

A web-HUMAN Renal Physiology Experiment

Response to Renal Artery Stenosis

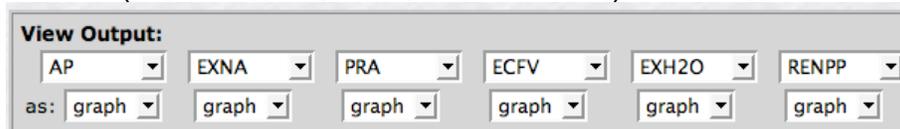
“Impaired renal perfusion initiates a complex humoral-hemodynamic response that results in systemic hypertension.”(1) This impaired perfusion can be induced in HUMAN via the parameter CLAMP which represents the pressure drop across the stenosis in renal arteries.

Basic Procedure

Always turn off your pop-up blocker before working in web-HUMAN!

1) Selecting variables of interest to read out the behavior of

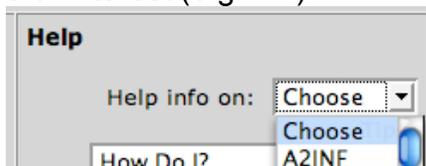
• In the **View Output:** section place each of the variables indicated in the first row below in your Tables (AP, EXNA, PRA, ECFV, EXH2O, RENPP).



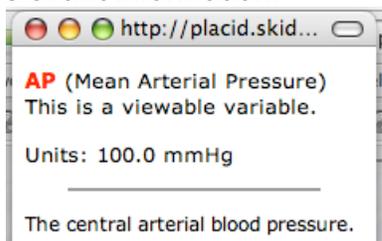
• To graph each of these variables, select the as: graph option (see above).

2) Understanding the meaning of the variables selected / using Help info on: option

• In the **Help** section, under the Help info on: Choose option (see below) mouse the variable of interest (e.g. AP)



• A Variable Help window appears (see below) that explains the variable, its units and other relevant information.

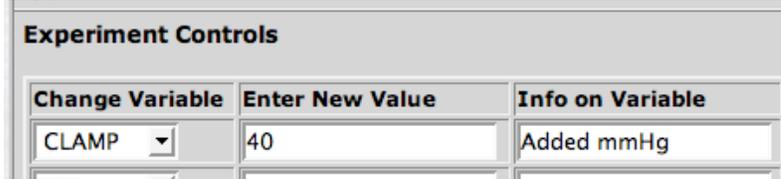


• we now do this for all six of our selected variables in order to better understand our experimental design. The 6 are AP, EXNA, PRA, ECFV, EXH2O and RENPP.

3) Setting up the experimental intervention – Inducing renal artery stenosis

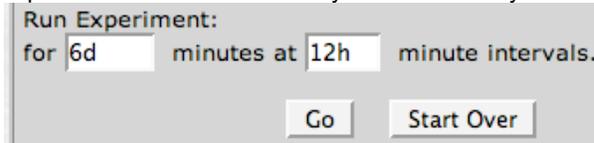
- Variables are changed in the **Experimental Controls / Change Variable** section (see below). To induce a renal artery stenosis that drops renal perfusion pressure by 40 mmHg across its resistance

- mouse CLAMP in the **Change Variable** box and
- type in 40 in the **Enter New Value** box. (Do not enter units, only the number.)



4) Executing the experiment

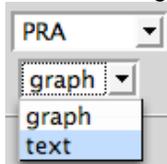
- In the Run Experiment: section of the navigator (see below) enter, as shown, 1) to run for 6d 2) at 12h intervals between data readouts and 3) then click the <Go> button. Note that while HUMAN expects minutes as the default you can enter days and hours by appending d or h to your number.



5) Your results appear as a graph and in the window under it, as a table of numbers. Note the enormous increase in plasma rennin activity (PRA) on the graph.

6) We remove plasma rennin activity from our graph - Since plasma rennin activity dominates the graphic result and thereby suppresses our visual resolution of the behavior of the other variables, we remove it as follows:

- click the <back arrow> of your browser once to return to the screen on which you set this experiment up
- uncheck the as: graph option under PRA, selecting as: text instead (see below).



- now simply re-click <Go> again to rerun, this time with PRA not graphing.

7) We will discuss the graphic and tabular results. Re: table numbers note Scientific notation in FORTRAN and HUMAN

scientific $-1.0*10^{-1} =$ 0.1
in HUMAN $-1.0*E-01 =$ 0.1

(1) The above experiment draws heavily on Exp. 6, Student's Manual, "HUMAN-80..", Dr. James E. Randall, 1981. [available in the *web-HUMAN* User's Manual, Section VI. Sample Models ...]. As always, we thank Drs. Randall & Coleman for their generosity in making the HUMAN model & associated materials available for non-commercial educational uses.