

From the "Student's Manual", HUMAN-80, "Microcomputer Version of A Mathematical Model of the Human Body in Health, Disease and During Treatment". Thomas G. Coleman and James E. Randal, April, 1981. Modified for use with web-HUMAN. Manual material is the property of Drs. Coleman & Randal and may be reproduced for educational purposes only.

EXPERIMENT #5. A PERIPHERAL A-V FISTULA

A peripheral fistula involves flow that serves no metabolic purpose but which places an unusual load on the heart. We can simulate this by setting AVFIST equal to some value greater than zero. A value of 0.5 will produce a shunt of about half the normal cardiac output and a value of 1.0 represents a very severe fistula.

Set AVFIST = 0.5 and record the responses.

		BEFORE	AT 30 MIN	% CHANGE
		-----	-----	-----
Arterial Pressure	AP	_____	_____	_____
Cardiac Output	CO	_____	_____	_____
Fistula Flow	AVFFLO	_____	_____	_____
Metabolic Flow	(Diff)	_____	_____	_____
Total Periph Resis	TPR	_____	_____	_____
Left Atrial Press	LAP	_____	_____	_____
Right Atrial Press	RAP	_____	_____	_____
Mean Circ Fill P	MCFP	_____	_____	_____
Heart Rate	PULSE	_____	_____	_____

What factors control cardiac output when a fistula is suddenly opened?

STUDENT MANUAL

EXPERIMENTS

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Now follow the hemodynamic response for about 10 days. Describe the following further changes:

Blood volume --

Cardiac output --

Fistula flow --

Metabolic flow --

Sympathetic nerve activity --

What happens to blood gases with an A-V fistula and why?

What are the consequences of opening a fistula when the heart is weak? Test this by reducing left basic heart strength (LHSB = 0.5).

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.