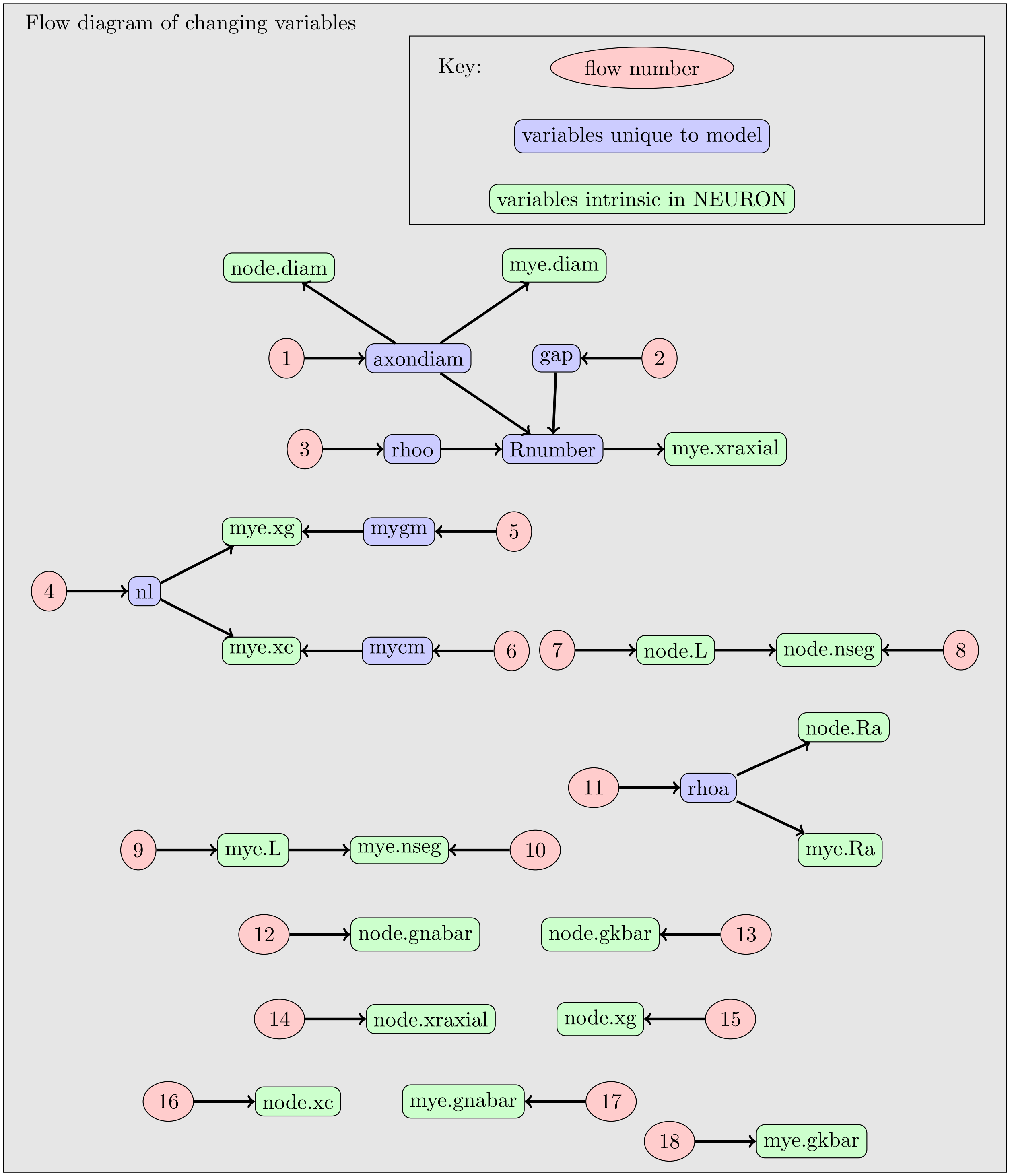
To investigate the evolution of myelin, we vary the parameters in our myelin model and observe how the physiology of the axon is affected.
`ALG_PARCHA-130523.hoc`, loads the PARCHA algorithm that allows the user to change one of 18 parameters in our model. The 18 parameters are listed in the beginning of the source code of the .hoc file and in the following figures. If there are other parameters that are dependent on the changing parameter, those will be changed accordingly as well (more details below). A base neuron must be loaded beforehand. This algorithm is executed with the command `PARCHA(parameter name, parameter value)` where `parameter name` is the parameter to be changed and `parameter value` is its new value. If the new parameter value is to be written into a `.dat` file, then the `.dat` file must be open prior to the execution of PARCHA algorithm. If a `.dat` file is open while PARCHA is executed, `parameter value` will be written in the `.dat` file followed by a comma and a space.

Parameter name	Flow	Description
`all_axondiam`	1	Axon diameter. Cross sectional area and hence per-length resistance of sub-myelin space (`mye.xraxial`) is also affected in addition to the usual diameter dependent dynamics.
`all_rhoa`	11	Resistivity of the intercellular medium.
`node_L`	7	Length of nodal segments (`node.L`). Whenever this length is changed, `node.nseg` is automatically changed as well.
`node_nsegs`	8	Number of spatial compartments that each nodal segment is partitioned into (`node.nseg`). NEURON discretizes the model spatially before "solving" the each compartment numerically.
`node_gnabar`	12	Maximum sodium conductance of nodal segment axolemma (`node.gnabar`).
`node_gkbar`	13	Maximum potassium conductance of nodal segment axolemma (`node.gkbar`).
`node_xraxial`	14	Axial resistance of the external medium surrounding the nodal segments (`node.xraxial`).
`node_xg`	15	Radial conductance of the external medium surrounding the nodal segments (`node.xg`).
`node_xc`	16	Radial capacitance of the external medium surrounding the nodal segments (`node.xc`).
`mye_gap`	2	Thickness of the submyelin space (from axolemma to sheath). Affects cross sectional area and hence per-length resistance of submyelin space (`mye.xraxial`).
`mye_rhoo`	3	Resistivity of the extracellular medium in the submyelin space. Also affects per-length resistance of submyelin space (`mye.xraxial`).

mye_nl	4	Number of myelin wraps (consisting of two phospholipid bilayers each). Each phospholipid layer adds a capacitor and resistor in series radially to the sheath. Each added capacitor and resistor have capacitance mycm and resistance 1/mygm, respectively. Radial conductance (mye.xg) and capacitance (mye.xc) through the sheath are affected
mye_mygm	5	Per-length conductance of each phospholipid layer of the sheath. Radial conductance through the sheath (mye.xg) is affected.
mye_mycm	6	Per-length capacitance of each phospholipid layer of the sheath. Radial capacitance through the sheath (mye.xc) is affected.
mye_L	9	Length of internodal segments (mye.L). Whenever this length is changed, mye.nseg is automatically changed as well.
mye_nsegs	10	Number of spatial compartments that each internodal segment is partitioned into (mye.nseg). NEURON discretizes the model spatially before "solving" the each compartment numerically.
mye_gnabar	17	Maximum sodium conductance of internodal segment axolemma (mye.gnabar).
mye_gkbar	18	Maximum potassium conductance of internodal segment axolemma (mye.gkbar).


Flow diagram of changing variables
Key:
flow number
variables unique to model
variables intrinsic in NEURON
node.diam
mye.diam
1
axondiam
gap
2
3
rhoo
Rnumber
mye.xraxial
mye.xg
mygm
5
4
nl
mye.xc
mycm
6
7
node.L
node.nseg
8
node.Ra
11
rhoa
mye.Ra
9
mye.L
mye.nseg
10
12
node.gnabar
node.gkbar
13
14
node.xraxial
node.xg
15
16
node.xc
mye.gnabar
17
18
mye.gkbar