A mathematical modeling toolbox for ion channels and transporters across cell membranes

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The following supplementary material is from " A mathematical modeling toolbox for ion channels and transporters across cell membranes" manuscript. It contains an overview of all equations related to Ion channels, Pumps, Cotransporters, and Symporters, organized in a table form. The detailed transporters along with the descriptions of their equatuons can be found from here.

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2.2. *Proton-ATPase (H-ATPase)*

Proton-ATPase ($H-ATPase$)		**Ref**
$J^{M-N(a)}_{H,HATPase} = -J^{max}_{H,HATPase} \frac{1}{1+exp\left(\zeta(\nu^{M-N(a)}_{H} - \nu^{M-N(a)}_{1/2,H-ATPase})\right)}$	(112)	[32]
$J^{M-N(b)}_{H,HATPase} = J^{max}_{H,HATPase} \frac{1}{1+exp\left(-\zeta(\nu^{M-N(b)}_{H} - \nu^{M-N(b)}_{1/2,H-ATPase})\right)}$	(113)	
$J^{M(i)-N(e)}_{H,H-ATPase} = J^{max}_{H,HATPase} \frac{[H^+]_{M(cell)}}{K^{M(cell)}_{H,H-ATPase} + [H^+]_{M(cell)}}$	(114)	[29]

Table 11: The corresponding equations describing the flux and current transported via proton-ATPase (H-ATPase) pumps across the cell membrane