3 Types of Ion Channels

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	Type of Channels	Description
I	Voltage gated	"GATED" called like this because of an imaginary gate that opens or closes in this case at voltage variation across the cell membrane allowing or not ions inside the cell. There are voltage gated channels for Na, Ca and K, usually more than one type for each ion. When one channel opens (is activated) in one phase, the previous opened channel usually closes (is inactivated). Order of activation/inactivation in action potential: Na -> Ca ->K
II	Receptor gated	"GATE" opens or close in this case in response to a molecule binding to a receptor. e.g. ATP binding to a receptor on a K channel or Acetylcholine binding to a receptor on a K channel
III	Ligand gated (Specific ions and Chemical Ligands)	opens in response to ions influx in the cell e.g. Ca influx in vascular smooth muscle opens a K channel

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I

Na channels	
slow Na I_f	"funny current" in phase 4 of pacemaker potential
fast Na	phase 0 (depolarization) of non-pacemaker cardiac action potential
K channels	
transient outward I_{to}	phase 1 of non-pacemaker cardiac action potential
slow delayed rectifier I_{KS}	phase 3 of cardiac action potential, starts in phase 2
rapid delayed rectifier I_{KR}	phase 3 of cardiac action potential, continues in phase 4
inward rectifier I_{K1} or I_{ir}	phase 4 of cardiac action potential and late 3
Ca channels	
L-type $I_{Ca\text{-}L}$	long-lasting current: phase 0 (depolarization) of pacemaker AP, phase 2 of non-pacemaker cardiac AP
T-type $I_{Ca\text{-}T}$	transient current: phase 4 of pacemaker action potential in SA and AV node

II

K channels	
ATP sensitive $I_{K,\,ATP}$	K_{ATP} channels, inhibited by ATP; in vascular smooth muscle, adenosine (final ATP metabolite) opens K channels resulting hyperpolarization* (more negative repolarization) and vasodilation
Acetylcholine activated $I_{K,\,ACh}$	opened by Acetylcholine; Gi protein coupled

III

K channels	
Calcium activated $I_{k,\,Ca}$ or BK_{Ca}	open in response to Ca influx in vascular smooth muscle