EXPERIMENT #8. ALVEOLAR VENTILATION

Although the total ventilation (VENT) is the product of tidal volume (TIDVOL) and respiration rate (RESPRT) the alveolar ventilation (AVENT) is less than this because of the presence of the dead space (DSPCE). The objective of this experiment is to have HUMAN simulate the effects upon the blood gases for different amounts of dead space, and for different combinations of tidal volume and respiration rate which show the same ventilation.

1. Determine the baseline values of alveolar ventilation and the arterial blood gases. Increase the basic dead space (DSPCEB) from its given value of 150 ml in increments of 50 ml and follow the responses of the respiratory system. What is the maximum value of this parameter which the model can tolerate?

2. Activate the artifical respirator switch by changing ARTRES from 0. to 1. Achieve a resting total ventilation of 6 liters/min by varying its component parts rate (ARRT) and volume (ARVOL) so that their product remains at 6. Note the alveolar ventilation and the blood gases in each case. Why are the combinations at the high respiratory rates ineffective in maintaining normal values of the blood gases?

Notes on the Use of HUMAN–80 Student Manual Experiments in *web*-HUMAN

Essentially all HUMAN-80 experiments run *perfectly* in *web*-HUMAN. Nevertheless, those using the HUMAN-80 experiments with the current *web*-HUMAN model should be aware of certain minor compatibility issues and limitations.

What is HUMAN–80?: There have been multiple past versions of the HUMAN model of which *web*-HUMAN and HUMAN–80 are but two. Human–80 was a version of the HUMAN model designed to run on desktop PC's. Although both versions of the model behave virtually identically *physiologically*, they obviously differ vastly in how the user interacts with them. This means that those parts of a HUMAN-80 experiment instruction sheet that are user-interface specific are not necessarily fully compatible with *web*-HUMAN.

Adapting HUMAN–80 Manual experiments to *web*-HUMAN:
Essentially all HUMAN-80 experiments run *perfectly* in *web*-HUMAN. Just follow Dr. Randall's instructions step by step.

- wherever possible the text of these exercises has been edited or annotated to increase compatibility of the instructions with *web*-HUMAN. Thus references to commands that differ between the two versions have been updated either by editing or by indication with a commented superscripted symbol (* or #) .

- experiment numbers in HUMAN-80 *DO NOT MATCH* those in those in *web*-HUMAN. To create your own tabular output format simply load web-HUMAN experiment #1 and follow Dr. Randall's instructions using View output: to create your own data tables.

- users should note that HUMAN-80 had no graphic output, only tables. In *web*-HUMAN you can choose to graph by simply selecting <graph> instead of just <text> below each variable in the View output: table.

- HUMAN-80 instructions sometimes ask for users to look at more than six variables. To do so simply rerun the experiment with the additional variables displayed or use the <View Variable> option to obtain a value for a variable that is not in the tables.