN* output is a *tabular readout* of the response of the physiological variables vs. time. Users can select from among over 137 physiological variables to monitor in the main output tables.

### Can I graph the results of a *web-Human* simulated experiment?

We also provide the ability to graph the response pattern of any of the variables selected vs. time. The user can chose between *normalized* (change from baseline value) or *absolute value* plot formats and between multiple and single variable plotting. The *web-HUMAN* Help section also contains instructions on how to pass data from *web-HUMAN* to Excel for a fuller graphic analysis.

### How many physiological systems does *web-Human* contain?

*Web-HUMAN* is a fairly comprehensive model that incorporates the major responses of the **cardiovascular, respiratory, renal, acid-base balance, thermoregulatory** and **fluid and electrolyte balance** physiological systems and in addition contains aspects of responses of the nervous system, the hormone system and muscle/metabolic system.

Significantly these individual system responses are *integrated*. Thus a high altitude challenge (reduced barometric pressure) shows not only the expected hypoxia (low PO<sub>2</sub>) but also the accompanying hyperventilation, its resultant hypocapnia (low PCO<sub>2</sub>) , the effect of this hypocapnia on blood acid-base status (a respiratory alkalosis) and the compensation over time via the kidneys (compensatory metabolic acidosis). The effects of these challenges on other systems (e.g. the cardiovascular system) are also apparent.

### How can I get started using *web-HUMAN*?

Read the **Introduction to *web-HUMAN*** tutorial that is often used here at Skidmore as the introductory student lab exercise for first time *HUMAN* users. This exercise takes you step-by-step through each of the skills needed to navigate your way through *web-HUMAN*.

In addition the *Help section* (see below) begins with many extended "**How to do it**" examples that take the user step by step (& screen by screen) through each procedure.

### **How can I find out more about web-HUMAN?**

All model pages contain a link to the **Help section**. Here users will find the "How to do it" tutorials (see above) and an extensive analysis of the capabilities of *web-HUMAN* in the *Help for variables* section. In addition, *sample teaching labs* are provided, links are available to material used in past *web-HUMAN workshops* and more information can be found about the underlying model itself, its author (Dr. Coleman), authors of the older microcomputer version (Dr. Randall) and more. Anytime you have a question or need more detailed knowledge on some aspect of using the model *click Help*.

### **Versions available of web-HUMAN\***

The current version of the model is version 6.0. Versions available are as follows:

Ver. 4 – The *previous standard version* with Tabular output and 2 variable graphing. This will be maintained for a while longer to support courses that had counted on it in the past.

Ver. 6 –The *new current version* that supports full graphing and also allows registered users to save their simulations and make them available publicly if they wish.

### **Contact us if we can be of help!**

Use of *web-HUMAN* has growing steadily with approximately 20,000 non-Skidmore simulation sessions run from June 2002- Nov. 2004. If you have any questions we can help you with or have suggestions for features you would like to see, write to me ([rmeyers@skidmore.edu](mailto:rmeyers@skidmore.edu)) or Leo Geoffrion ([ldg@skidmore.edu](mailto:ldg@skidmore.edu)) and we will try to get back to you as soon as is feasible within the framework of our work schedules.

**Enjoy!**