

Supplementary Material S3

Virtual Control Panel of the Simulator Program

LabVIEW programs have a 'virtual control panel' mnemonically representing all controls, input and output windows, indicators and graphs. In present simulator input and output windows are used for the majority of control and current parameter values. Optional conditional inputs are realized as on/off switches with color indication. Certain parameter threshold conditions have own indicators in the shape of color lamps. A number of critical parameters are represented as graphs showing parameter dynamics from the start of the simulation. Full virtual control panel of the simulator is presented in Figure S3 below.

Large number of controls and indicators may seem excessive. However, this simulator was developed in a number of stages, allowing for testing very different scenarios. Many trials were performed aiming at 'what if' cases and some simulations were performed to replicate known experimental results.

Realized Controls and Outputs (Parameter Displays)

- > Simulator monitors 'age distributions' of four groups of elements: stem cells, multipotent cells, somatic cells, regulating molecules- as arrays, where the entries are numbers of elements with certain age, up to the maximal age at the current moment.
- > Initial conditions are represented by the starting distributions for all four element pools, and values of the critical input parameters. Corresponding pools are compiled before simulation starts and cannot be changed during the simulation.
- > All input parameters can be changed at any moment during simulation
- > Additional controls can switch 'on' and 'off' certain effects and conditions, allowing multiple possibilities of assessing 'what if' situations.
- > Simulator continuously displays current values of critical output parameters, and their time history from the start of simulation.

Realized Graphs:

- > Four graphs: age distributions of somatic, multipotent, sleeping stem cells, regulating molecules: time changes from the start of simulation;
- > Four graphs: number of somatic, multipotent, active (woken up) stem cells and regulatory molecules: time changes from the start of simulation and display shows time evolution for these parameters;
- > Four graphs: number of removed multipotent and somatic cells, number of cell divisions and 'consumed energy': time changes from the start of simulation and display shows time evolution for these parameters.

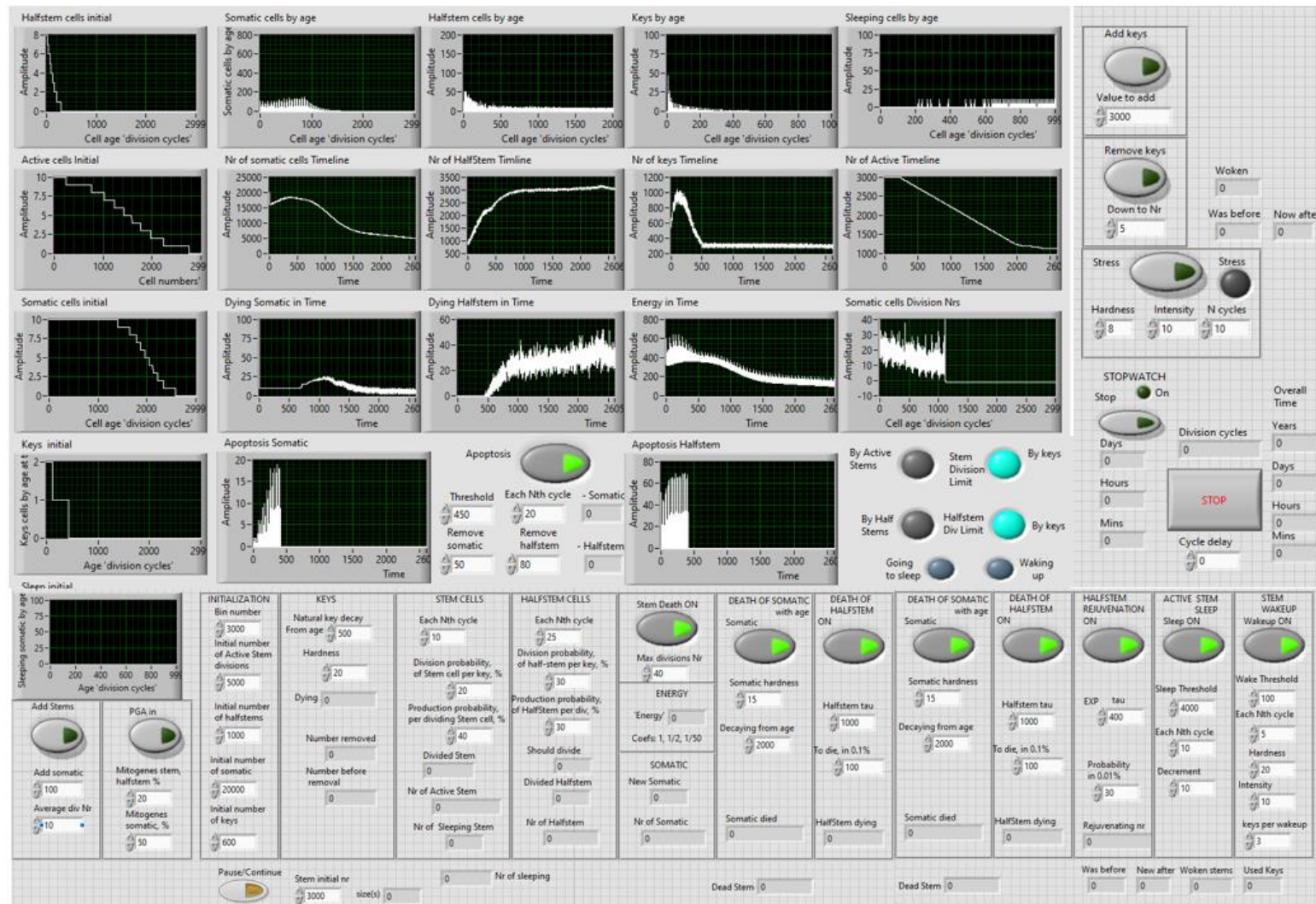


Figure S3 Virtual front panel of the simulator program. Note that ‘Key’ notation is used instead of longer ‘Regulatory molecules’ one.