Virtual Physiology: Corrections and Extensions (2015-05-20)

Here are some notes concerning recent corrections and extensions of the Virtual Physiology teaching tools that have been made since our last circular mail.

SimNeuron:

Major changes were made in SimNeuron which has been redesigned, specifically with regard on the Neuron Editor where you now will find the complete set of equations, including those for leak currents and equilibrium potentials as well as for the noise current that can be added.

The SimNeuron **tutorial** is now directly referring to the SimNeuron laboratories with several extensions, e.g. a paragraph about tail currents, and a more detailed description of the Neuron Editor. The last chapter describes the pre-settings which are accessible via the corresponding buttons in the tool bar of the labs.

SimVessel:

In SimVessel, the parameter values have been adjusted so that the provided substance concentrations in the test tubes are sufficient to bring the dose-response curves of muscle contractions up to clear saturation and to illustrate the effects of competitive and non-competitive inhibitors.

The error with Phentolamin vs. Propranolol effects on the Antrum has been corrected. Also, an occasionally appearing error bringing the muscle stripes abruptly to maximal length has been eliminated. The tutorial has been slightly extended but is still in a rather preliminary form.

SimNerv and SimMuscle:

Occasionally appearing problem with the adjustment of the wheel buttons of the oscilloscope have been eliminated

Some additional notes:

Current activities:

We are currently working on an extension of SimVessel by a third preparation, the rat duodenum. The idea is to illustrate more clearly the different forms of smooth muscle contractions (tonic, phasic and mixed tonic-phasic) and the diversity drug effects. We hope that we can deliver the new version with an appropriately extended tutorial, including protocol forms, till September 2015.

In parallel, we are trying to bring together a group of experts from experimental physiology and movie makers for the preparation videos. We hope that we then finally will have the programs completed before the end of this year.

Apologies for all the delays! Indeed, reprogramming the Virtual Physiology teaching tools is much more work than we originally expected.

Your Comments are appreciated:

In these virtual laboratories, the number of possible stimulus constellations, e.g. in SimNerv, or possible substance combinations, e.g. in SimVessel, is going to infinity. Indeed, we did our best designing the mathematical algorithm in a way that they, as we say, “guarantee for the physiologically appropriate reaction of the preparations” in all situations. If you nevertheless find errors or inconsistencies, please, let us know. We are grateful for all comments and suggestions to improve the programs