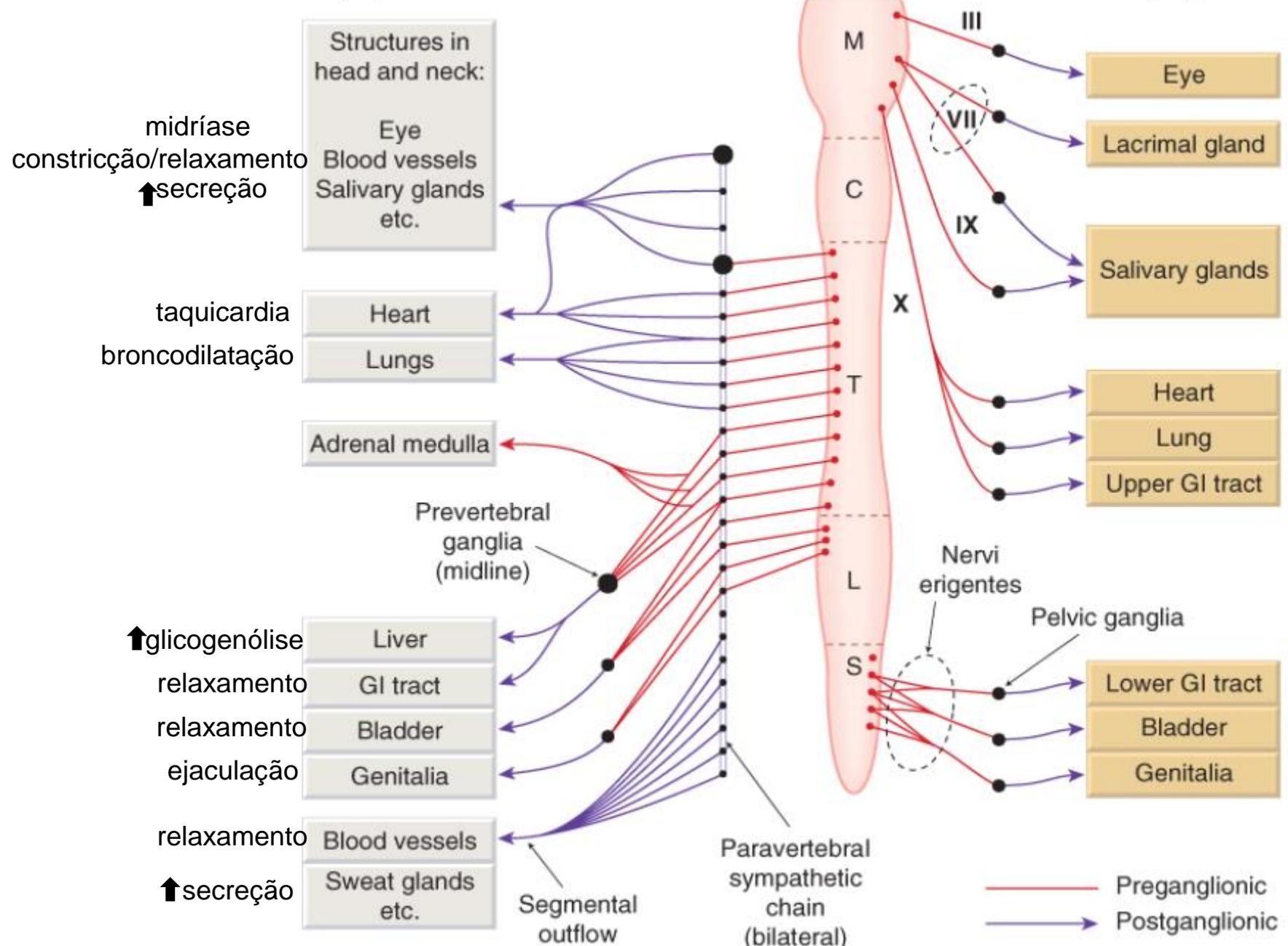


Fármacos Adrenérgicos e Antiadrenérgicos

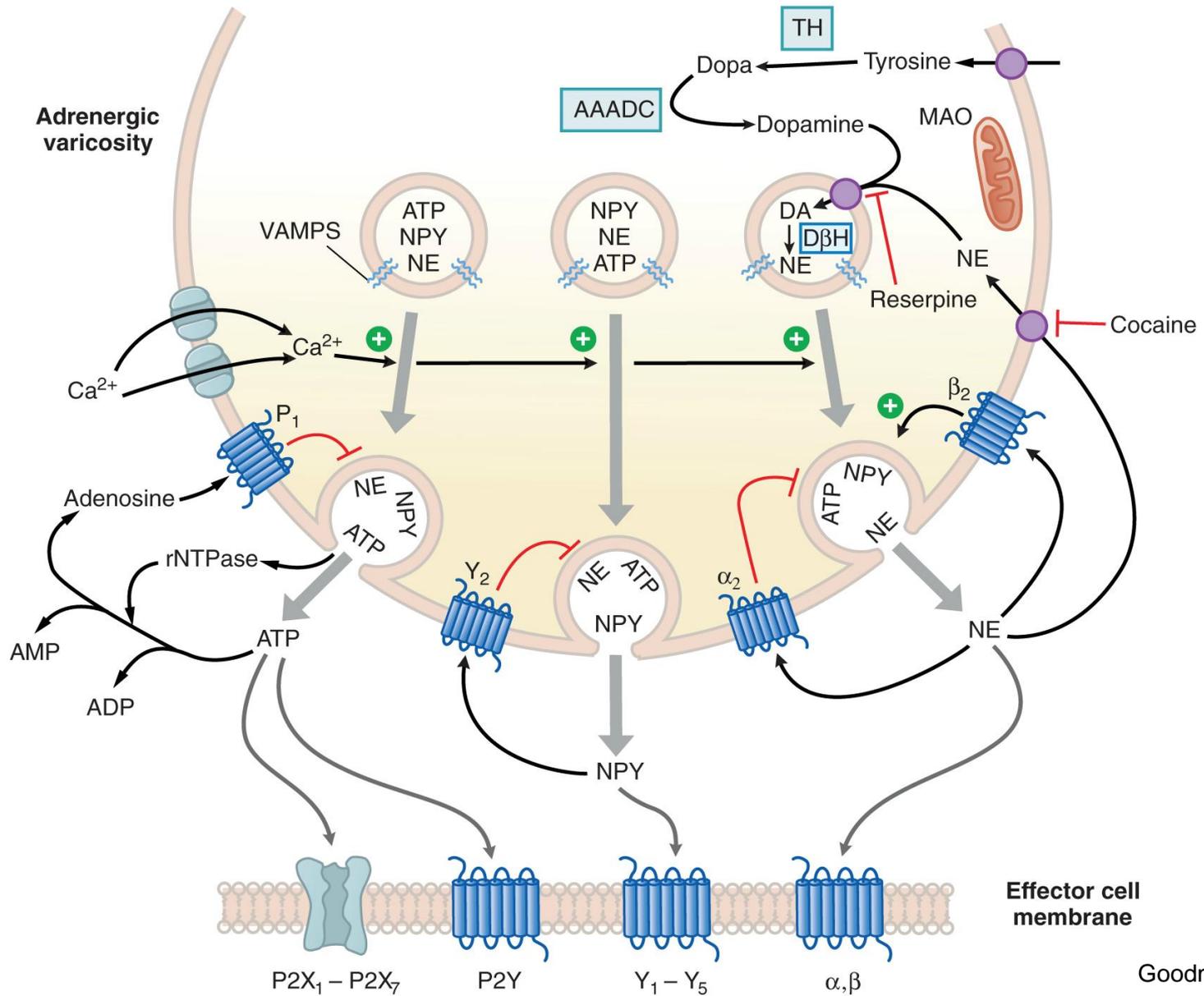
Elisa M. Kawamoto

Sympathetic

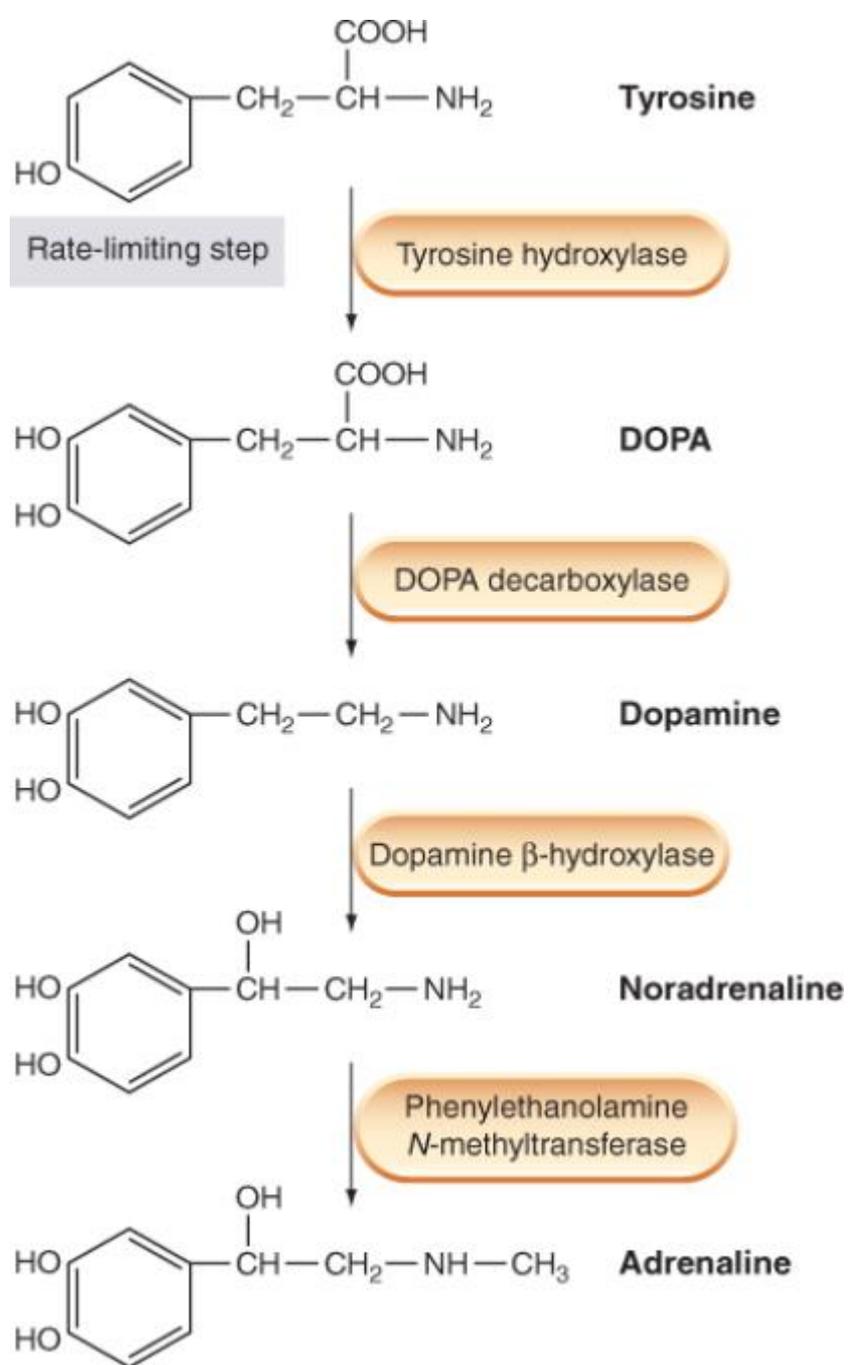
Parasympathetic



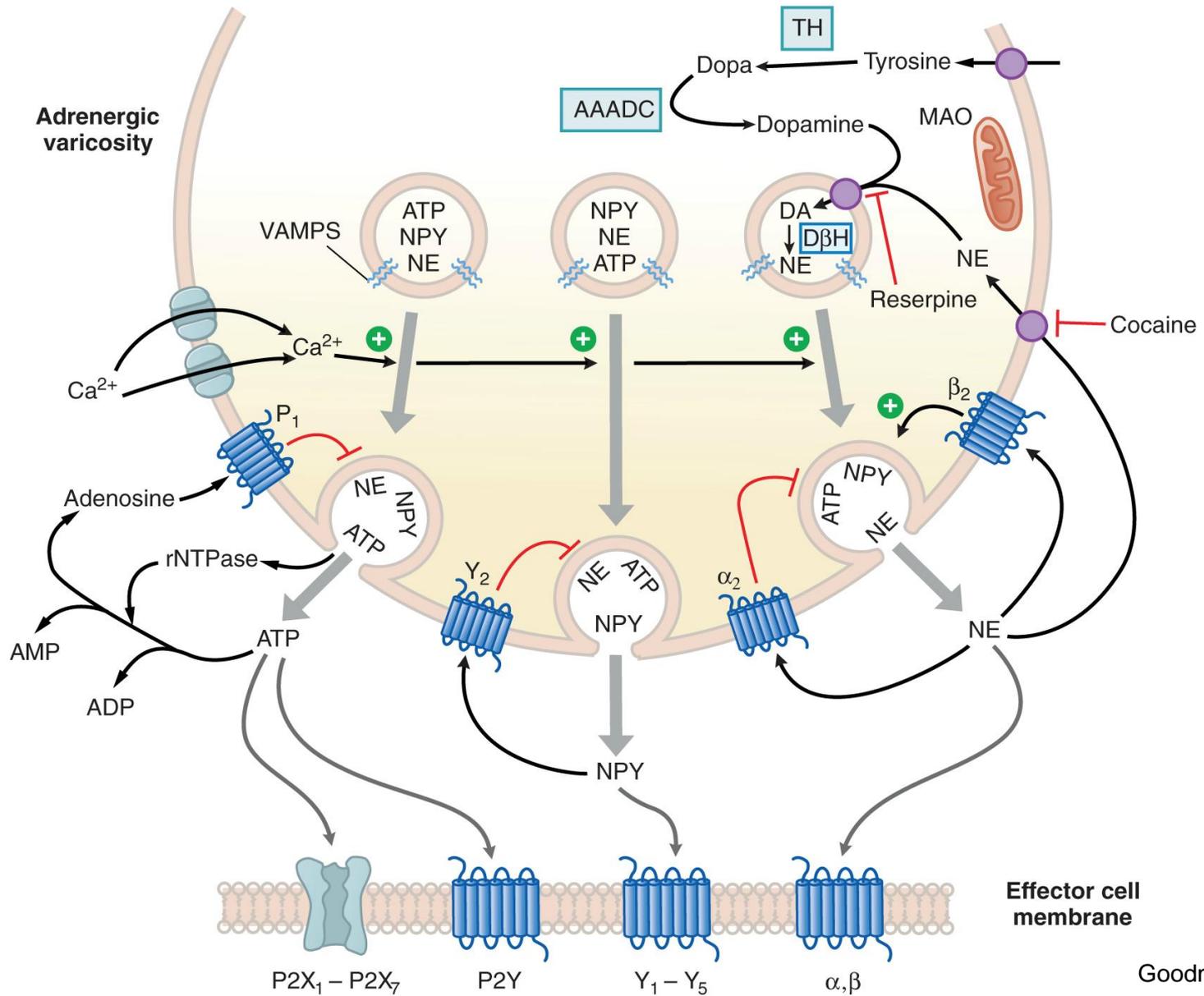
Transmissão Adrenérgica



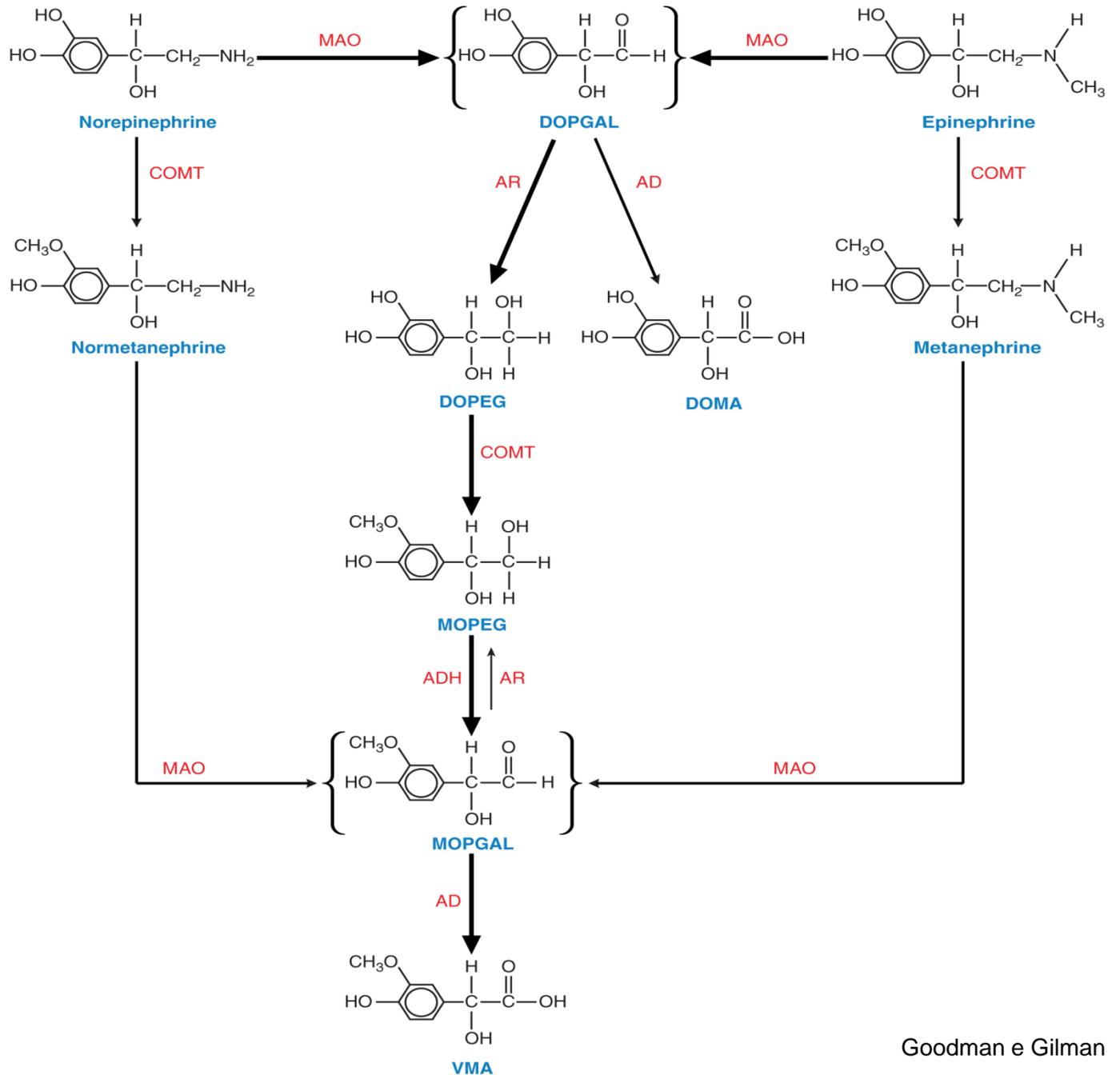
Síntese de noradrenalina e adrenalina



Transmissão Adrenérgica



Metabolismo de noradrenalina e adrenalina

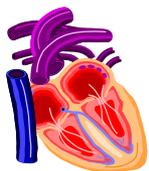
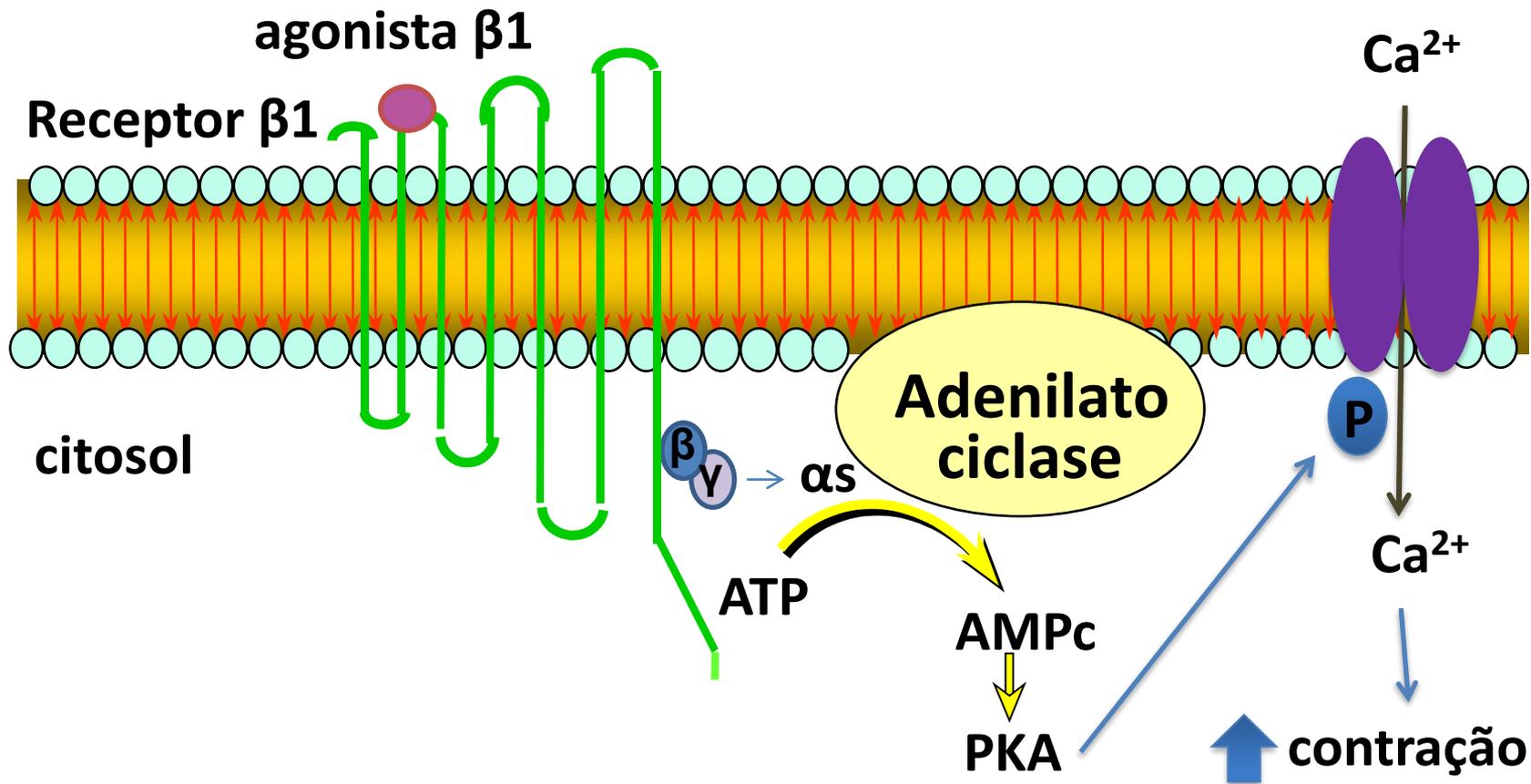


Receptores adrenérgicos e seus sistemas de transdução

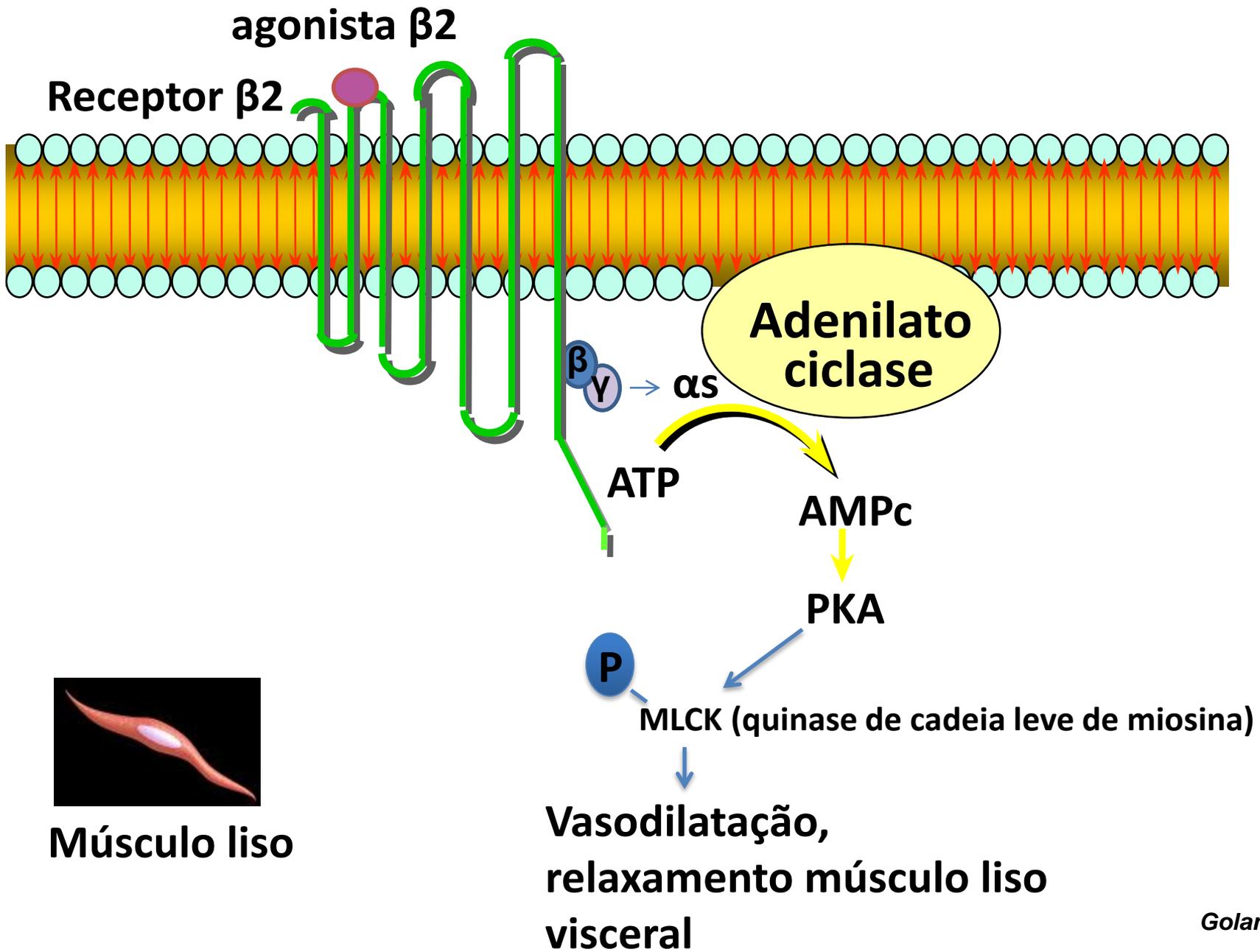
Receptor	Proteína G	Mecanismo Molecular
α_1	Gq	\uparrow Fosfolipase C – IP3 \uparrow Ca ⁺⁺
α_2	Gi	\downarrow AC, \downarrow Ca ⁺⁺ , \uparrow K ⁺ ,

Receptores adrenérgicos e seus sistemas de transdução

Receptor	Proteína G	Mecanismo Molecular
$\beta_1, \beta_2, \beta_3$	Gs	$\uparrow AC, \uparrow Ca^{2+}$



Músculo cardíaco



Músculo liso

Receptores-Efeitos

α 1: contração músculo liso

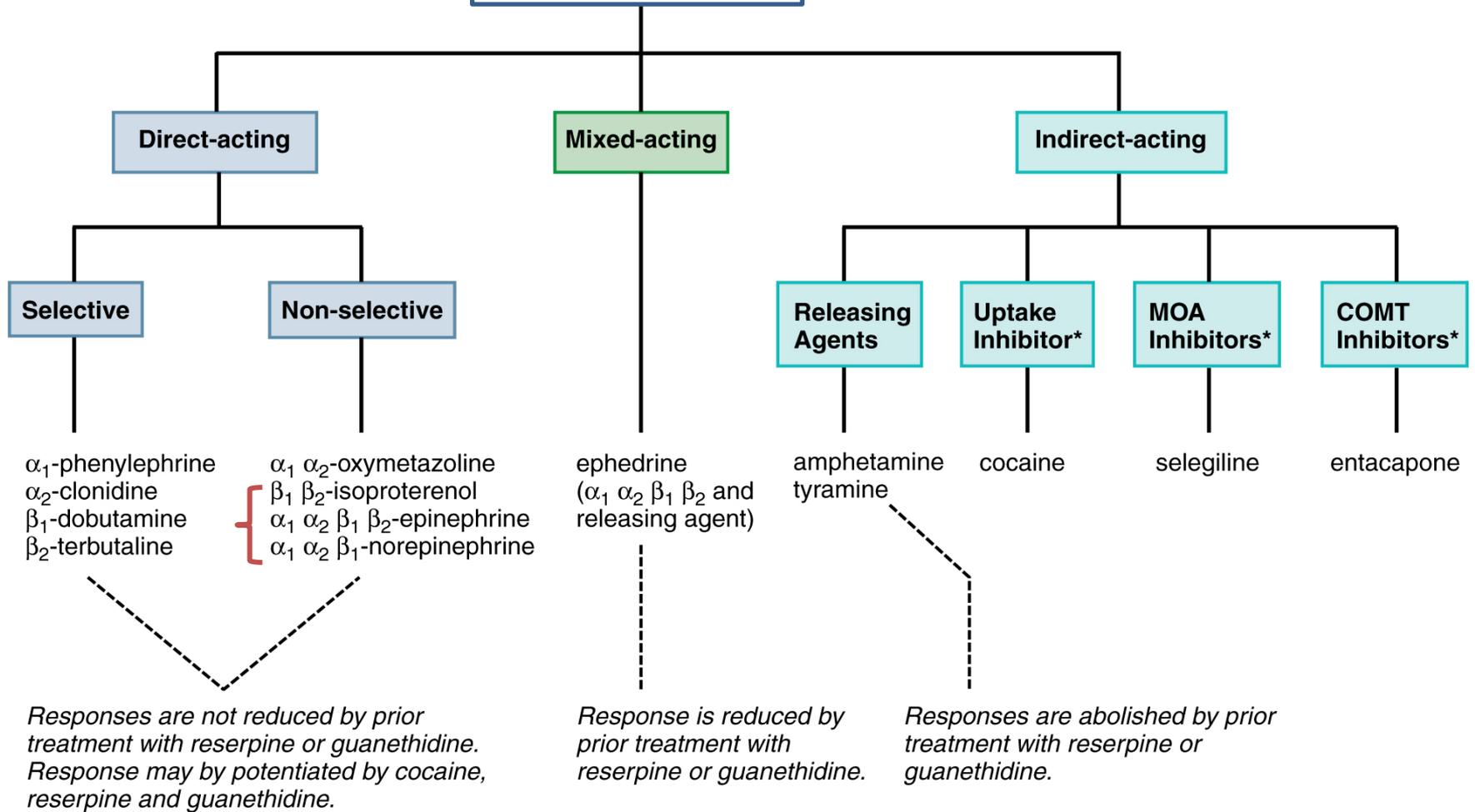
α 2: inibe liberação de NT

β 1: contração músculo cardíaco

β 2: relaxamento músculo liso

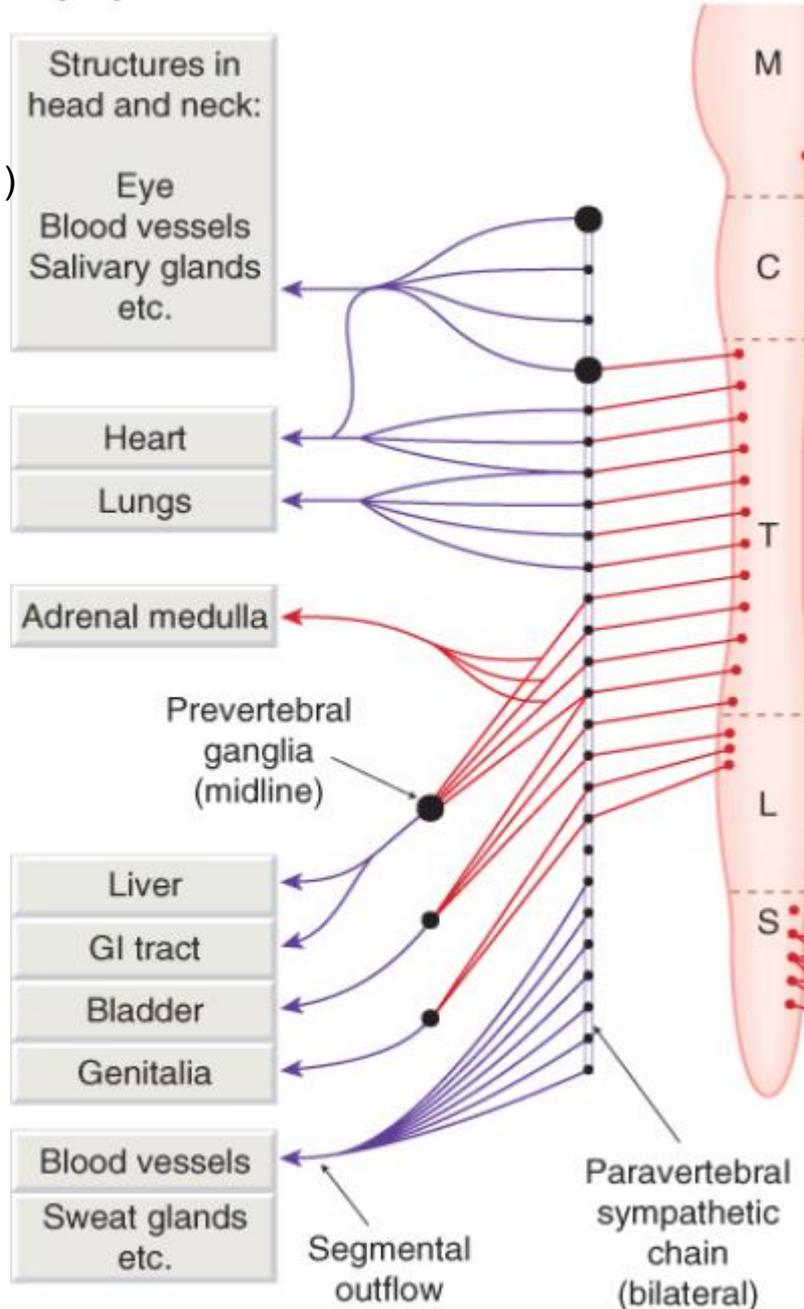
β 3: lipólise

Adrenergic drugs



Sympathetic

Midriase (α_1)



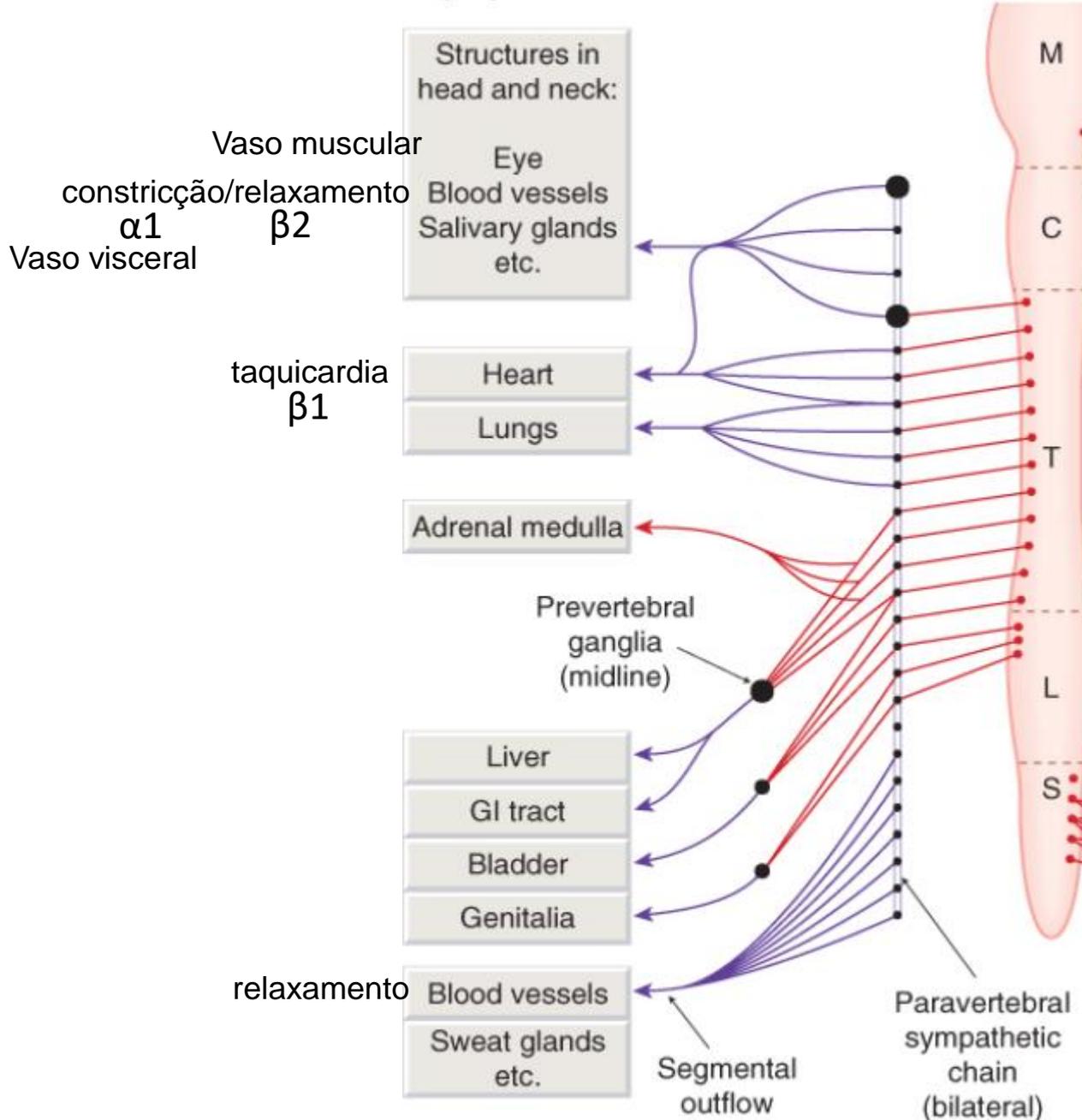
Usos clínicos

Aparelho Visual

Tratamento de glaucoma

Agonista α_2 : (\downarrow PIO, \downarrow produção humor aquoso)

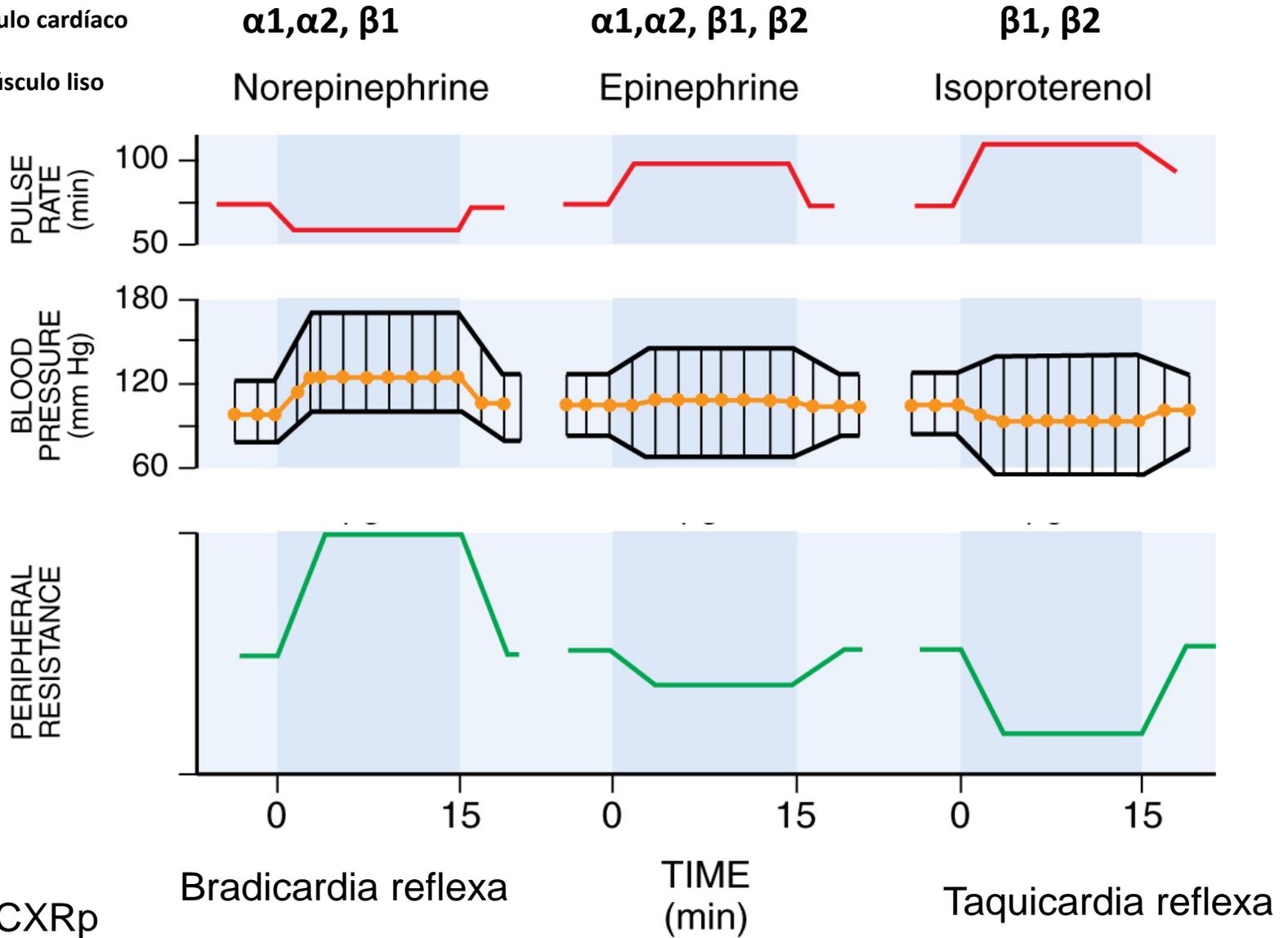
Sympathetic



α_1 : contração músculo liso

β_1 : contração músculo cardíaco

β_2 : relaxamento músculo liso



Usos clínicos

Aparelho Cardiovascular

Agonista α_1 : vasoconstricção (fenilefrina):

Usos: choque, hipotensão

Agonista α_2 : clonidina:

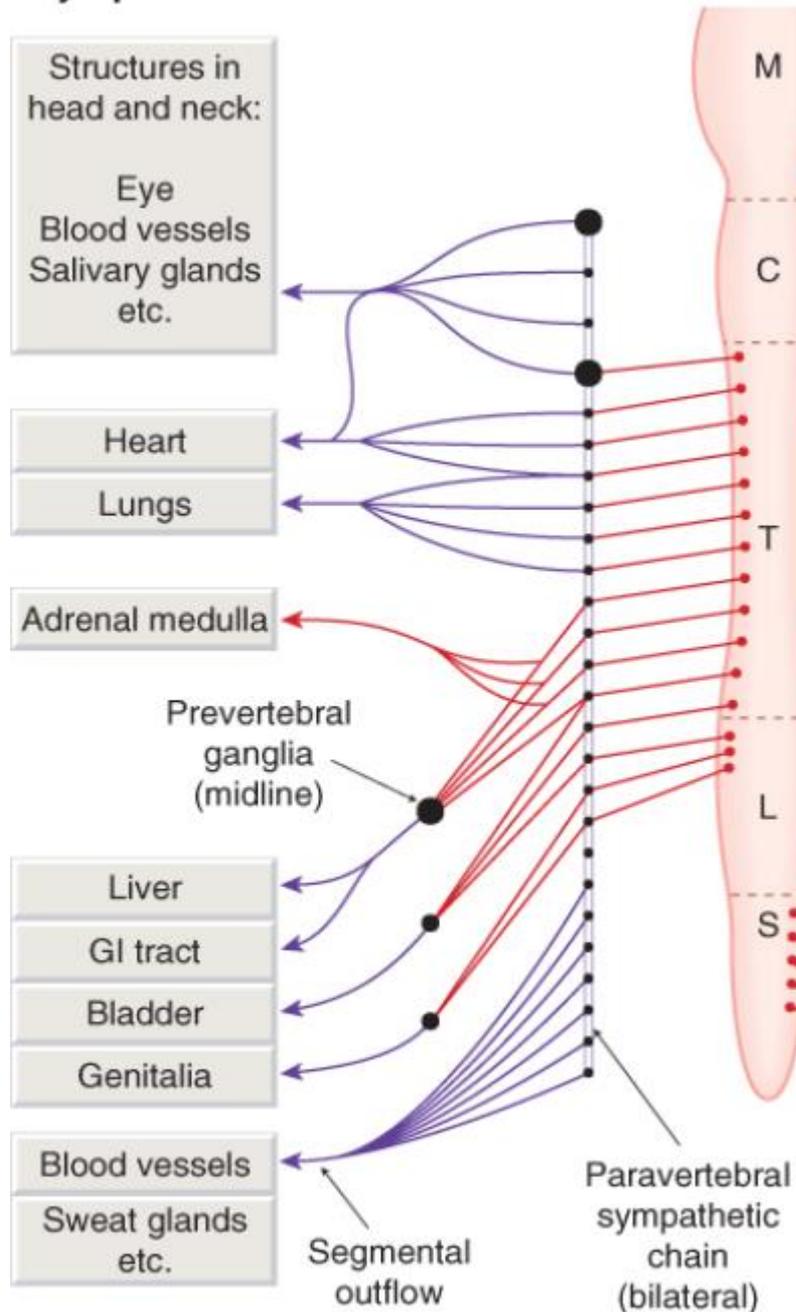
Uso: hipertensão

Agonista β_1 : dobutamina:

Uso: choque cardiogênico por infarto do miocárdio

Sympathetic

broncodilatação



Usos clínicos

Aparelho Respiratório

Agonista α_1 : fenilefrina

Uso: descongestionante nasal

Agonista β_2 : Salbutamol, terbutalina, salmeterol:

Uso: asma, DPOC

α_1 : contração músculo liso

α_2 : inibe liberação de NT

β_1 : contração músculo cardíaco

β_2 : relaxamento músculo liso

β_3 : lipólise

Usos clínicos

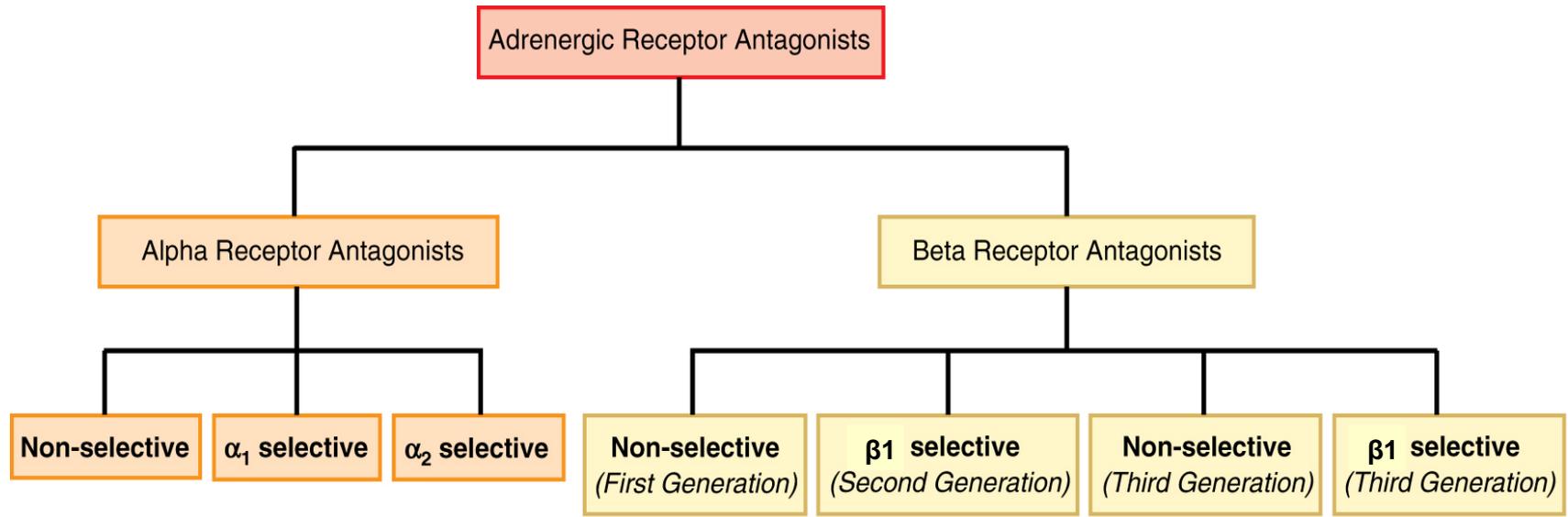
Outras indicações

Adrenalina:

Prolongar ação de anestésico local

Alívio de reações de hiperssensibilidade

Agente hemostático (sangramento da boca)



- phenoxybenzamine
- phentolamine
- prazosin
- terazosin
- doxazosin
- alfuzosin
- tamsulosin
- indoramin
- urapidil
- bunazosin
- yohimbine

- nadolol
- penbutolol
- pindolol
- propranolol
- timolol
- sotalol
- levobunolol
- metipranolol

- acebutolol
- atenolol
- bisoprolol
- esmolol
- metoprolol

- carteolol
- carvedilol*
- bucindolol
- labetalol*

- betaxolol
- celiprolol
- nebivolol

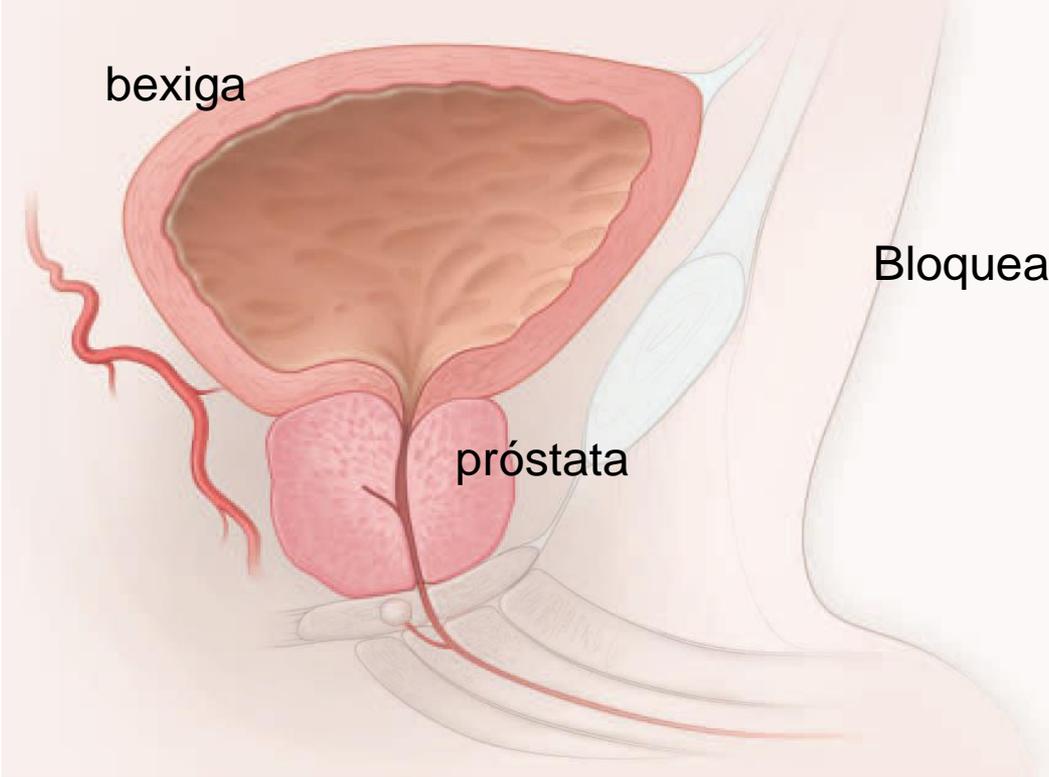
Usos clínicos – bloqueadores α

Preparo de pacientes para retirada do feocromocitoma: fenoxibenzamina

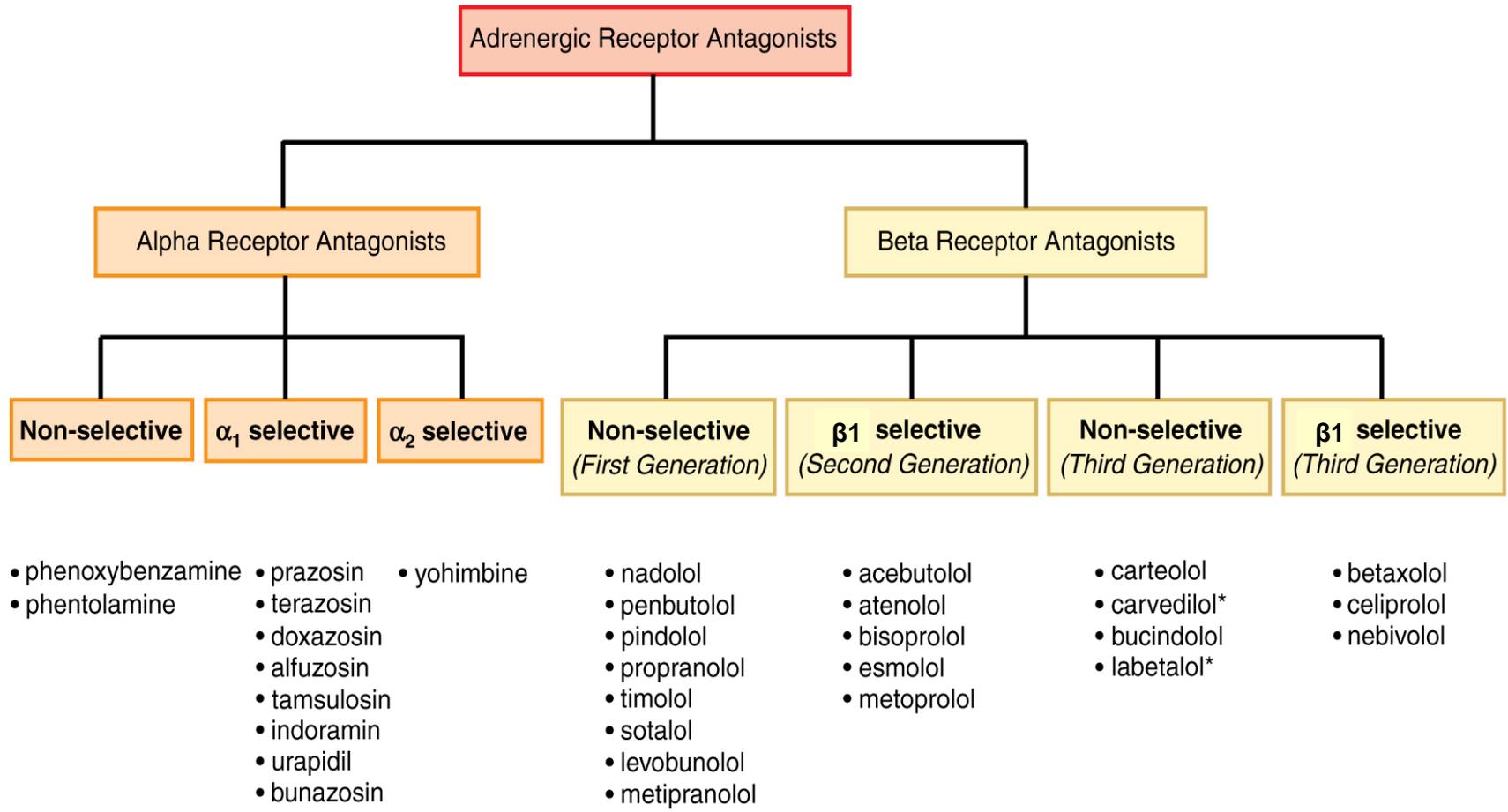
Tratamento da hipertensão: α 1-seletivo

Tratamento da retenção urinária na hiperplasia prostática benigna: α 1-seletivo
(relaxamento do músculo liso próstata)

Hiperplasia prostática benigna

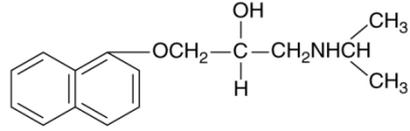


Bloqueador $\alpha 1$

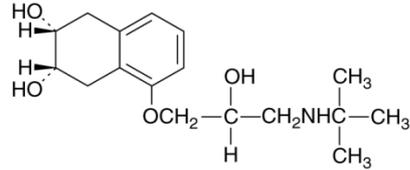


Bloqueadores β

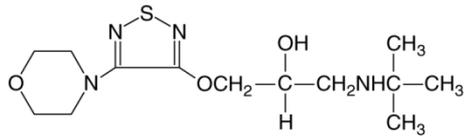
Nonselective antagonists



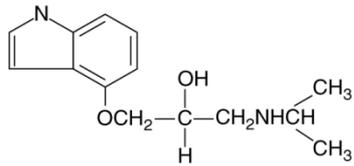
PROPRANOLOL



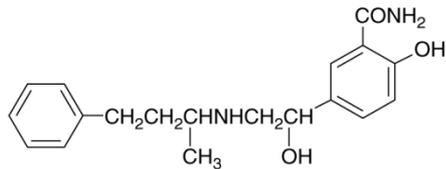
NADOLOL



TIMOLOL

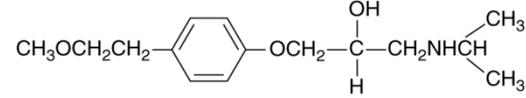


PINDOLOL

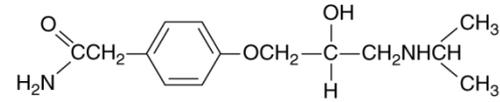


LABETALOL

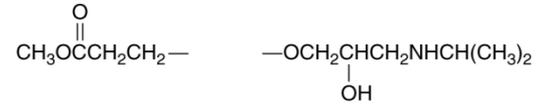
β 1-selective antagonists



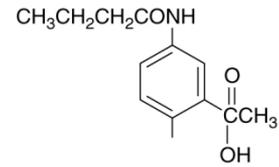
METOPROLOL



ATENOLOL

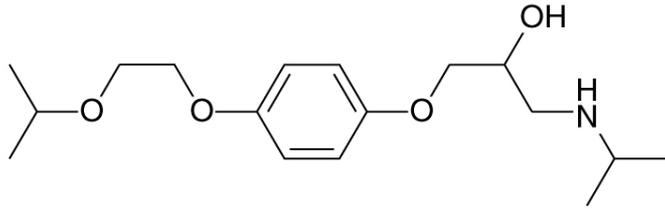


ESMOLOL

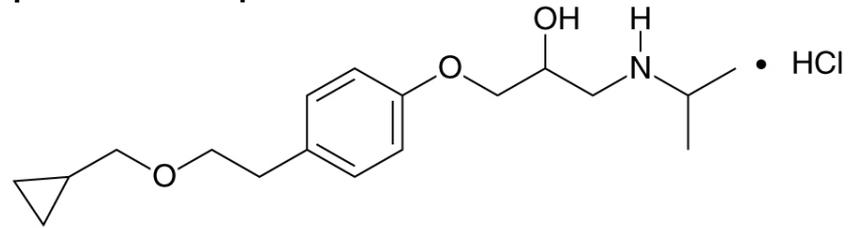


ACEBUTOLOL

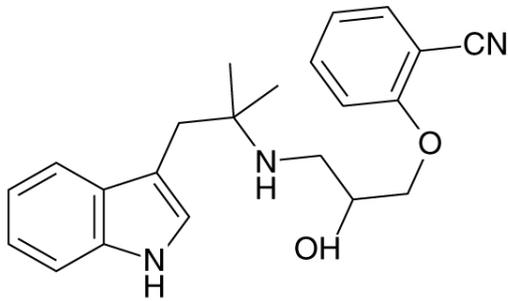
Bloqueadores β



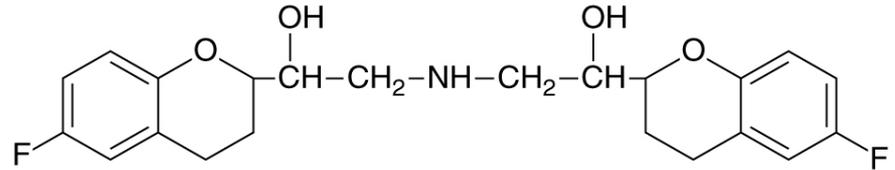
BISOPROLOL



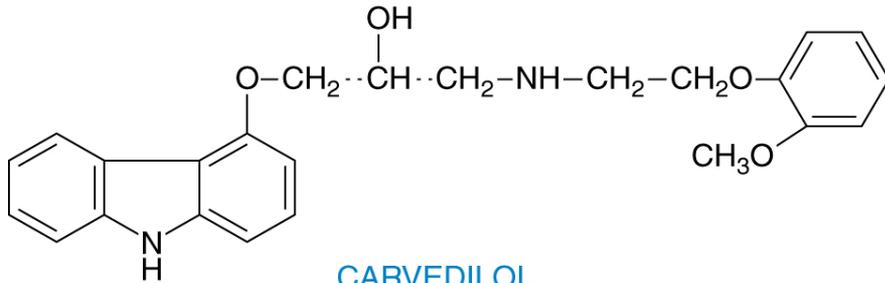
BETAXOLOL



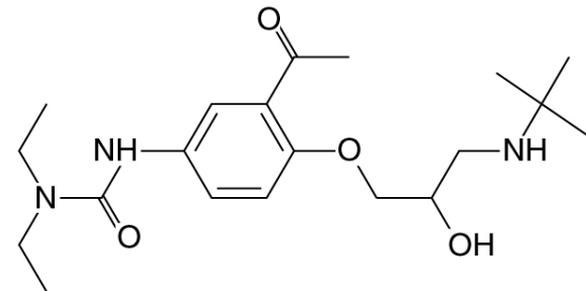
BUCINDOLOL



NEBIVOLOL



CARVEDILOL



CELIPROLOL

Bloqueadores β (3ª geração) – com ações vasodilatadoras

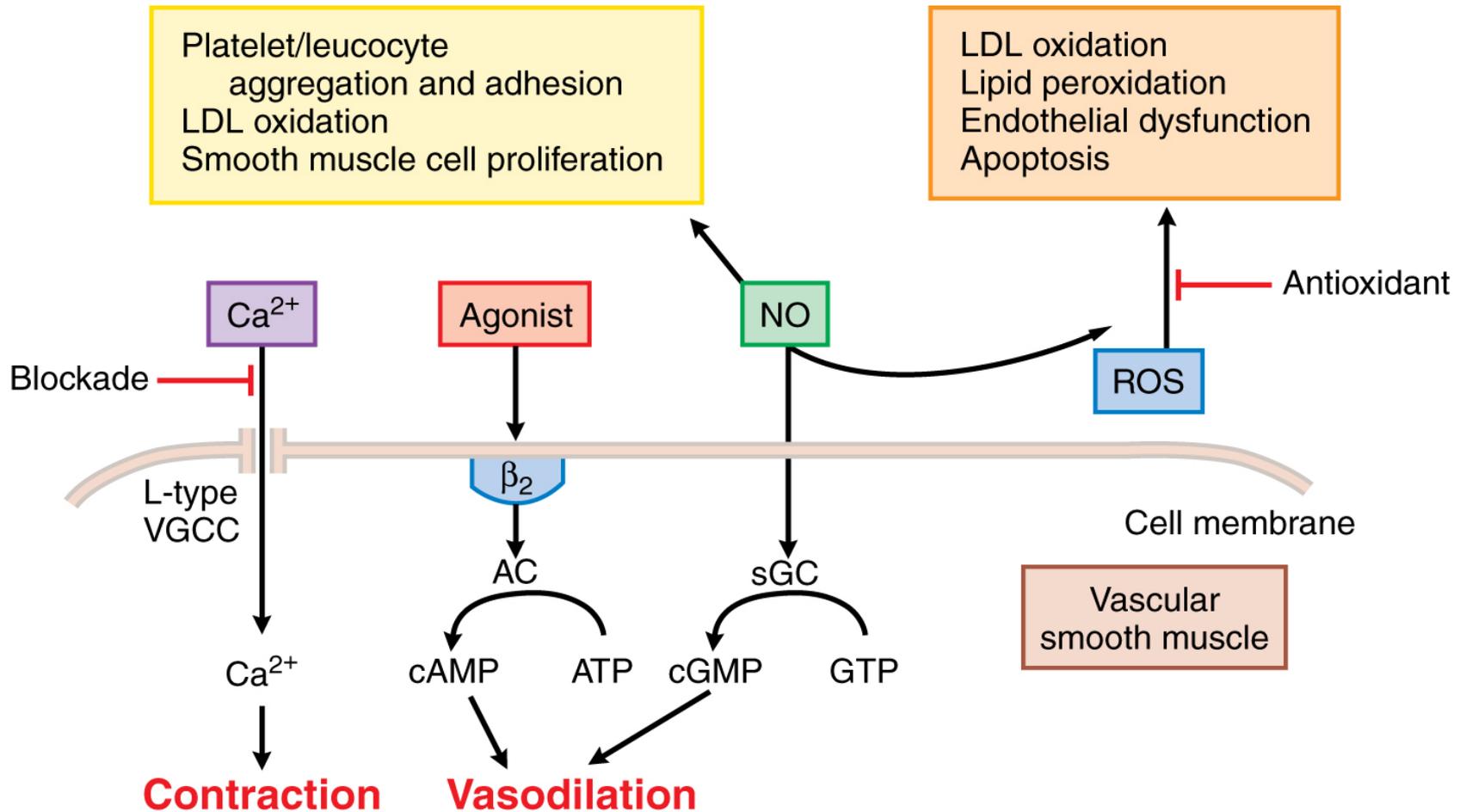
Table 12-4

Third Generation β Receptor Antagonists with Putative Additional Mechanisms of Vasodilation

NITRIC OXIDE PRODUCTION	β_2 RECEPTOR AGONISM	α_1 RECEPTOR ANTAGONISM	Ca^{2+} ENTRY BLOCKADE	K ⁺ CHANNEL OPENING	ANTIOXIDANT ACTIVITY
Celiprolol ^a Nebivolol Carteolol Bopindolol ^a Nipradilol ^a	Celiprolol ^a Carteolol Bopindolol ^a	Carvedilol Bucindolol ^a Bevantolol ^a Nipradilol ^a Labetalol	Carvedilol Betaxolol Bevantolol ^a	Tilisolol ^a	Carvedilol

^aNot currently available in the U.S., where most are under investigation for use.

Bloqueadores β (3ª geração) – com ações vasodilatadoras



Usos clínicos

Glaucoma (ângulo aberto): bloqueadores β não seletivos

Doenças cardiovasculares: várias indicações (hipertensão arterial, angina, ICC e arritmias)

Hipertensão arterial

 Liberação renina

angiotensinogênio
renina ↓
Angiotensina I (vasoconstrictor)

Angina

Perfusão coronariana insuficiente para necessidade do coração

 Trabalho cardíaco  força de contração

ICC

Reforço simpático constante: deletério coração

β -bloqueador : proteção contra reforço simpático

Útil a longo prazo

Arritmias

β -bloqueador:  Número de despolarizações no ventrículo

Referências Bibliográficas

1. Rang, H.P., Dale, M.M., Ritter, J.M., Gardner, P. *Farmacologia*. 8° ed. Guanabara Koogan, 2016.
2. Goodman and Gilman's. *The Pharmacological Basis of Therapeutics*. 12th ed., A.G. Gilman et al., eds. New York: MacGraw-Hill, 2015.