



UNIVERSIDADE FEDERAL DO RIO DE JANEIRO



MÓDULO 1 – AULA 2

Excitabilidade e Comunicação no Sistema Nervoso

**CFF 204 - Fisiologia E1
Turma A (Licenciatura)**

**Professor João Vítor Galo Esteves
jvitorgallo@biof.ufrj.br**

Tecido Nervoso

Células

CÉLULAS DA GLIA

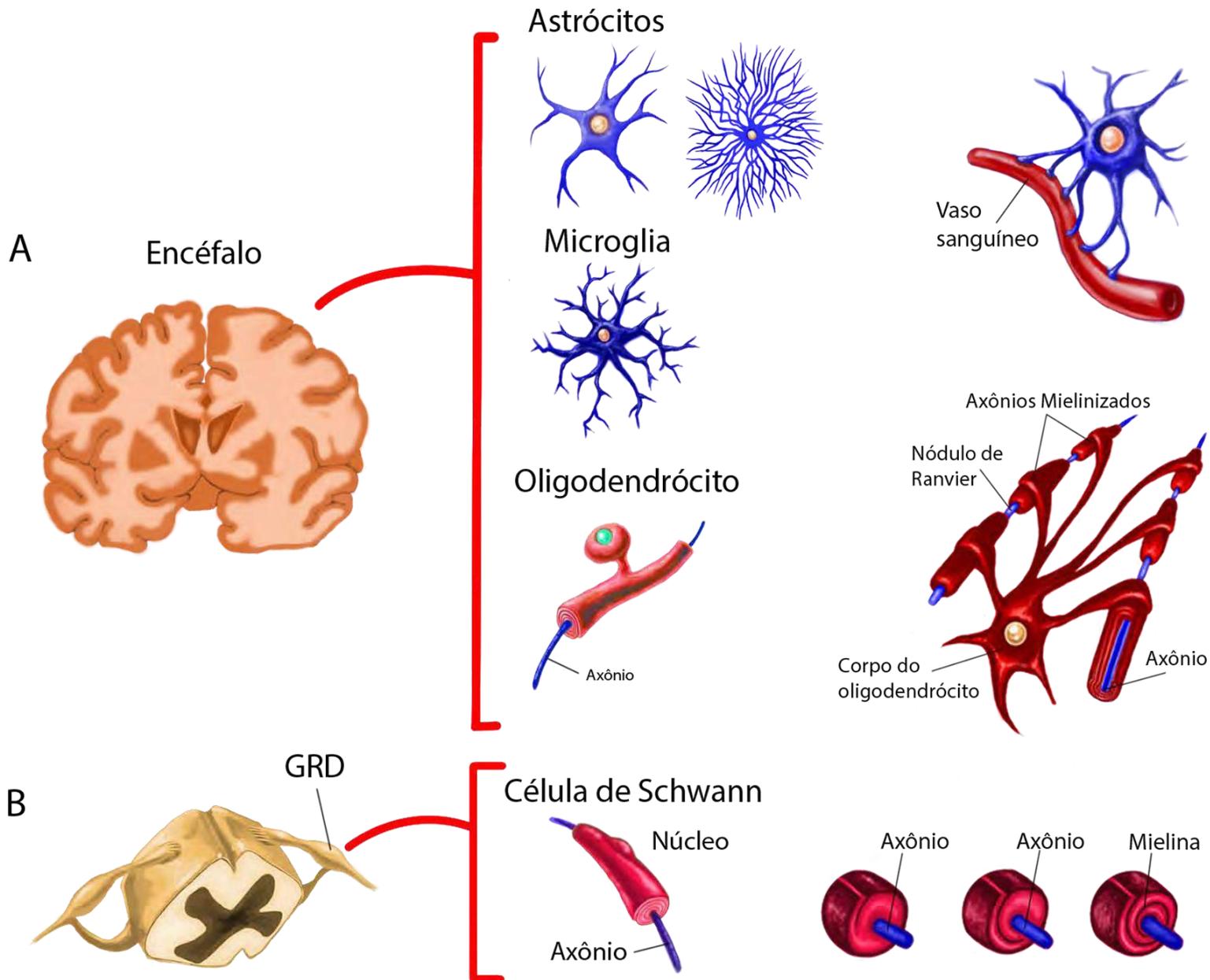
Função de sustentação,
proteção e comunicação
com neurônios

NEURÔNIOS

Funções de recepção,
integração e motoras

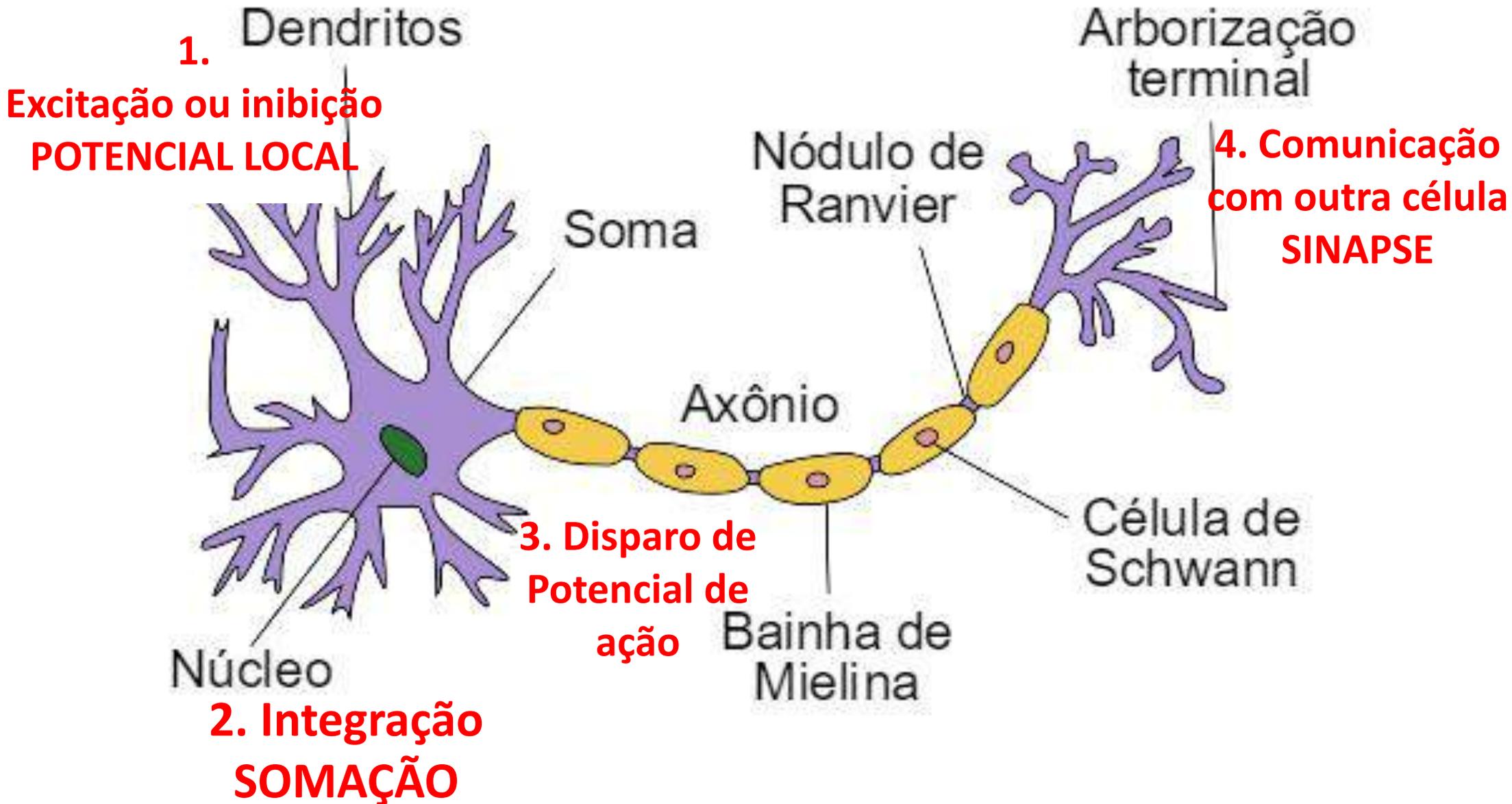
Matriz extracelular

TIPOS DE GLIA



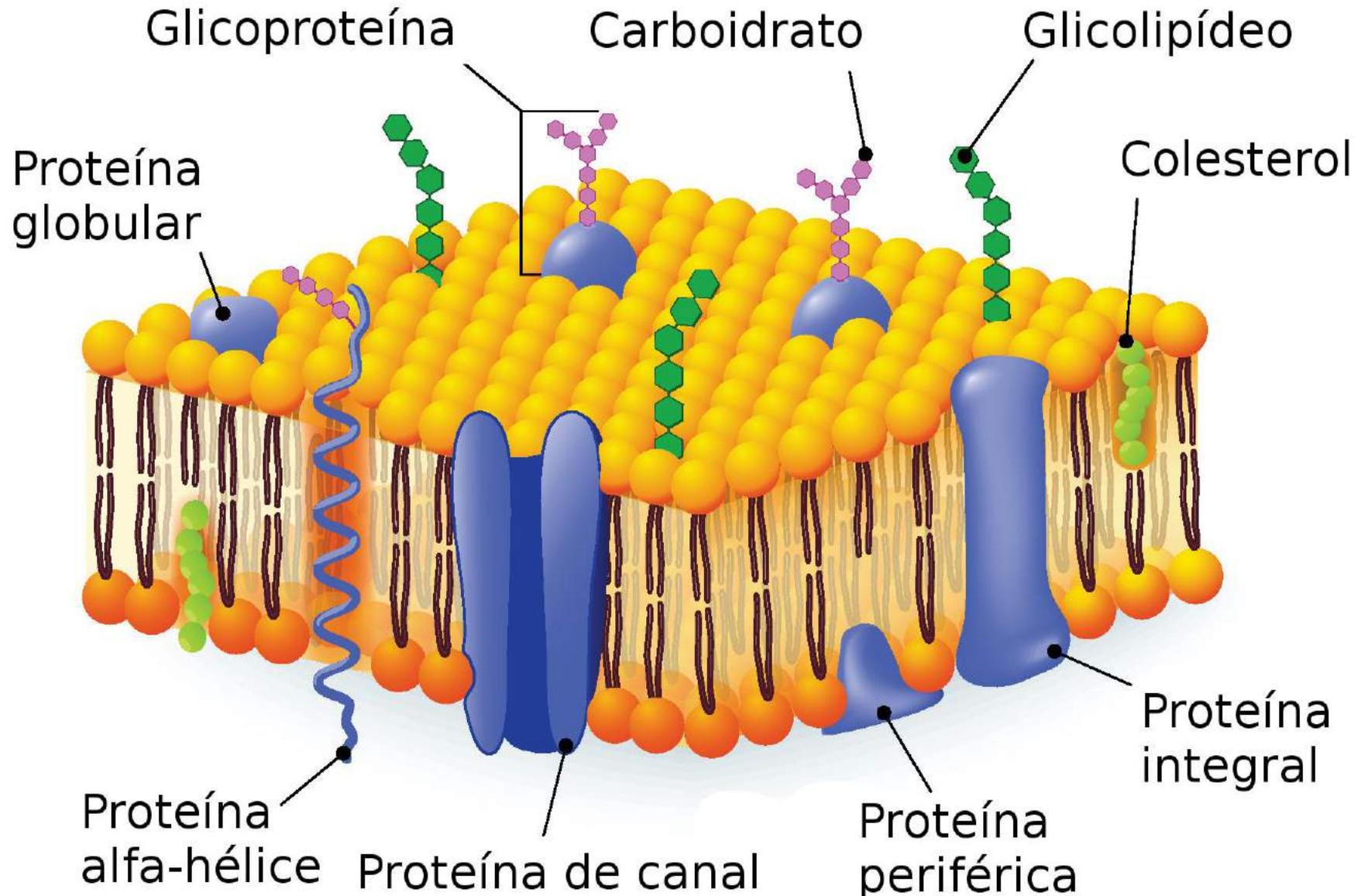
Sholl-Franco, A. (2015). Bases Morfofuncionais do Sistema Nervoso, Em: Neuropsicologia Hoje.

Neurônio



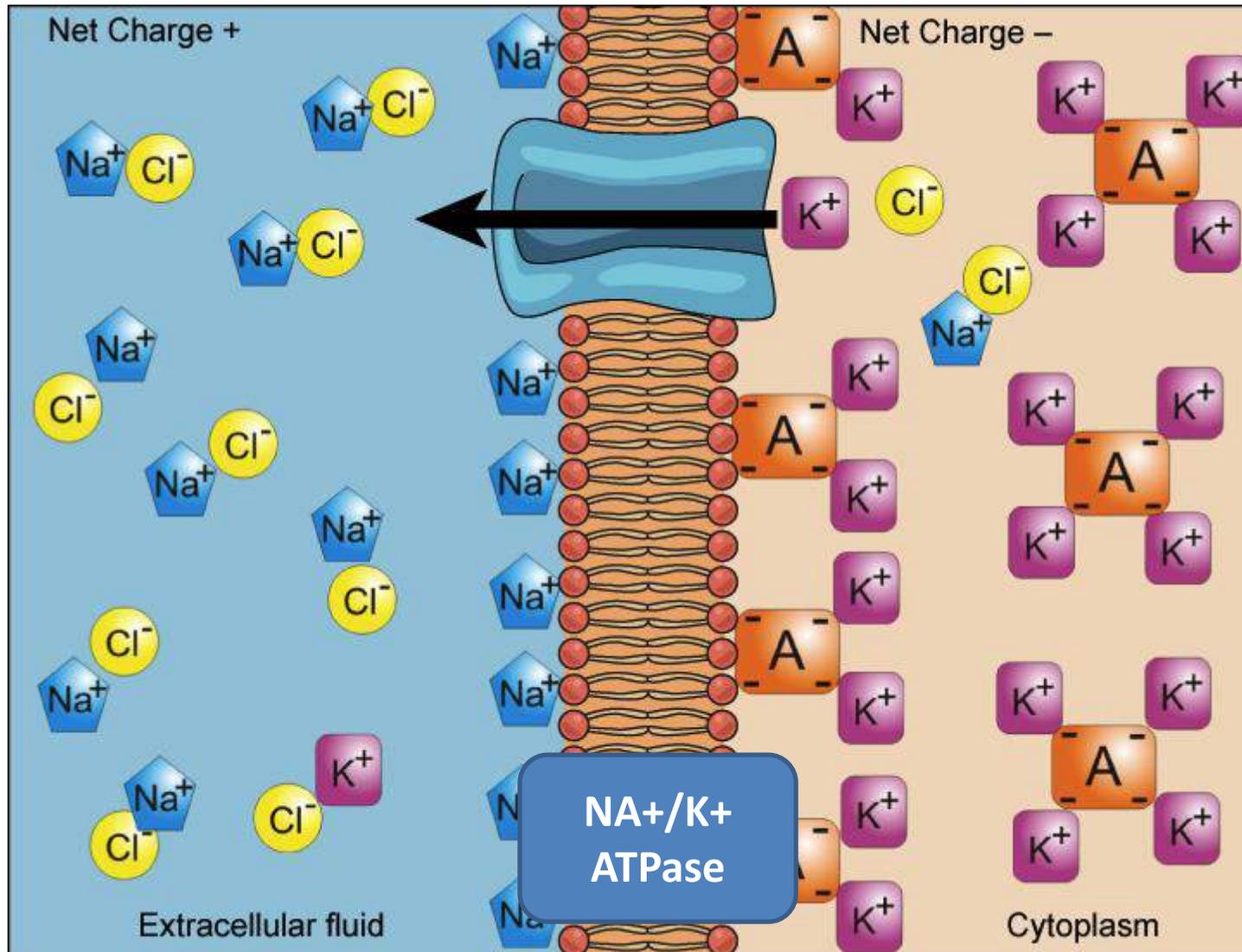
Sholl-Franco, A. (2015). Bases Morfofuncionais do Sistema Nervoso, Em: Neuropsicologia Hoje.

Membrana e canais

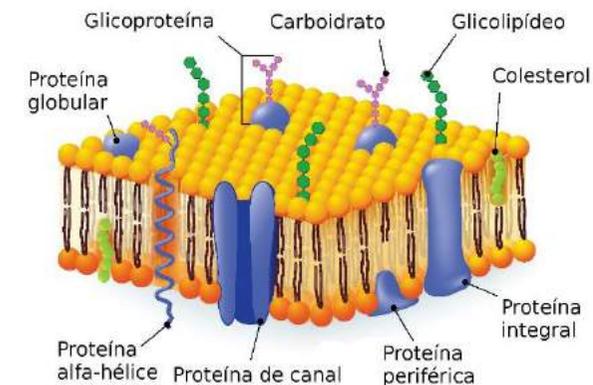


Sholl-Franco, A. (2015). Bases Morfofuncionais do Sistema Nervoso, Em: Neuropsicologia Hoje.

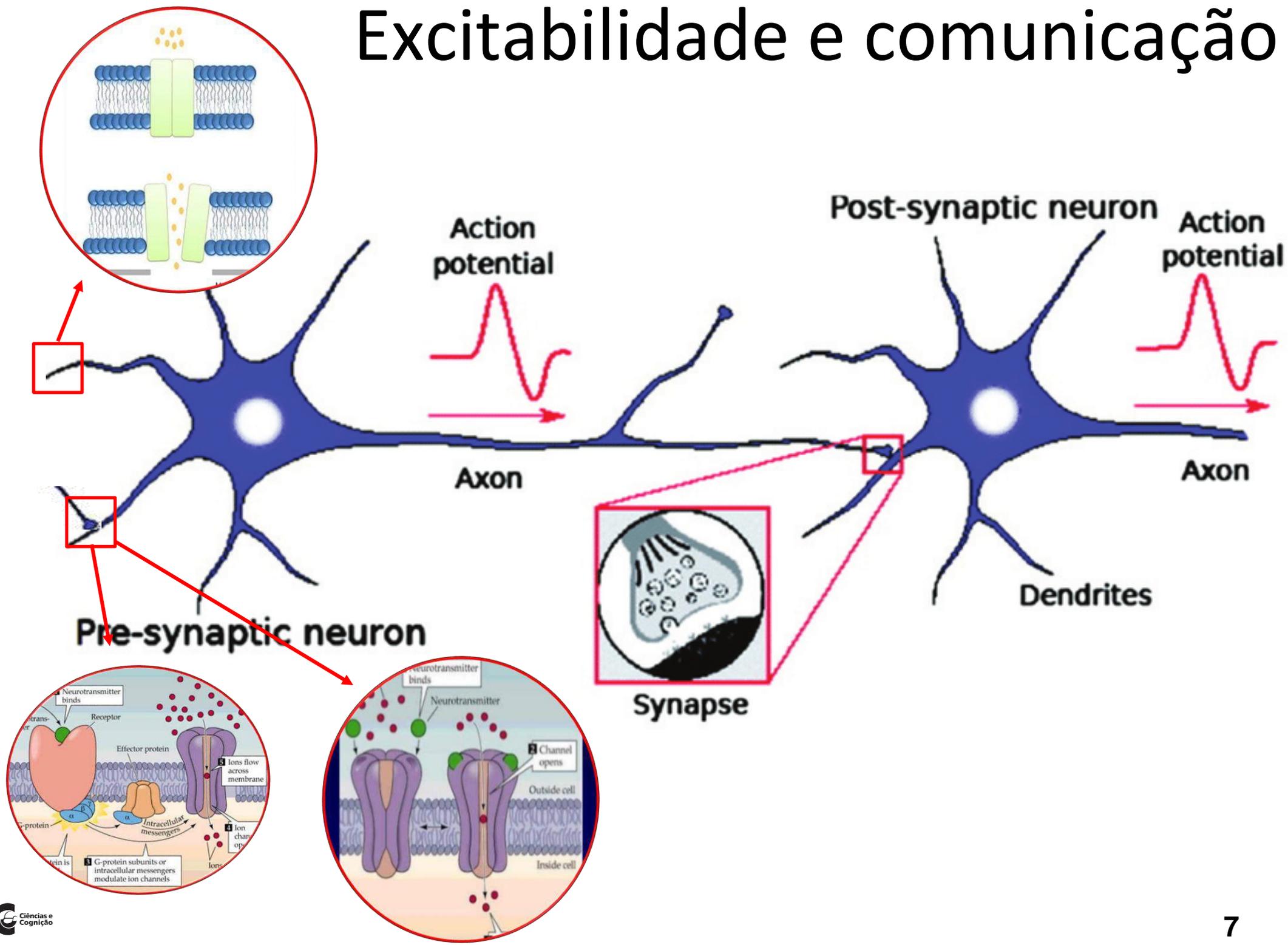
Membrana e canais



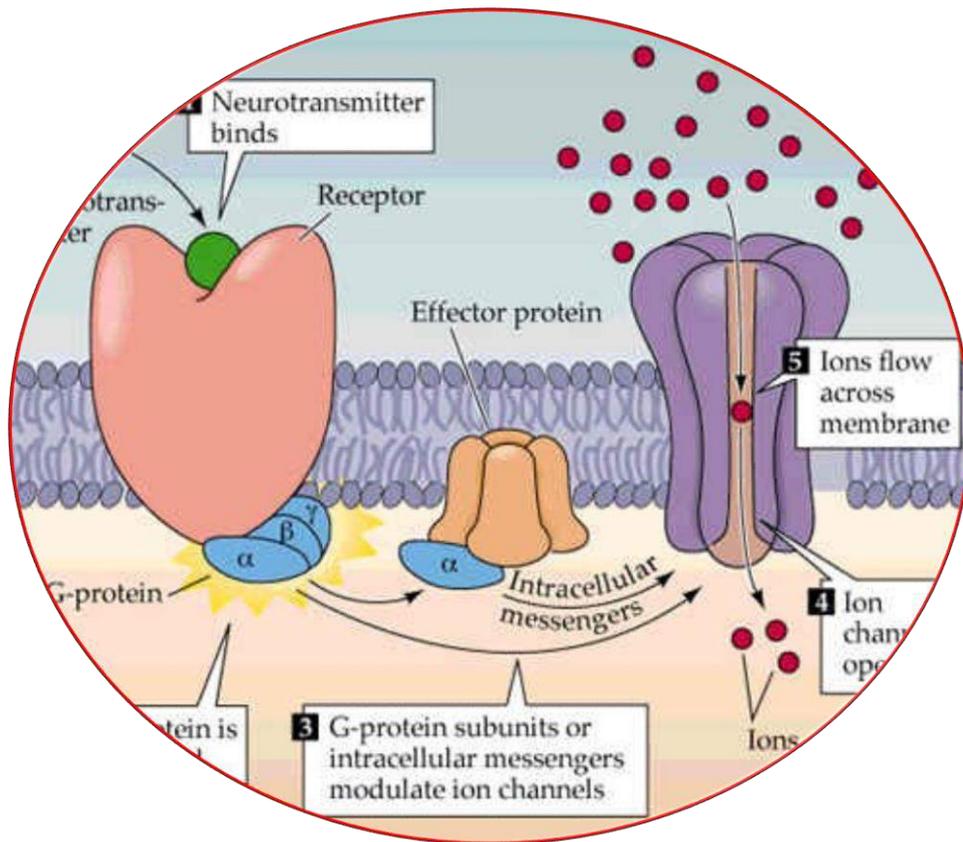
Potencial de repouso: -70mV



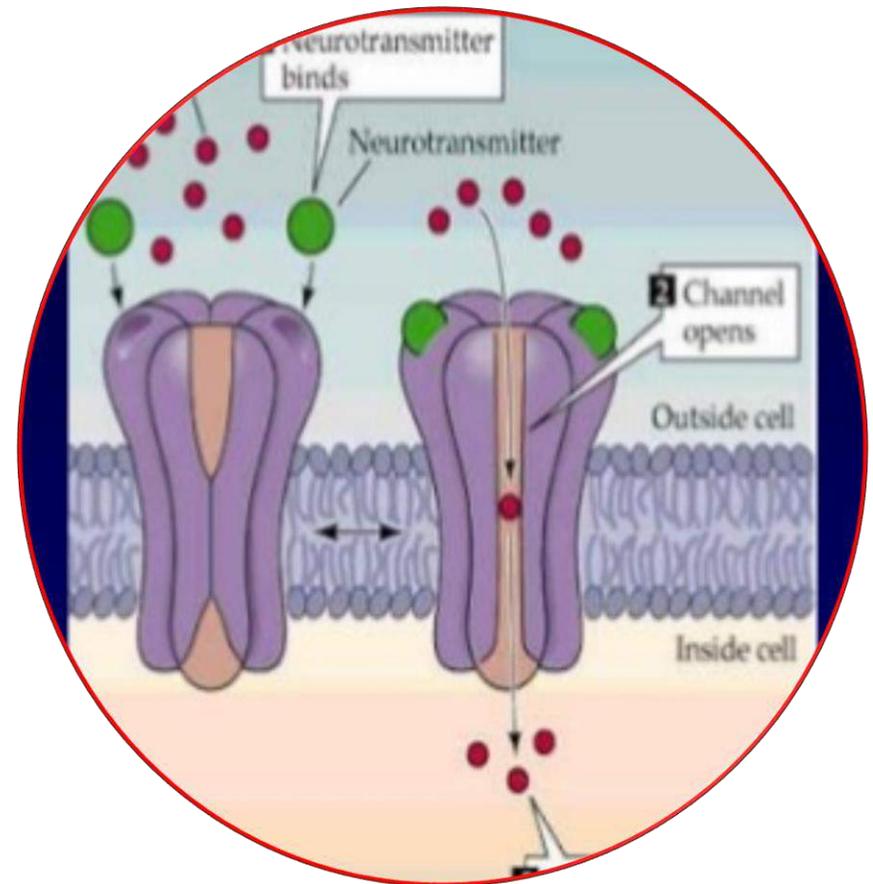
Excitabilidade e comunicação



Potencial Local



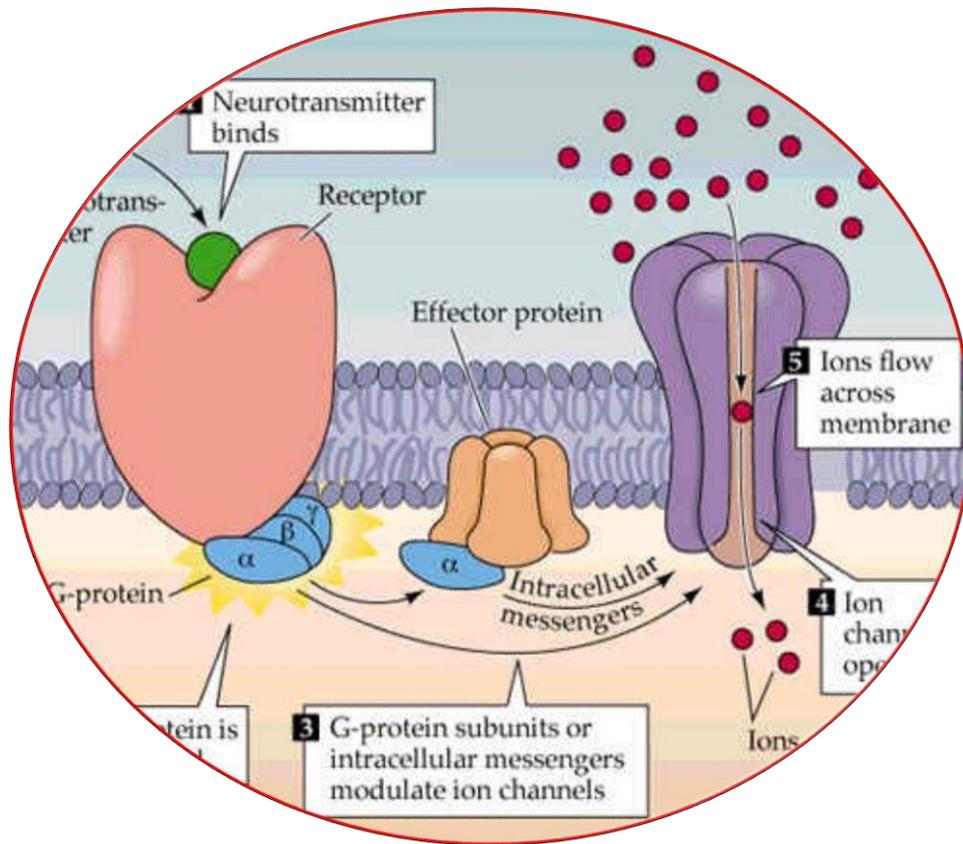
Canais metabotrópicos



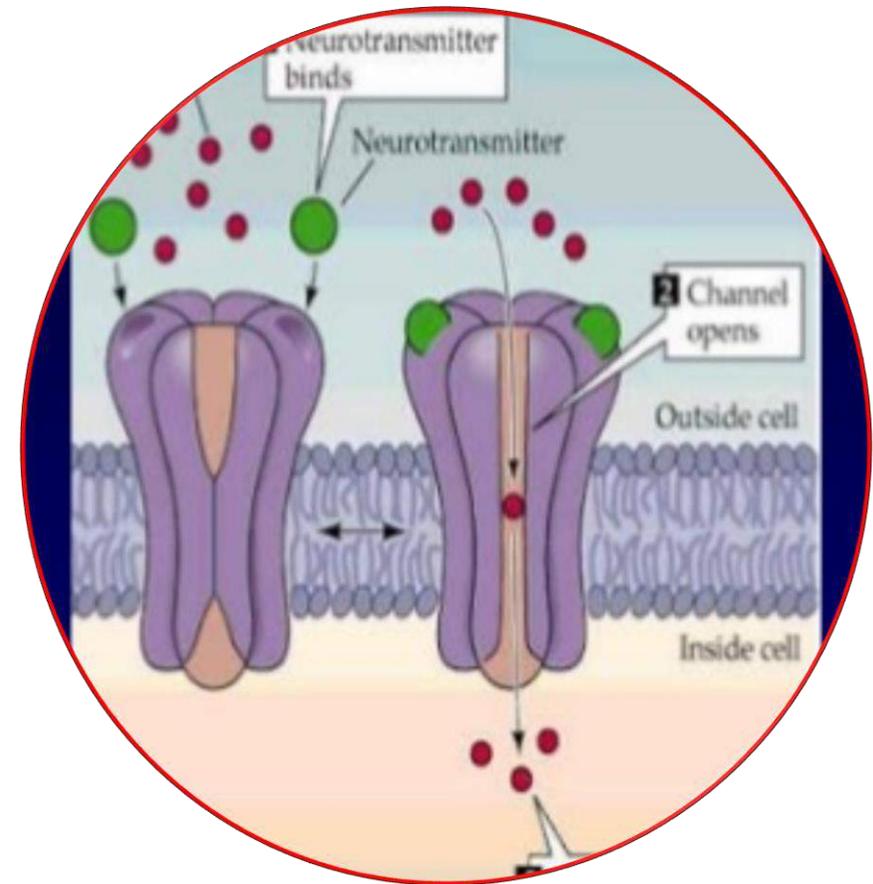
Canais ionotrópicos

- Dependentes de ligante (neurotransmissor ou outra moléculas)
- Dependentes de voltagem
- Sensíveis ao estiramento
- Etc.

Potencial Local: tipos de estímulo

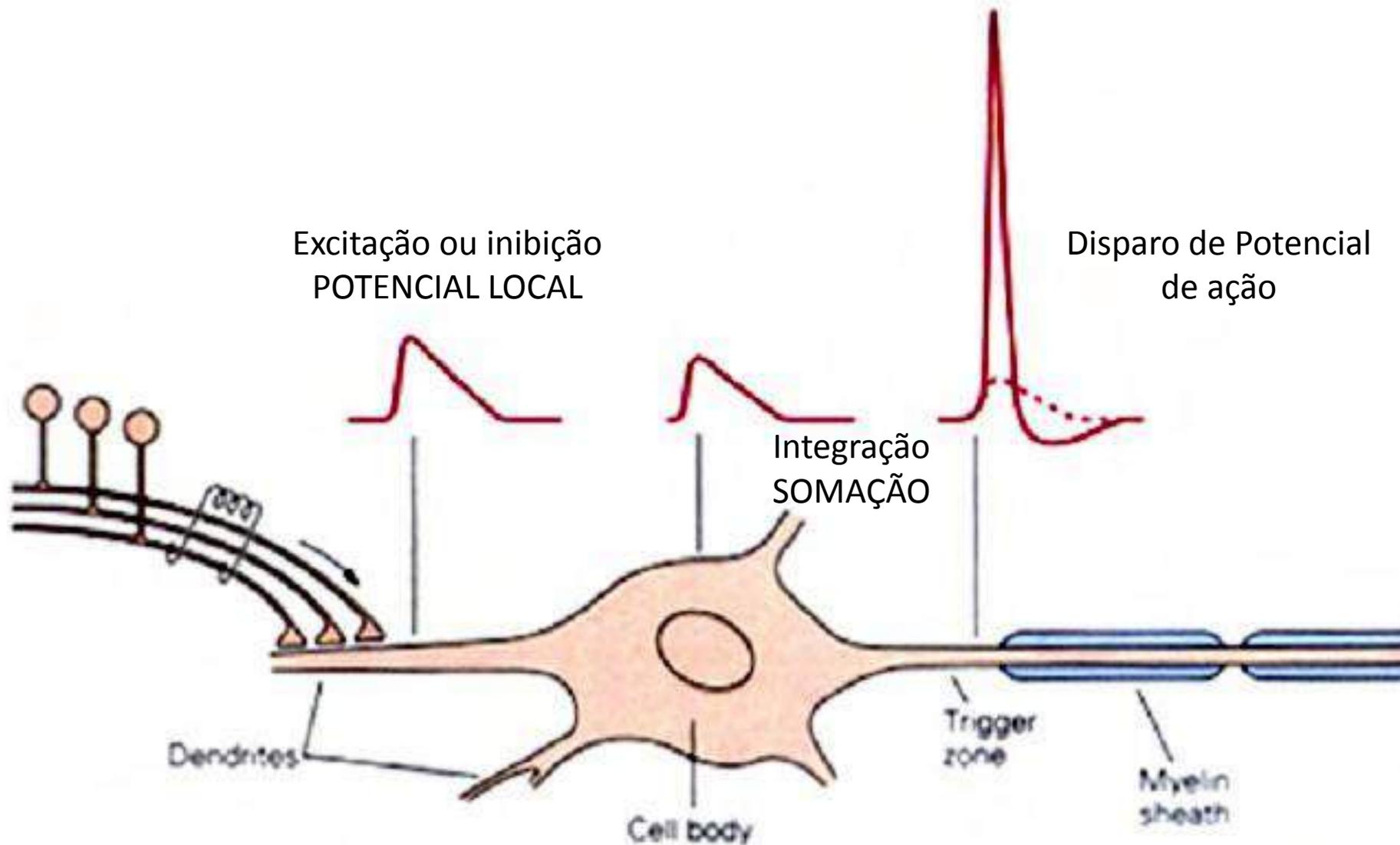


Canais metabotrópicos



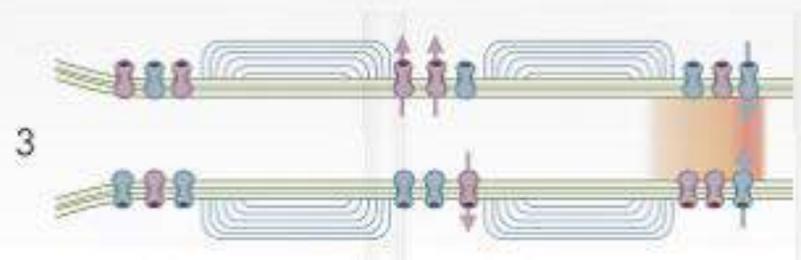
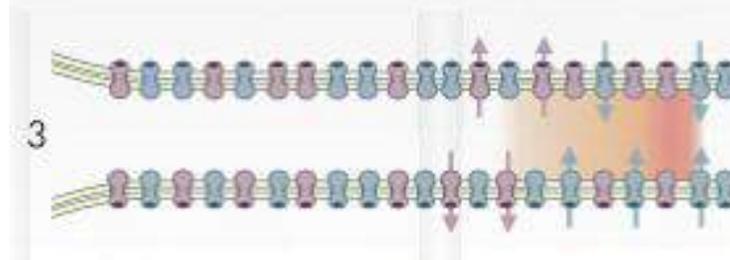
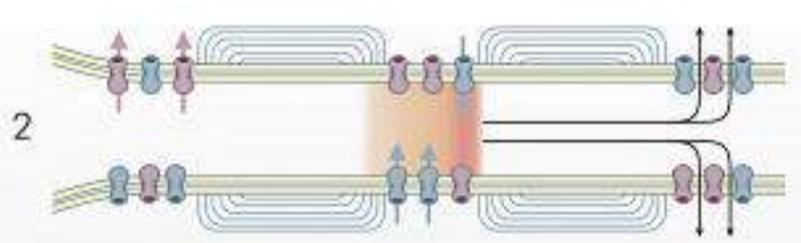
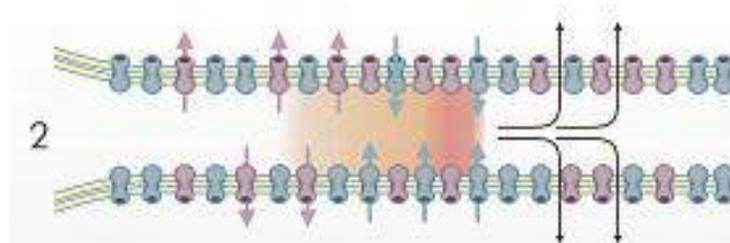
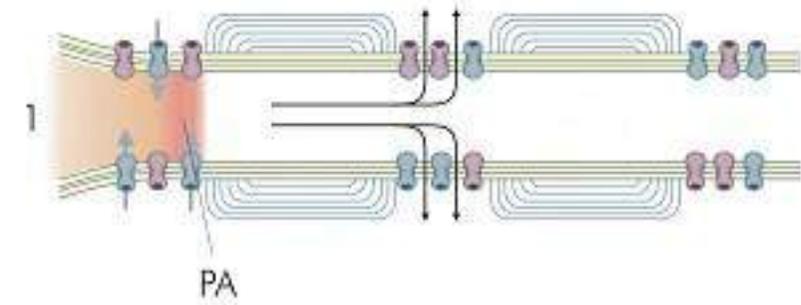
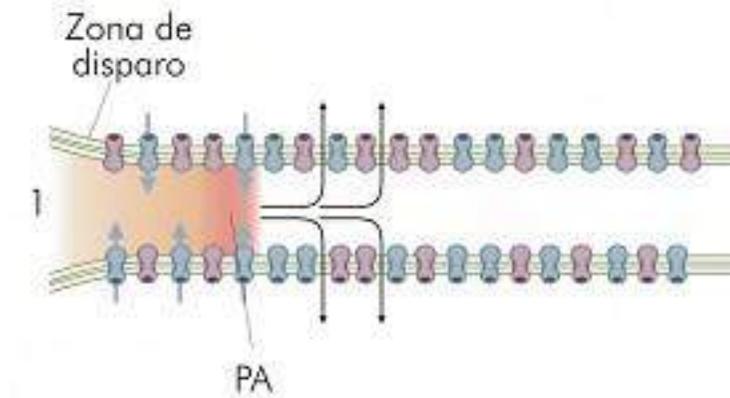
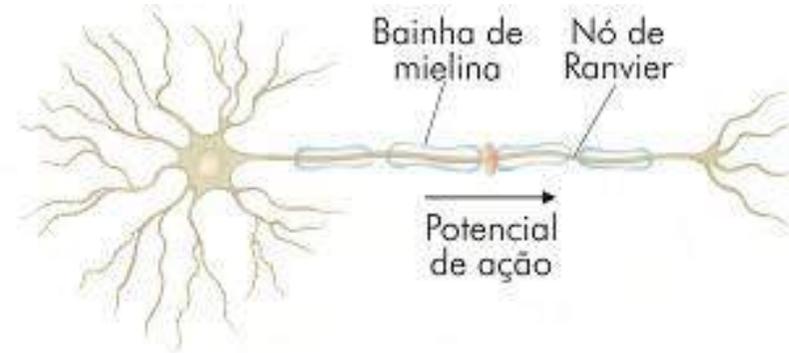
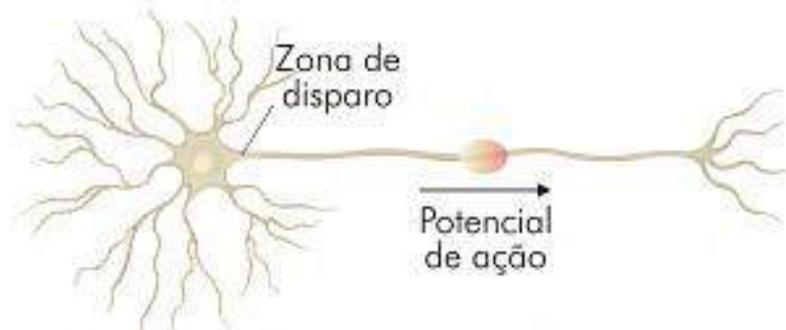
Canais ionotrópicos

Integração/somação



Sholl-Franco, A. (2015). Bases Morfofuncionais do Sistema Nervoso, Em: Neuropsicologia Hoje.

Potencial de ação



Potencial de ação

- Propagável
- Unidirecional
- Transmissão saltatória
- Frequência de disparo

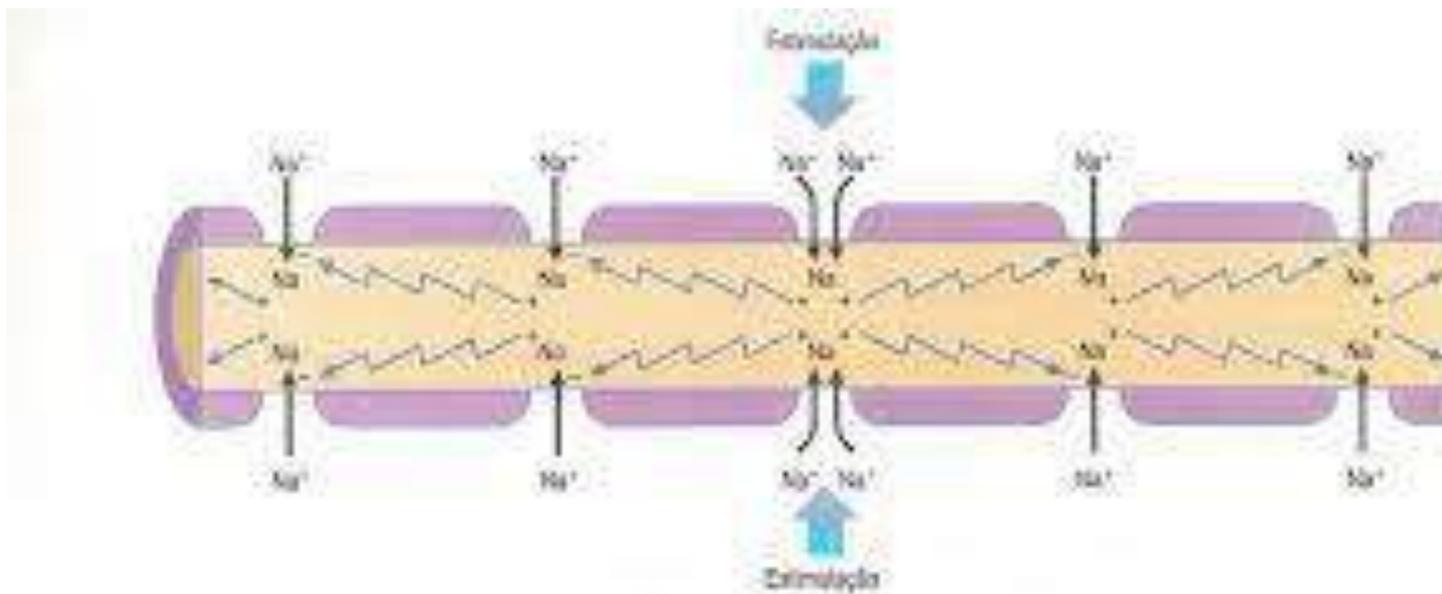
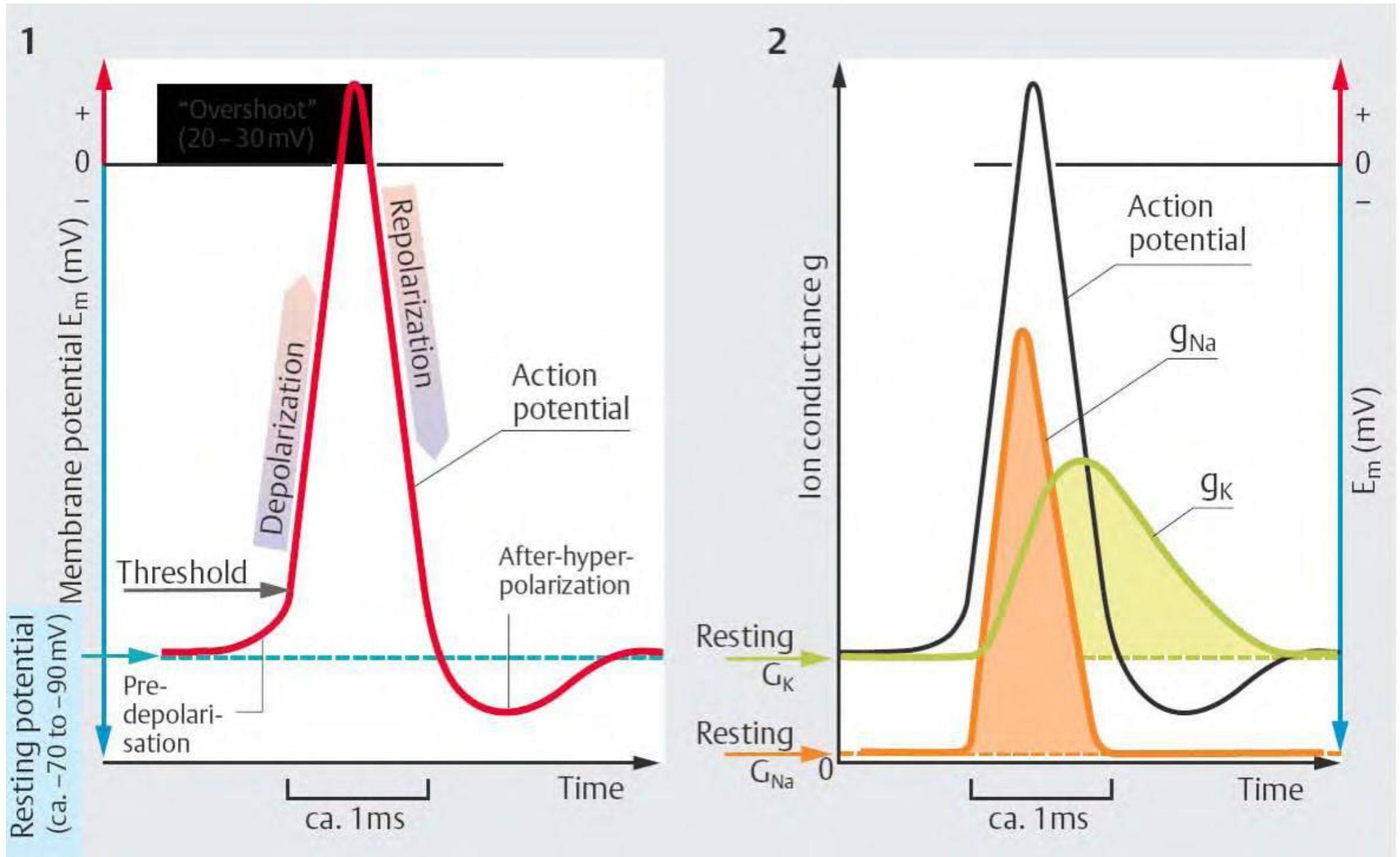


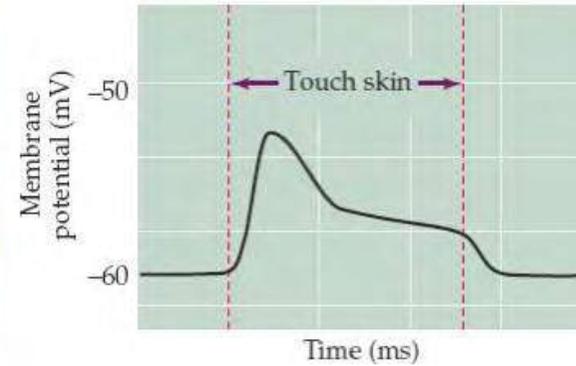
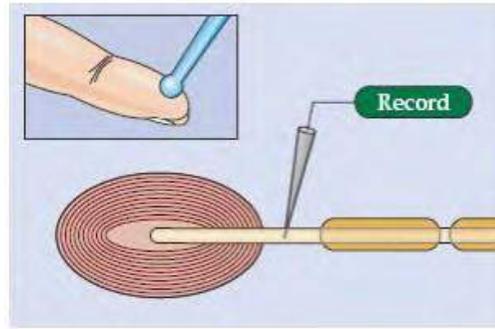
Figura 1.3.7 Condução saltatória. A propagação do potencial de ação, em axônio amielínico, envolve a abertura e o fechamento dos canais iônicos. Esse é processo biológico e, portanto, lento, quando comparado à condução física de eletricidade por um fio. Na condução saltatória, ocorre condução física, ao longo do segmento mielinizado do axônio, de nodo a nodo, onde o potencial de ação é regenerado em cada um. Isso acelera a transmissão ao longo do nervo.

Potencial de ação: canais envolvidos

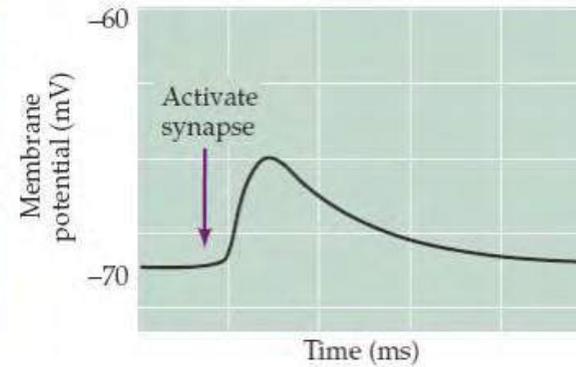
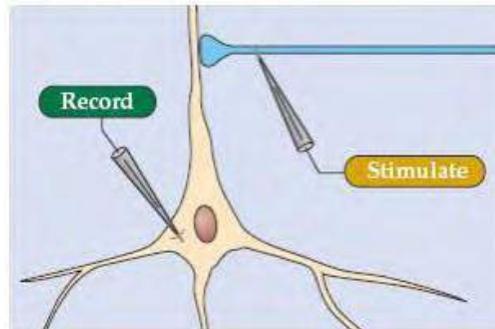


Código Unitário

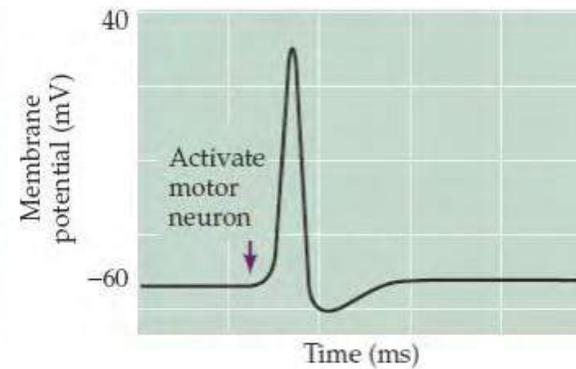
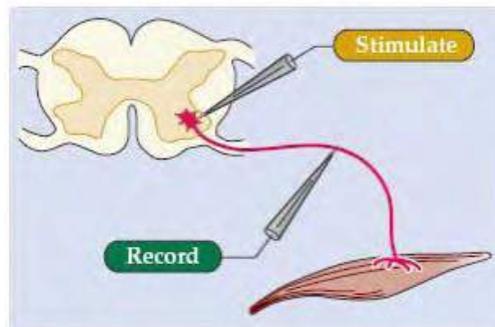
(A) Receptor potential



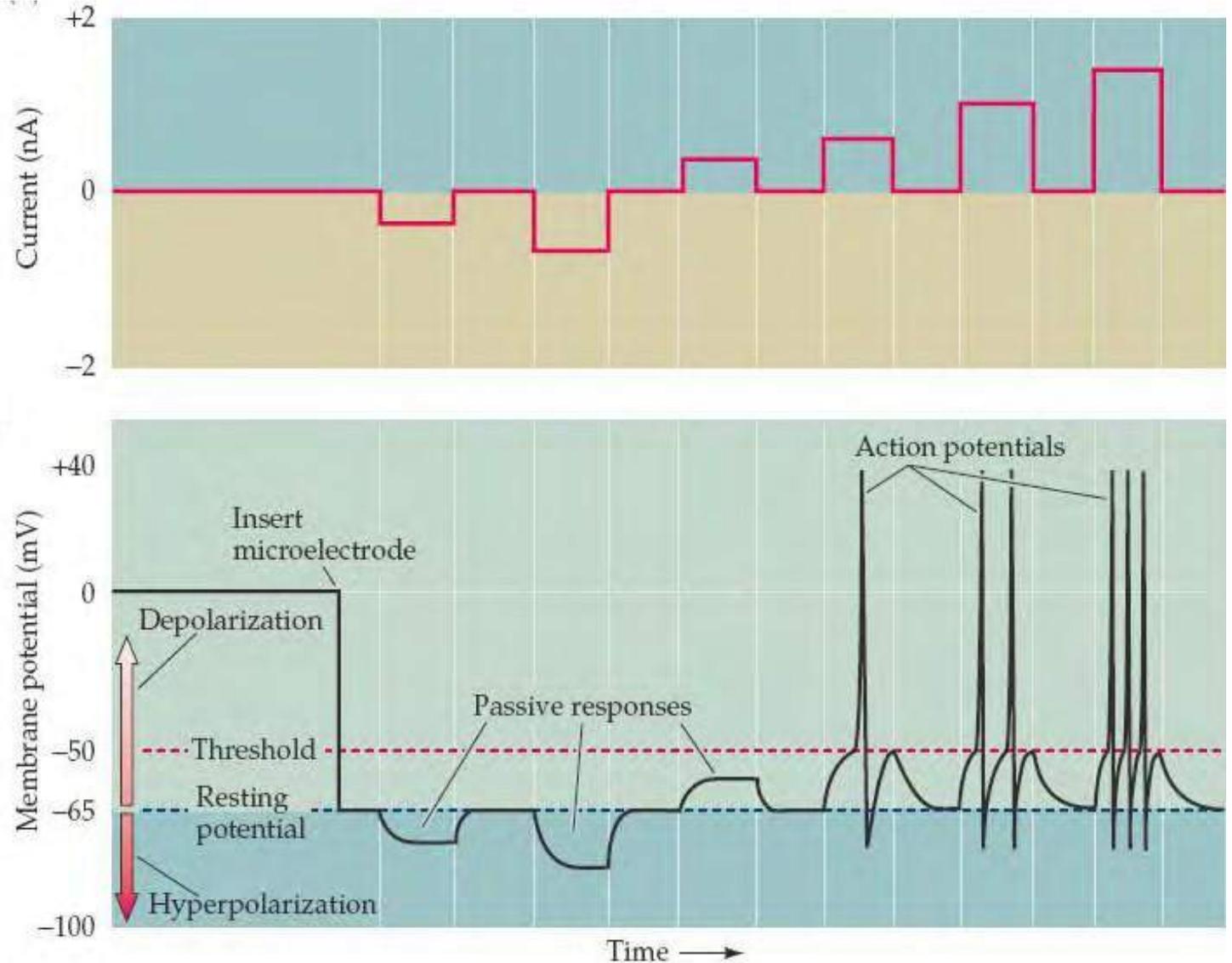
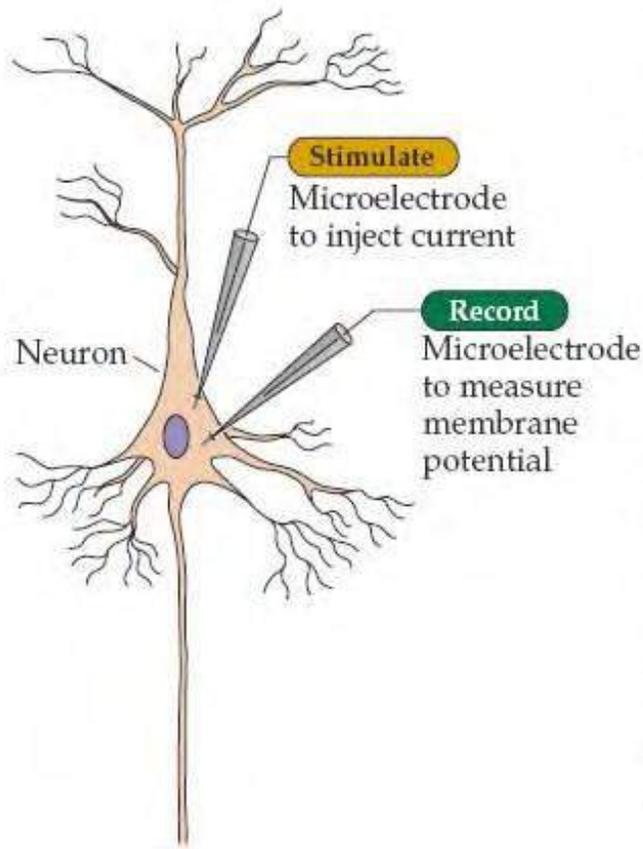
(B) Synaptic potential



(C) Action potential



Código Unitário



PRÁTICA DE EXCITABILIDADE

Tipos de neurotransmissores

NEUROTRANSMITTER	FUNCTION	EFFECT OF DEFICIT	EFFECT OF SURPLUS	AGONIST DRUG	ANTAGONIST DRUG
ACETYLCHOLINE (ACH)	EXCITATORY: STIMULATES MUSCLE CONTRACTION; INVOLVED IN MEMORY, LEARNING AND GENERAL INTELLECTUAL FUNCTIONING	ALZHEIMER'S	SEVERE MUSCLE SPASMS	NICOTINE BLACK WIDOW SPIDER VENOM	CURARE
DOPAMINE	INHIBITORY: PLEASURABLE SENSATIONS INVOLVED IN MOVEMENT, ATTENTION, LEARNING, AND	PARKINSON'S	SCHIZOPHRENIA DRUG ADDICTION	L-DOPA COCAINE	ANTI-PSYCHOTIC DRUGS LIKE THORAZINE
SEROTONIN	INHIBITORY: MOODS AND EMOTIONAL STATES	DEPRESSION, MOOD DISORDERS	AUTISM	PROZAC SSRIS	
NOREPINEPHRINE	EXCITATORY: USED FOR AROUSAL IN THE FLIGHT/FIGHT RESPONSE, PLAYS A ROLE IN LEARNING AND MEMORY RETRIEVAL	MENTAL DISORDERS, ESPECIALLY DEPRESSION	ANXIETY	CAFFEINE, AMPHETAMINES	LITHIUM
GABA (GAMMA-AMINOBUTYRIC ACID)	INHIBITORY: HELPS TO OFFSET EXCITATORY MESSAGES AND REGULATE DAILY SLEEP-WAKE CYCLES	ANXIETY	SLEEP AND EATING DISORDERS	VALIUM, XANAX	
ENDORPHINS	INHIBITORY: INVOLVED IN PAIN PERCEPTION AND POSITIVE EMOTIONS	BODY EXPERIENCES PAIN	BODY MAY NOT GIVE ADEQUATE WARNING ABOUT PAIN, ARTIFICIAL HIGHS	OPIATES	NALOXONE
GLUTAMATE	EXCITATORY: USED IN MEMORY, LEARNING, MOVEMENT		TOO MUCH GLUTAMATE (AND TOO LITTLE GABA) ASSOCIATED WITH EPILEPTIC SEIZURES		

Diversidade de respostas ao mesmo neurotransmissor

Tabela 4.2 Receptores de dopamina

	D ₁	D ₂	D ₃	D ₄	D ₅
Sistema de segundo mensageiro	Ativa adenilil ciclase	Inibe a adenilil ciclase			Ativa a adenilil ciclase
Localização no cérebro	Neostriado e estriado ventral, córtex?	Neostriado e estriado ventral	Estriado ventral, hipotálamo	Córtex ventral, medula, mesencéfalo	Hipocampo, hipotálamo
Pré/Pós-sináptico	Pós-sináptico	Tanto pré como pós-sináptico	Pós-sináptico	Pós-sináptico	Pós-sináptico
Cromossomo humano	5	11	3	11	4
Afinidade para dopamina*	2.000	2.000	30	450	250

*Quanto menor o número, mais estreitamente a dopamina liga-se ao receptor.

