

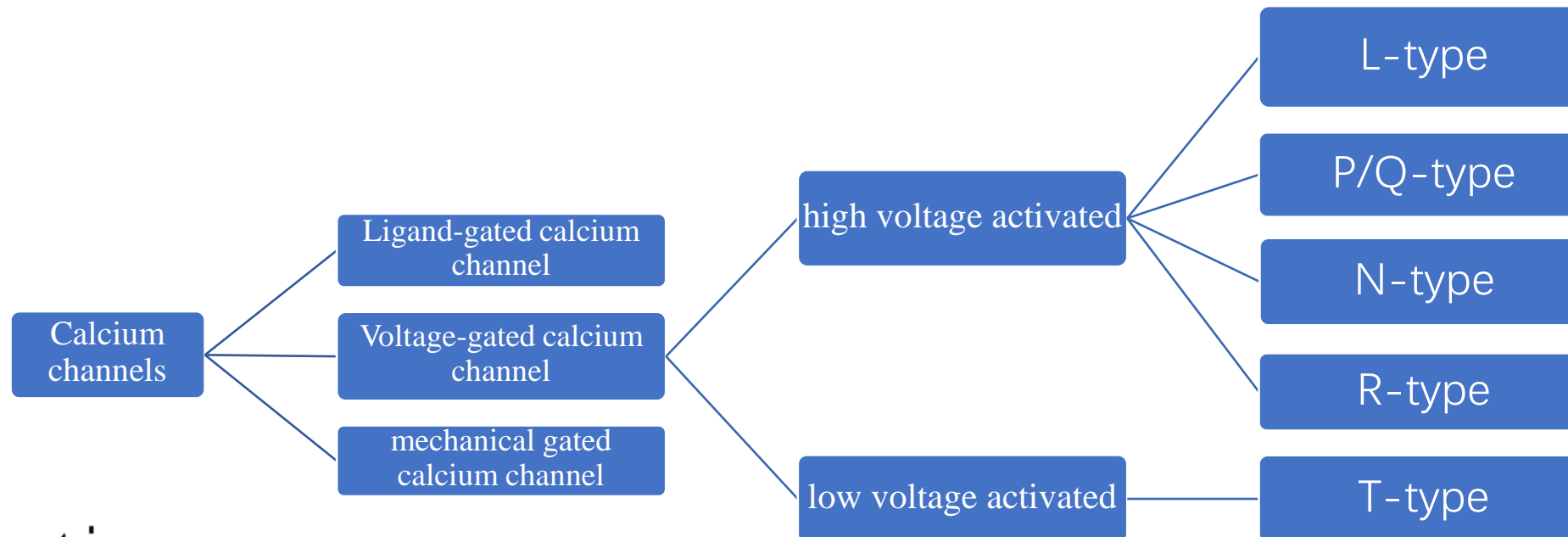
Dramatic response to lamotrigine in two patients with refractory epilepsy due to calcium channel mutations

Xiaoyue Hu, Yanping Wang, Miao Jing, Ying Hua, Jianbiao Wang

Department of Neurology, Wuxi
Children's Hospital, Wuxi, Jiangsu,
China

Calcium channels are divided into voltage-gated calcium channels (VDCC), ligand-gated calcium channels (LDCC) and mechanical -gated calcium channels. VDCC is a type of calcium channel which is controlled by membrane potential; $\alpha 1$ subunits are the main components of this functional calcium channel.

VDCC is usually classified as high-voltage-activated (HVA) and low-voltage-activated (LVA) subtypes according to the threshold value when the channel is open. HVA can be divided into L-type (Cav 1.1- Cav 1.4), P/Q-type (CaV2.1), N-type (Cav2.2) and R-type (Cav2.3) according to the different composition of $\alpha 1$ subunits (Cav). LVA is also known as T-type (Cav 3.1 to Cav 3.3).



The characteristics of voltage-gated calcium channels

Type	Gene	Epilepsy	Gain-of-function mutations	ASMs blocked
L-type	<i>CACNA1C</i>	yes		
	<i>CACNA1D</i>	yes	yes	Topiramate, Carbamazepine, Felbamate
	<i>CACNA1F</i>			
	<i>CACNA1S</i>			
P/Q-type	<i>CACNA1A</i>	yes	yes	Lamotrigine, Oxcarbazepine, Gabapentin, Pregabalin
N-type	<i>CACNA1B</i>	yes		
R-type	<i>CACNA1E</i>	yes	yes	Lamotrigine, Topiramate
T-type	<i>CACNA1G</i>	yes	yes	
	<i>CACNA1H</i>	yes	yes	Lamotrigine, Ethosuximide, Valproate, Zonisamide
	<i>CACNA1I</i>			