



Liga Acadêmica de Farmacologia

Fisiologia do Sistema  
Endócrino e o papel da  
Melatonina

Prof. Dr. Luiz Carlos dos Reis

Melatonin, human aging, and age-related diseases

M Karaseka

Experimental Gerontology 39 (2004) 1723–1729

The basic physiology and pathophysiology of melatonin

B Claustrata, J Bruna, G Chazotb

Sleep Med Rev (2005) 9, 11–24

Melatonin as a hypnotic: Pro

IV Zhdanova

Sleep Med Rev (2005) 9, 51–65

Melatonin

R Hardeland, SR Pandi-Perumal, DP Cardinali

The Int J Biochem Cell Biol 38 (2006) 313–316

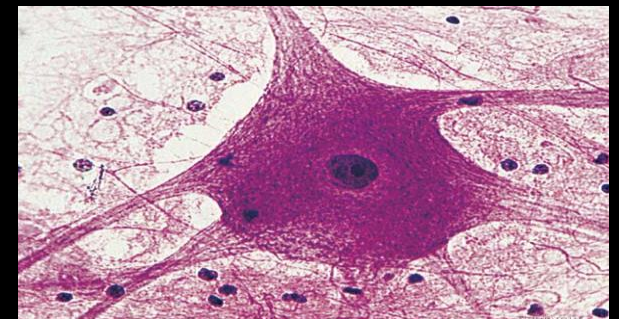
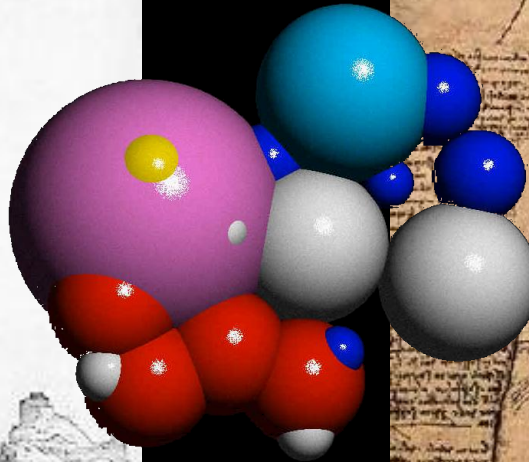
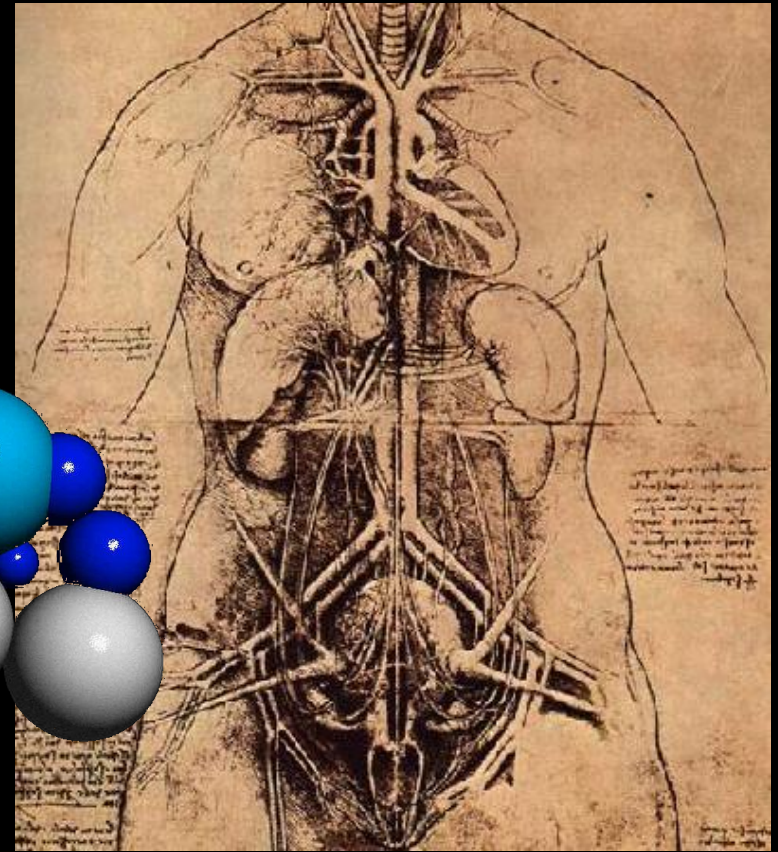
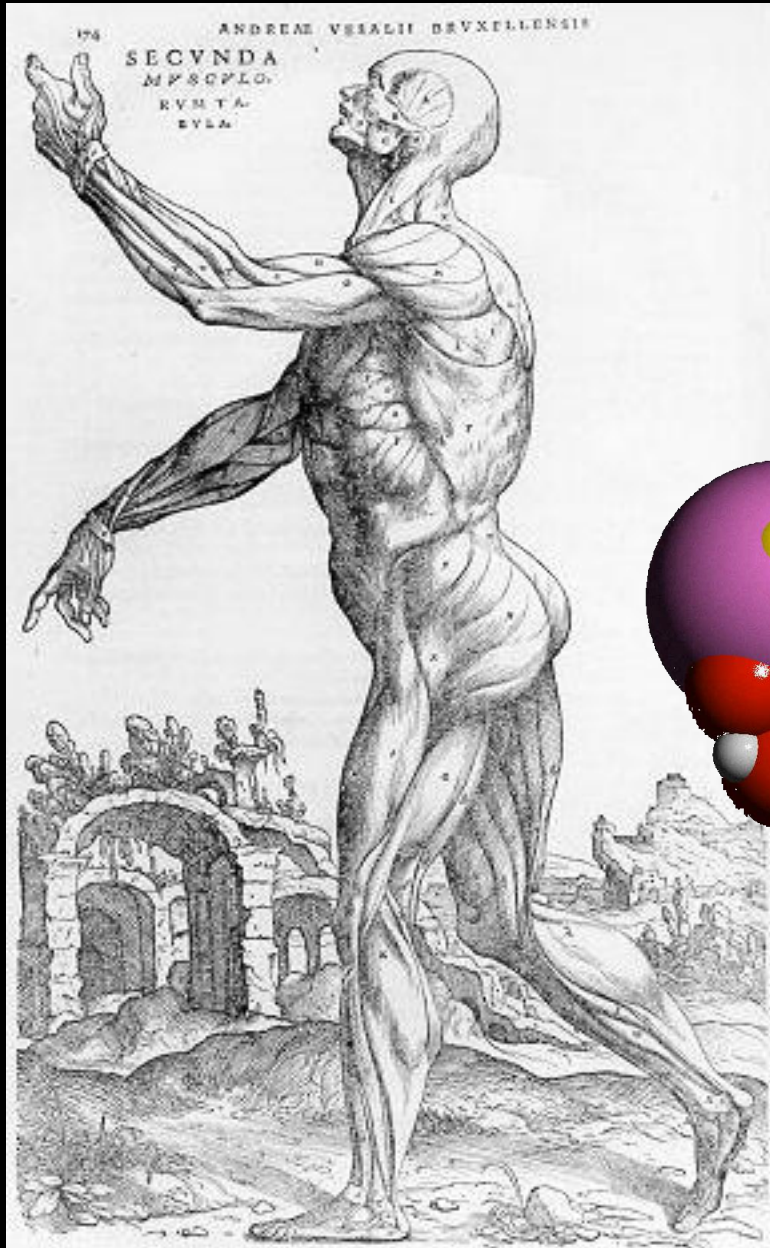
Circadian rhythms, sleep, and the menstrual cycle  
FC Baker and HS Driver  
Sleep Medicine 8 (2007) 613–622

Anti-oxidant strategies  
G Buonocore and F Groenendaal  
Semin Fetal Neonat Med (2007) 12, 287-295

How to assess circadian rhythm in humans: A review  
WA Hofstra and Al W de Weerd  
Epilepsy & Behavior 13 (2008) 438–444

Neuroendocrine features in extreme longevity  
E Ferrari, L Cravello, F Falvo et al  
Experimental Gerontology 43 (2008) 88–94

# MOLÉCULAS < < > > ORGANISMO



# HOMEOSTASE

## Equilíbrio do Meio Interno

Gases Respiratórios

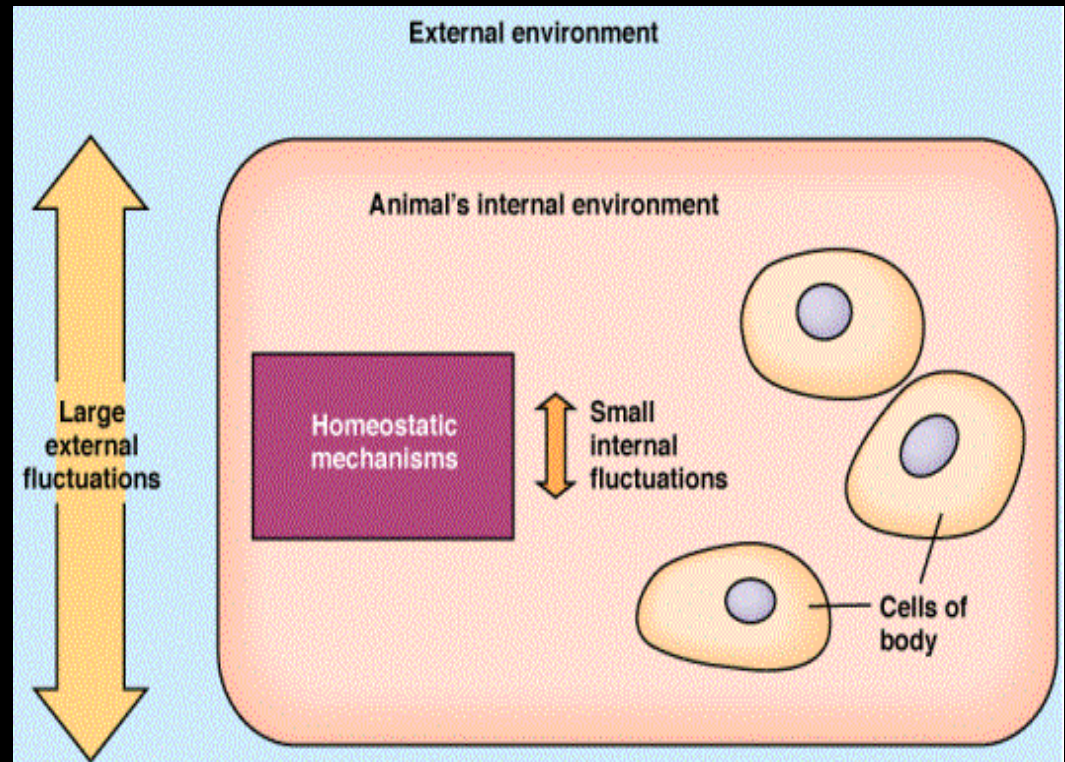
Osmolaridade

Temperatura

Nutrientes

Íons

pH



# DESAFIOS

## Alterações Ambientais

Claro/Escuro

Temperatura

Umidade

Pressão

## Atividade Física

Crescimento

Reprodução

# INTEGRAÇÃO

## Sistemas Orgânicos em Atividade

**Muscular**

**Esquelético**

**Circulatório**

**Respiratório**

**Neural**

**Endócrino**

**Digestório**

**Urinário**

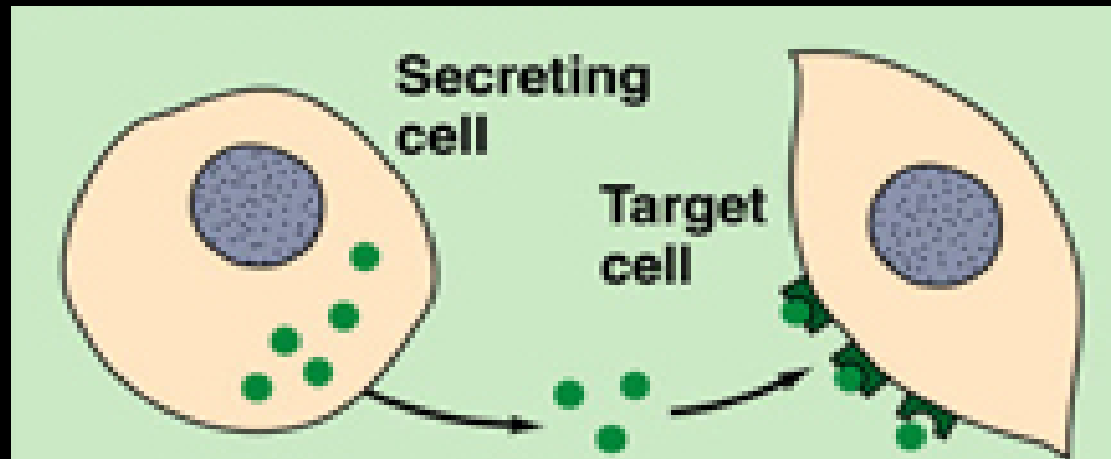
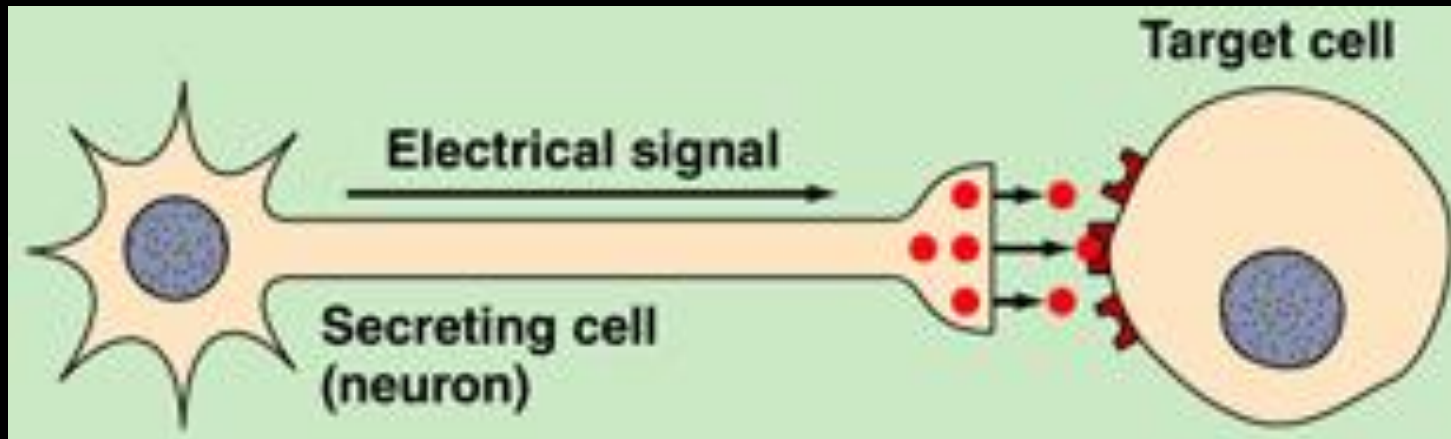
**Imunológico**

**Reprodutor**



# COMUNICAÇÃO CELULAR

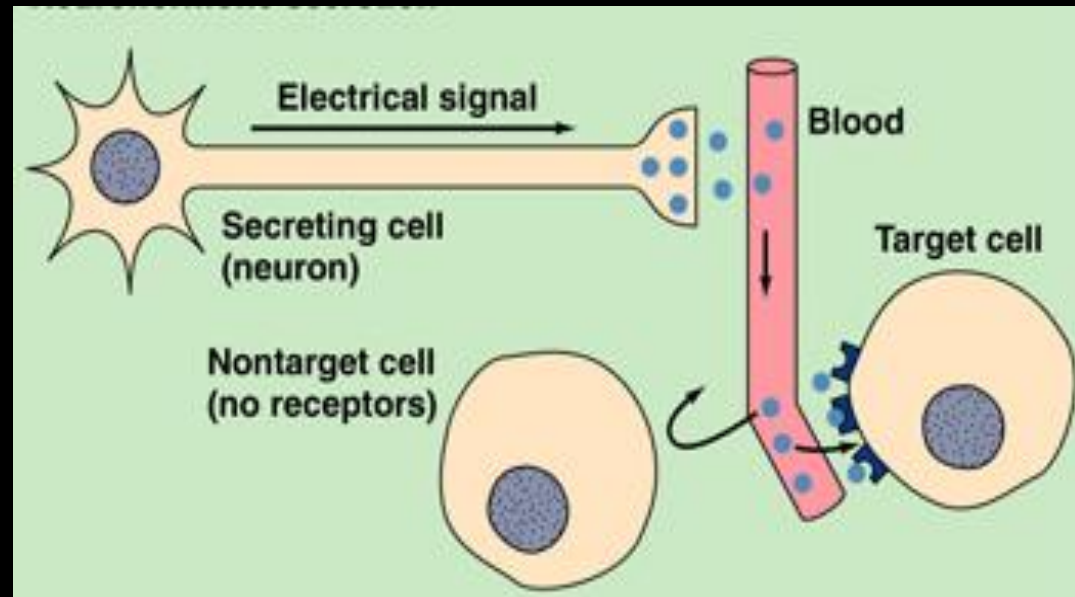
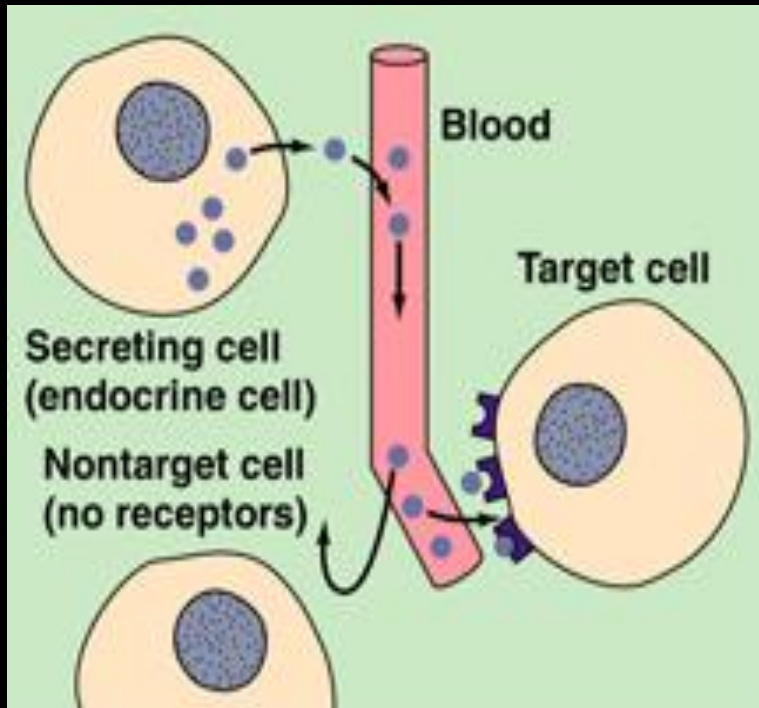
## Sinalizadores químicos



# HORMÔNIOS

Informação

Controle



# HORMÔNIOS

Substâncias químicas produzidas por grupos de células e que influenciam a atividade de outras células, sendo transportadas pelo sangue, importantes para a manutenção da homeostase do meio interno em condições normais e sob situações de desafios.

# HORMÔNIOS

## Classes Químicas

### LIPÍDICOS (Esteróides)

colesterol

Lipossolúveis

### PROTEÍCOS (Peptídeos / Proteínas)

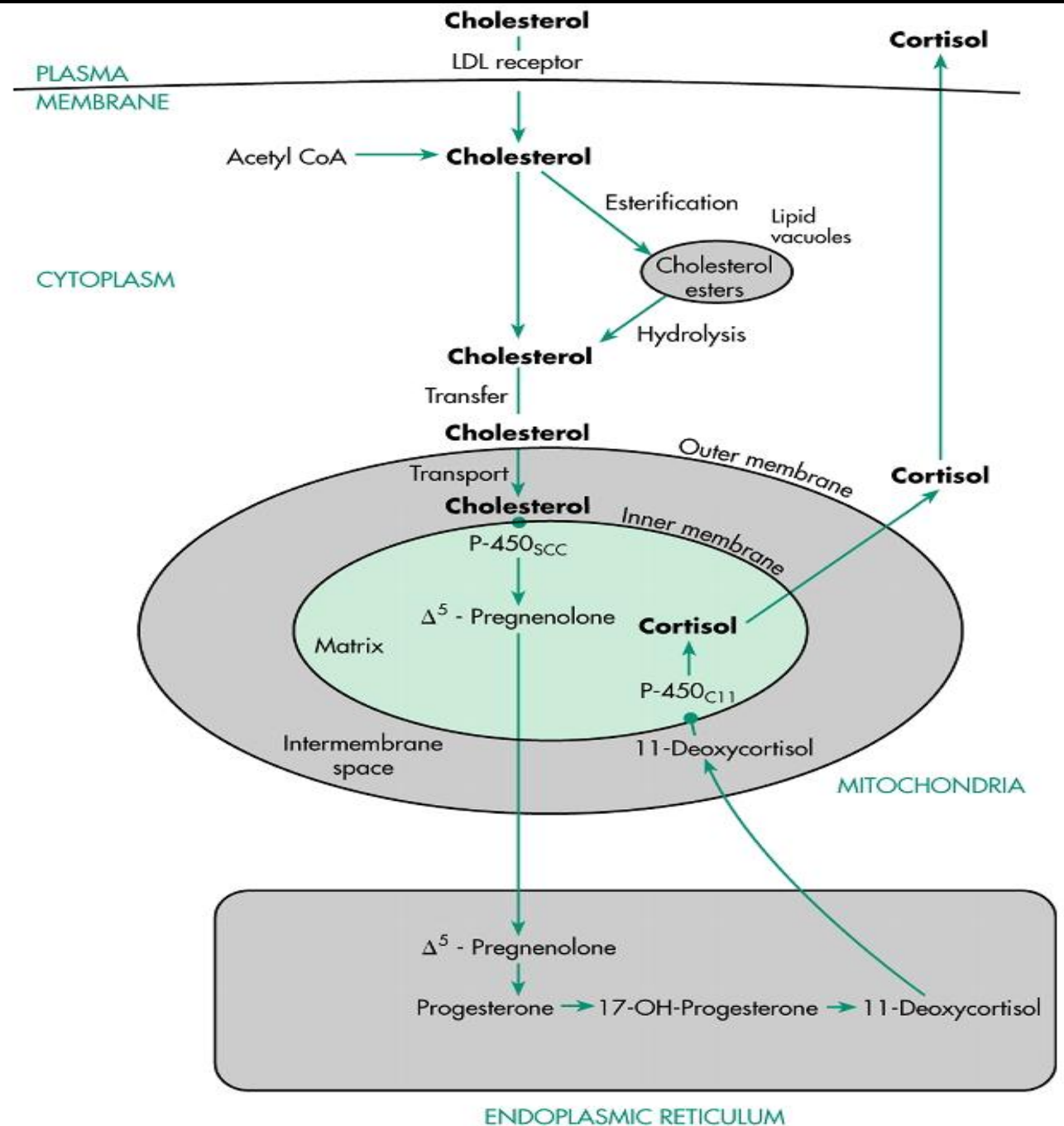
aminoácidos

Hidrossolúveis

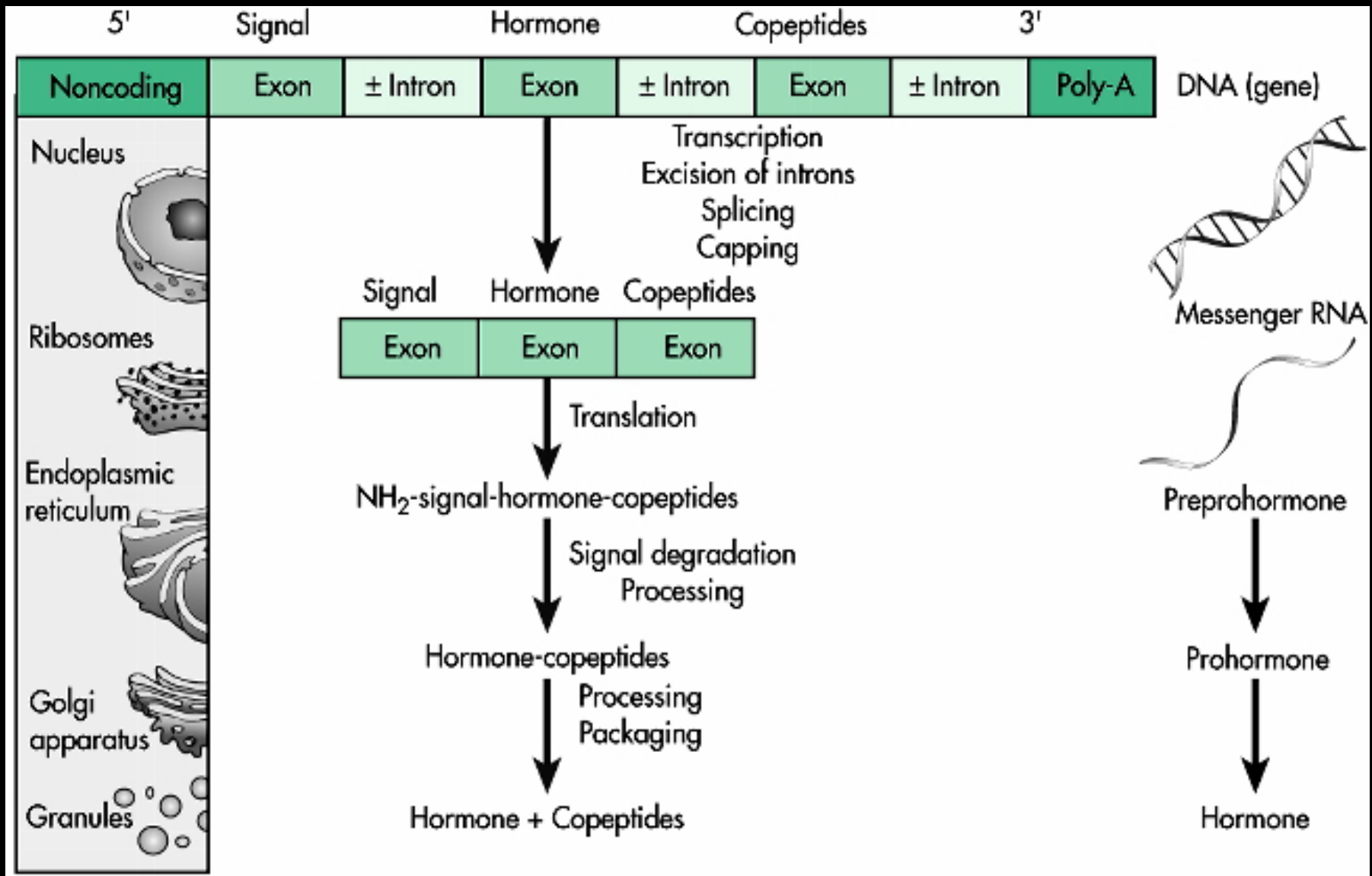
### AMINOÁCIDOS MODIFICADOS

tirosina / triptofano

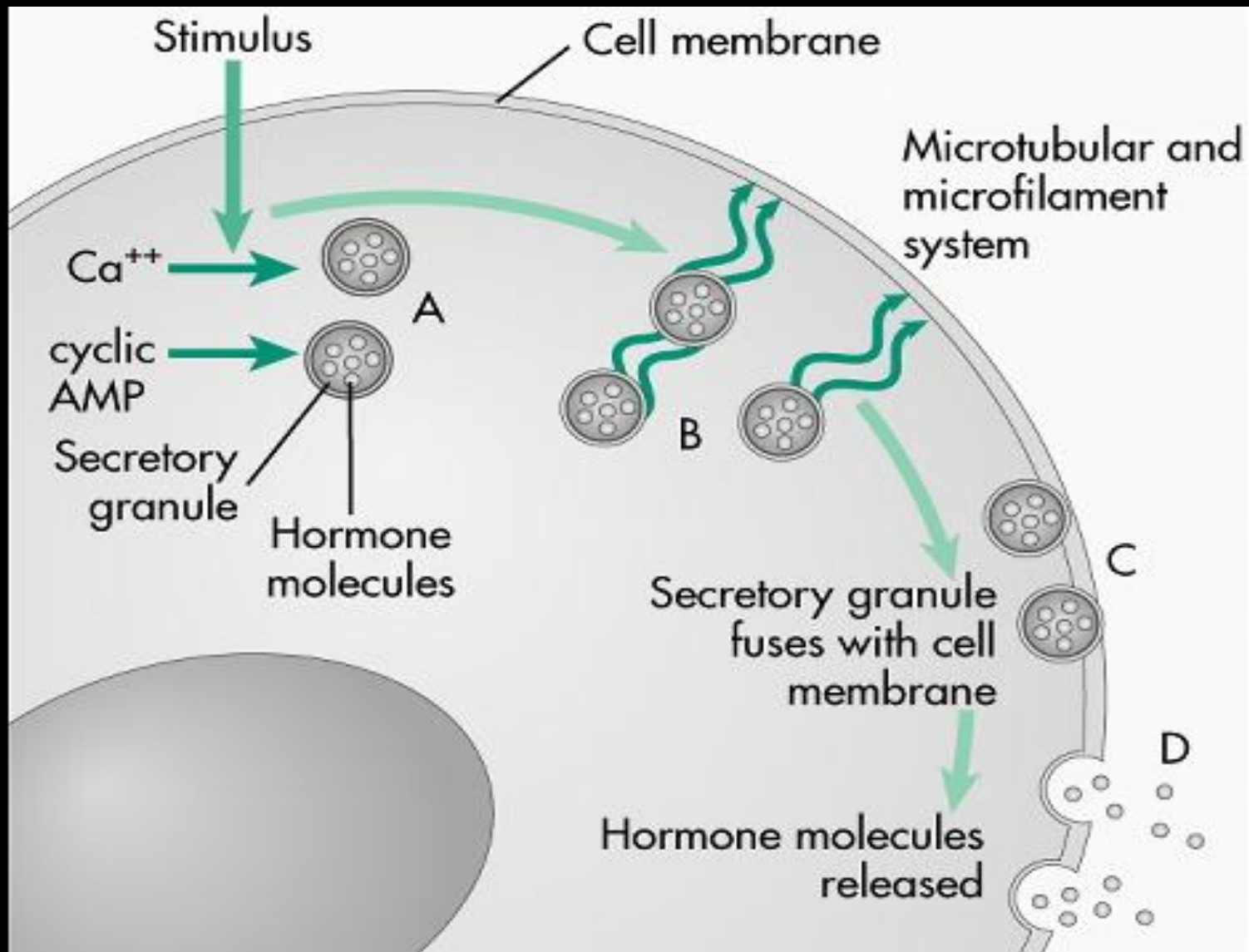
# Síntese Hormônios Esteróides



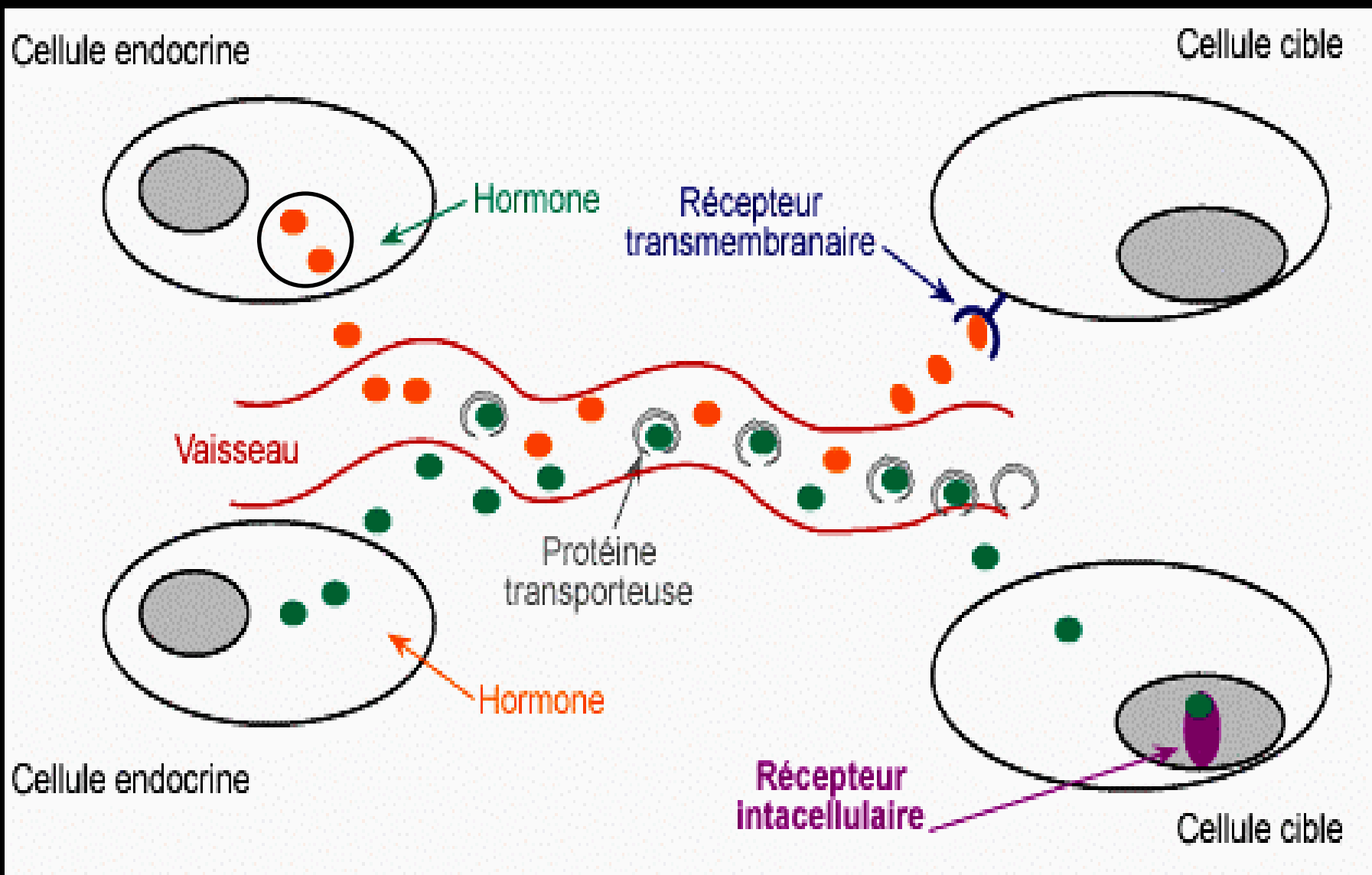
# Síntese de Hormônios Protéicos



# Síntese e Secreção Hormonal

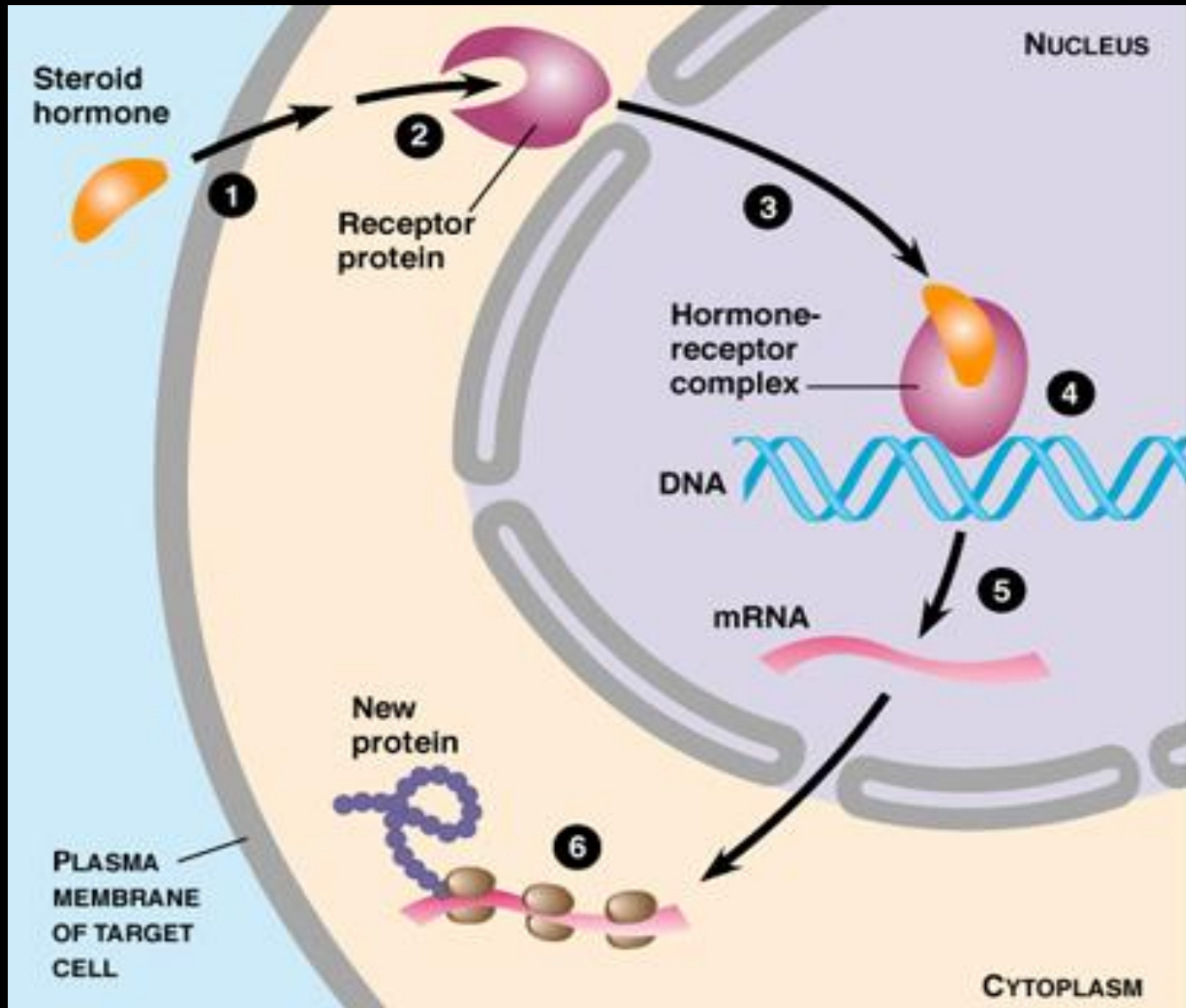


# Transporte e Ação Hormonal

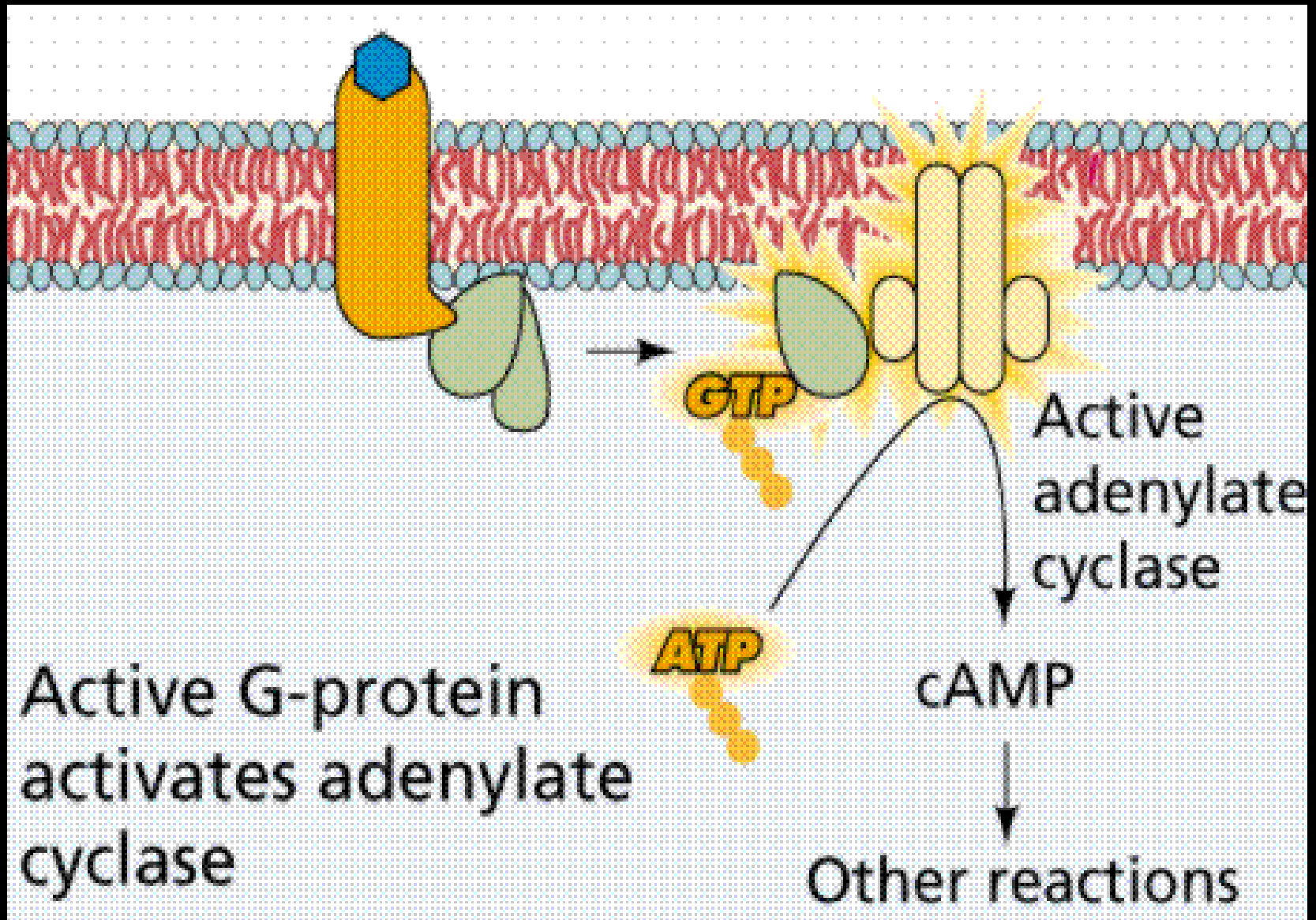




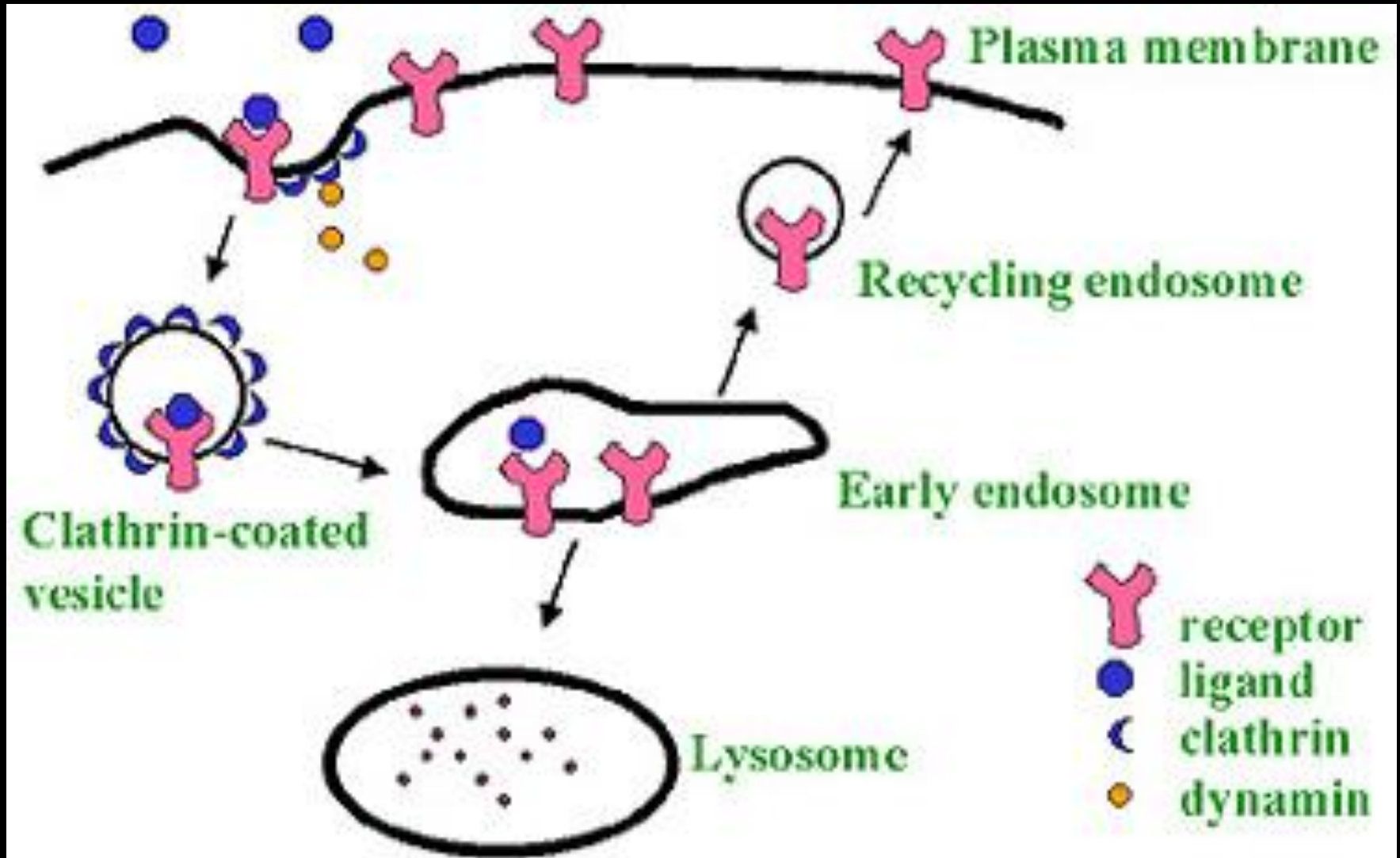
# Mecanismo de Ação - Esteróides



# Mecanismo de Ação – Protéicos



# Metabolização de Hormônios



# Controle da Secreção Hormonal

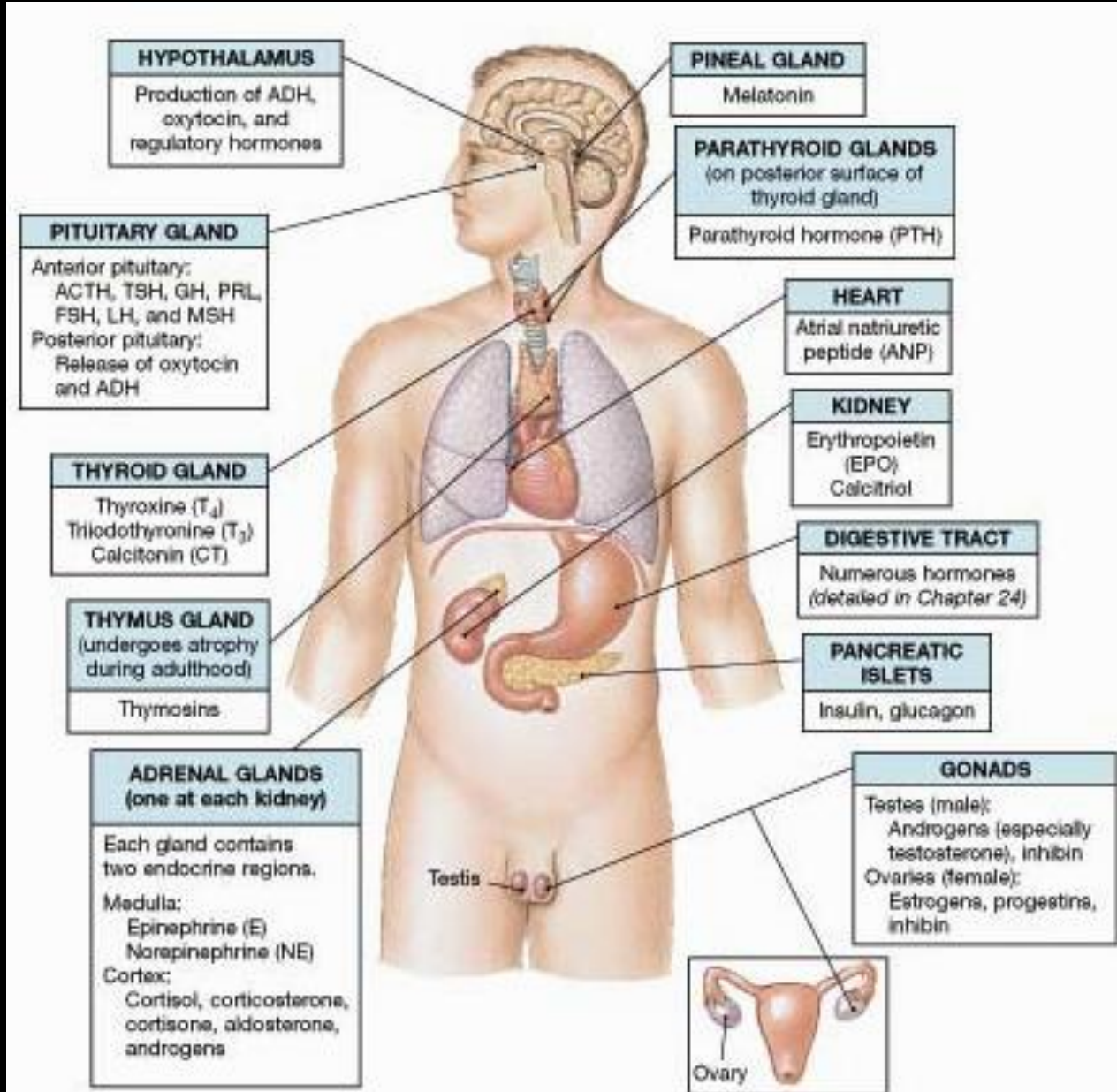
- **Controle Neural**
- **Controle Cronotrópico**
- **Controle por Feed-Back**

**Hormônio - Hormônio**

**Mineral - Hormônio**

**Substrato Metabólico - Hormônio**

# SISTEMA ENDÓCRINO



# CRESCIMENTO

**Somatotrofina**

**Adeno-hipófise**

**Somatomedinas**

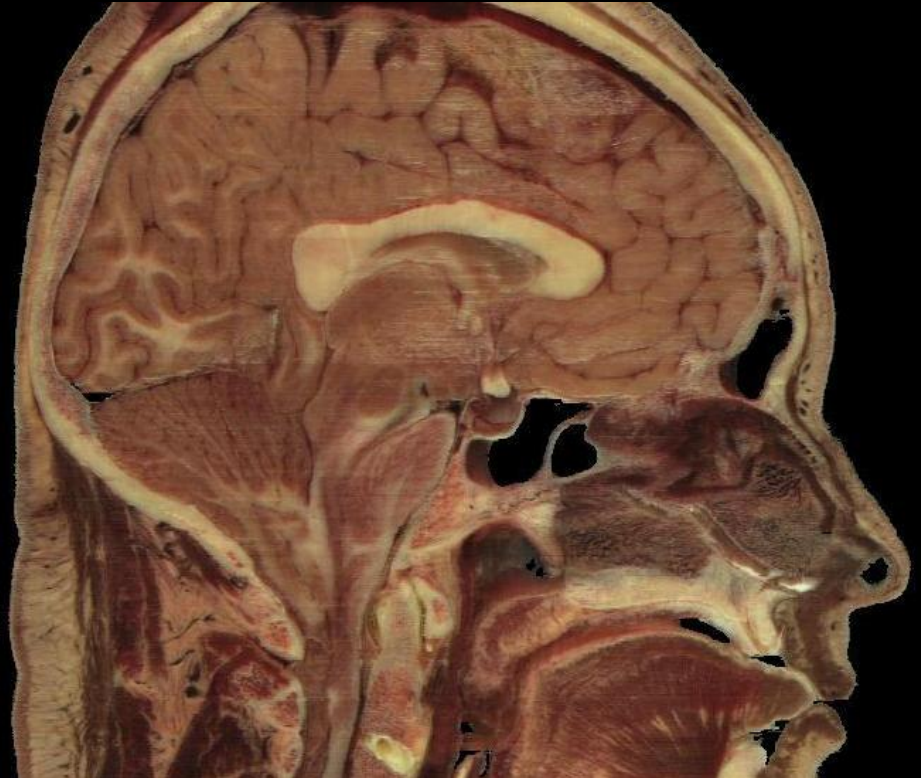
**Fígado**

**Insulina**

**Pâncreas**

**Andrógenos/Estrógenos**

**Gônadas**



# CÁLCIO CORPORAL

**Paratormônio**

**Paratireóides**

**Calcitonina**

**Tireóide**

**Vitamina D**

**Rins**



# EQUILÍBRIO ENERGÉTICO

**Insulina - Glucagon**

**Pâncreas**

**Cortisol**

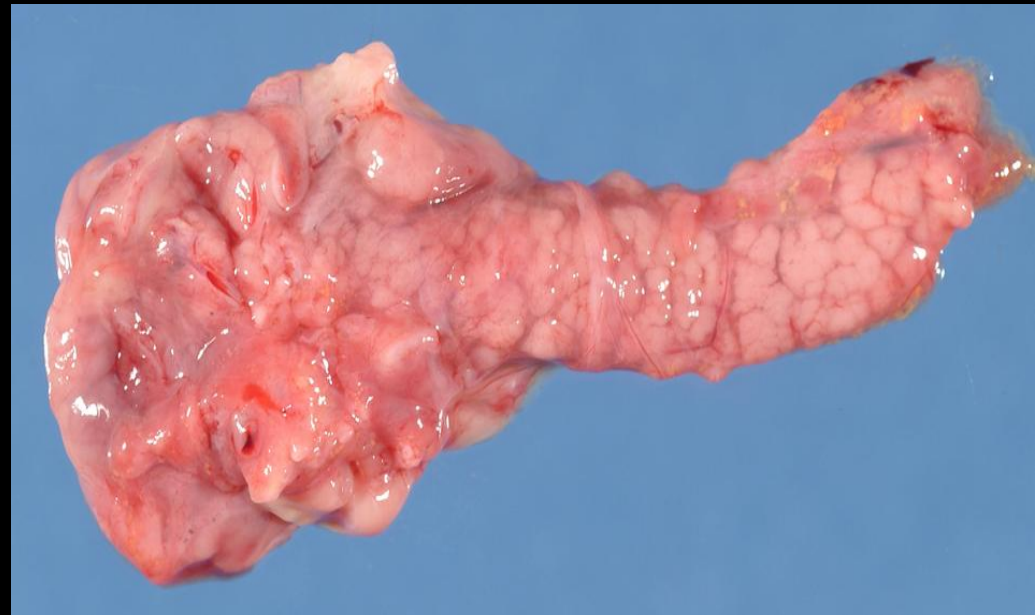
**Córtex Adrenal**

**GH**

**Adenohipófise**

**Adrenalina**

**Medula Adrenal**





# **METABOLISMO**

## **TEMPERATURA CORPORAL**

**Tiroxina**

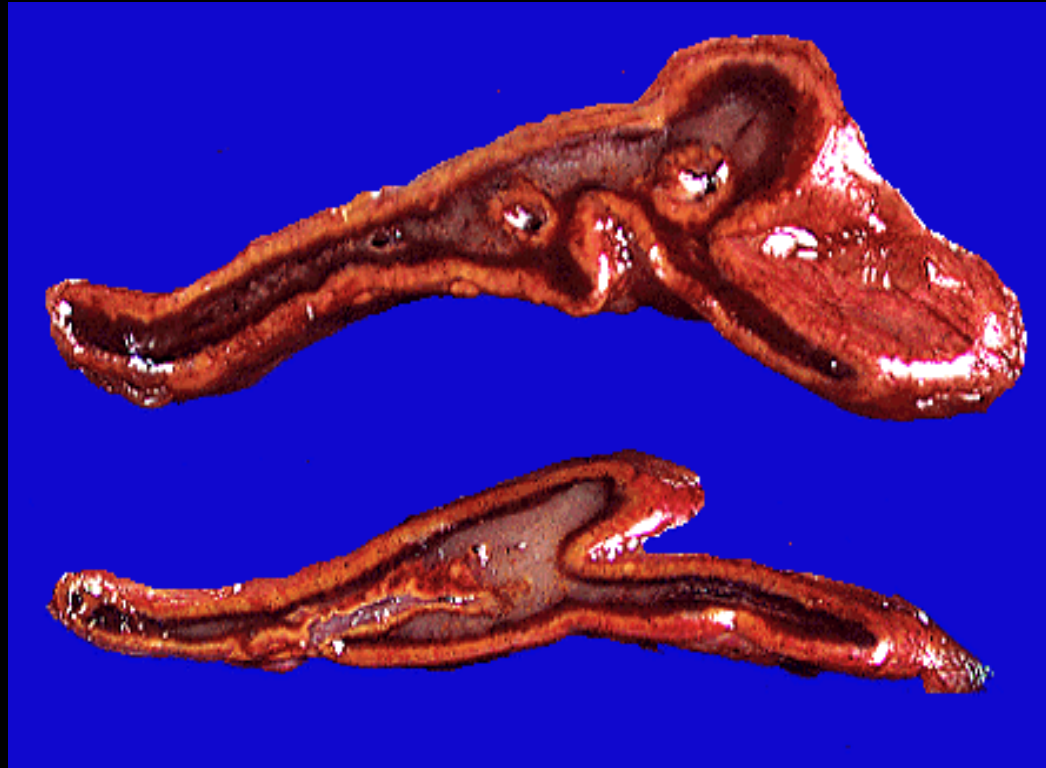
**Tireóide**

**Cortisol**

**Adrenal**  
**(córtex)**

**Adrenalina**

**Adrenal**  
**(medula)**



# **EQUILÍBRIO HIDROELETROLÍTICO**

**ADH**

**Neurohipófise**

**Aldosterona**

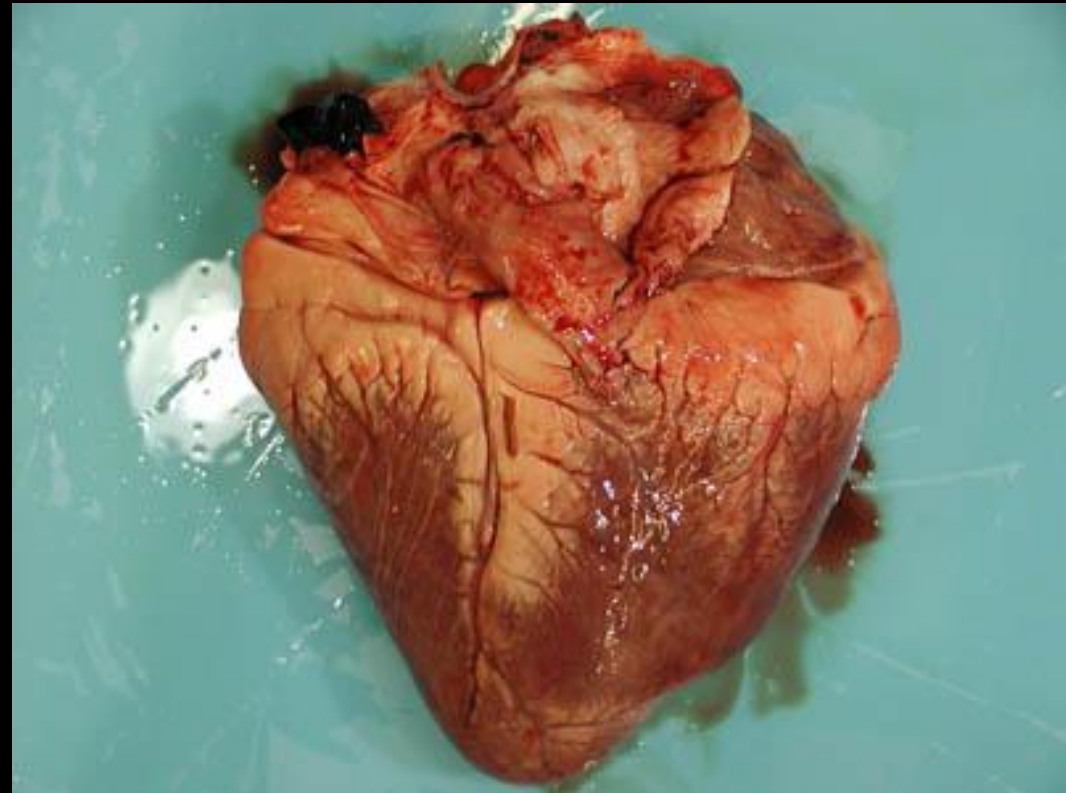
**Adrenal**

**ANP**

**Coração**

**BNP**

**Cérebro**



# REPRODUÇÃO

**Estrogênios**

**Ovários**

**Androgênios**

**Testículos**

**Prolactina**

**Adenohipófise**

**Ocitocina**

**Neurohipófise**



# PESO CORPORAL

**GHrelina**

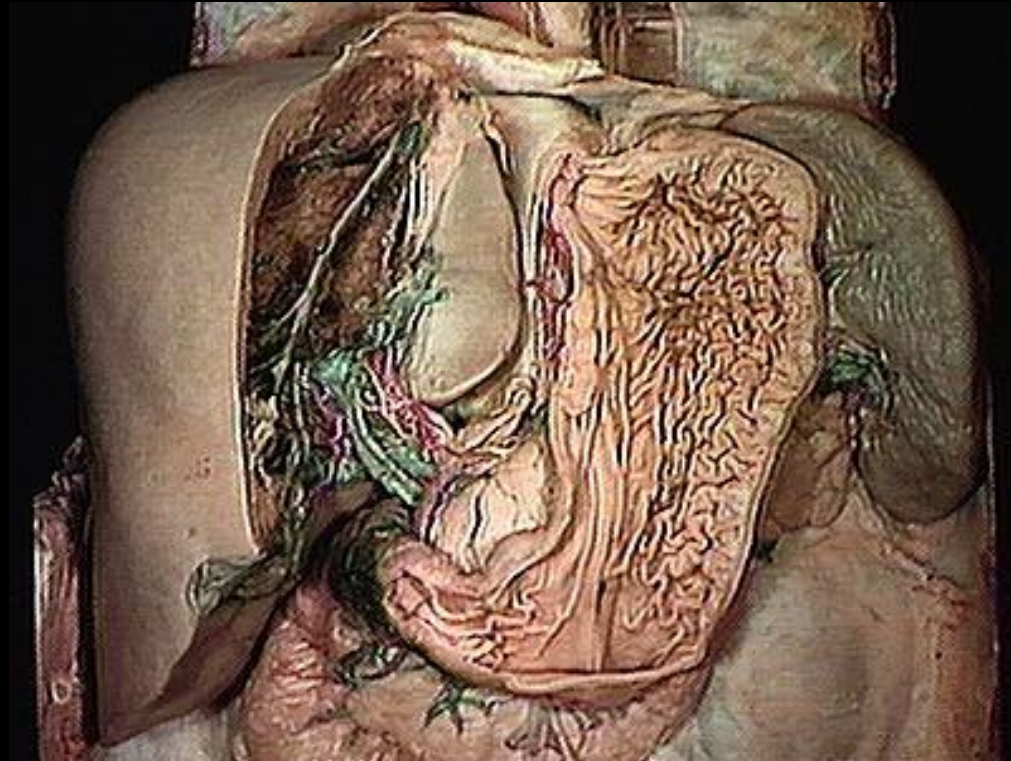
**Estômago**

**NPY**

**Hipotálamo**

**Leptina**

**Tecido Adiposo**



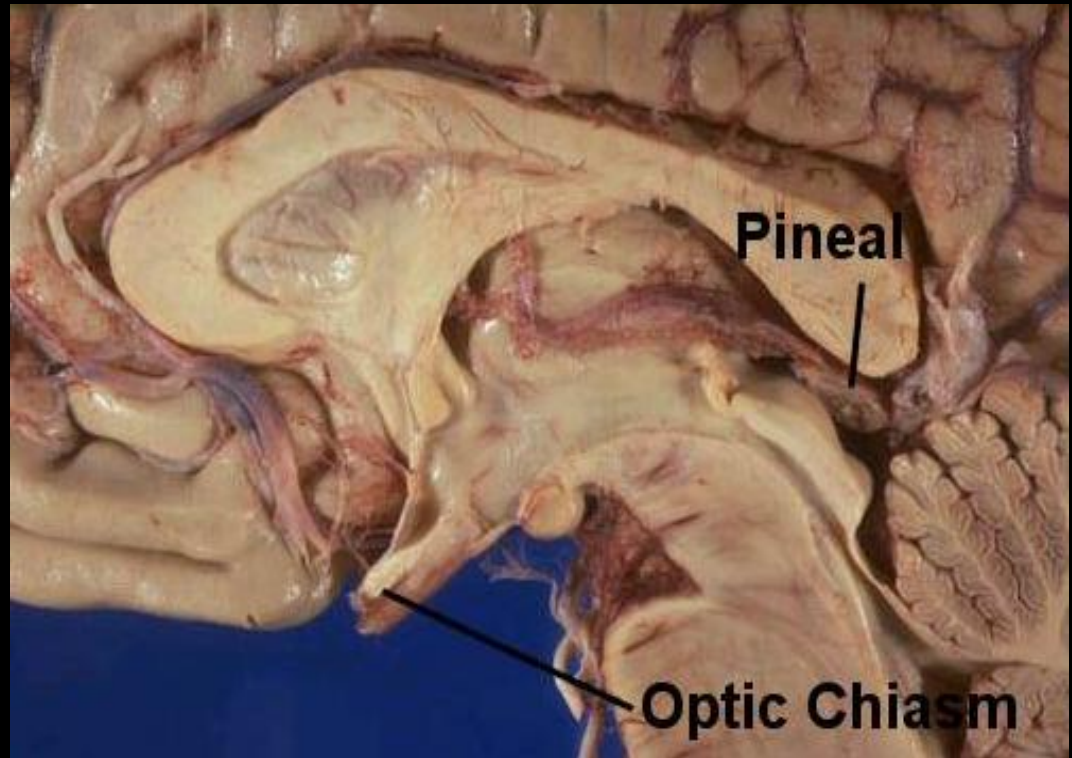
# RITMOS BIOLÓGICOS

**Melatonina**

**Pineal**

**Cortisol**

**Adrenal**











melatonin



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[Compre Melatonina | melatoninaportugal.com](#)

Links Patrocinados

Key Night 60 comprimidos Indicada Para: Insônia, Depressão  
[www.melatoninaportugal.com](http://www.melatoninaportugal.com)

[Melatonina em Promoção | bossesuplementos.com.br](#)

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[Melatonina](#)  
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[www.shuzu.com.br/Suplementos](http://www.shuzu.com.br/Suplementos)

[Melatonina – Wikipédia, a enciclopédia livre](#)

A **melatonina** (N-acetil-5-metoxitriptamina) é um hormônio produzido por diversos animais e plantas. Em animais superiores, é o produto de secreção da ...  
[pt.wikipedia.org/wiki/Melatonina](http://pt.wikipedia.org/wiki/Melatonina) - [Em cache](#) - [Similares](#)

[Melatonin - Wikipedia, the free encyclopedia](#)

In mammals, **melatonin** is secreted into the blood by the pineal gland in the brain. Known as the "hormone of darkness," it is secreted in darkness in both ...  
[en.wikipedia.org/wiki/Melatonin](http://en.wikipedia.org/wiki/Melatonin) - [Em cache](#) - [Similares](#)

[Melatonin](#)

**Melatonin** is a hormone secreted by the pineal gland in the brain. It helps regulate other hormones and maintains the body's circadian rhythm. The circadian ...  
[www.umm.edu/altmed/articles/melatonin-000315.htm](http://www.umm.edu/altmed/articles/melatonin-000315.htm) - [Em cache](#) - [Similares](#)

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 Acorde Revitalizado. Adeus Insônia!  
[www.sousaude.com.br](http://www.sousaude.com.br)

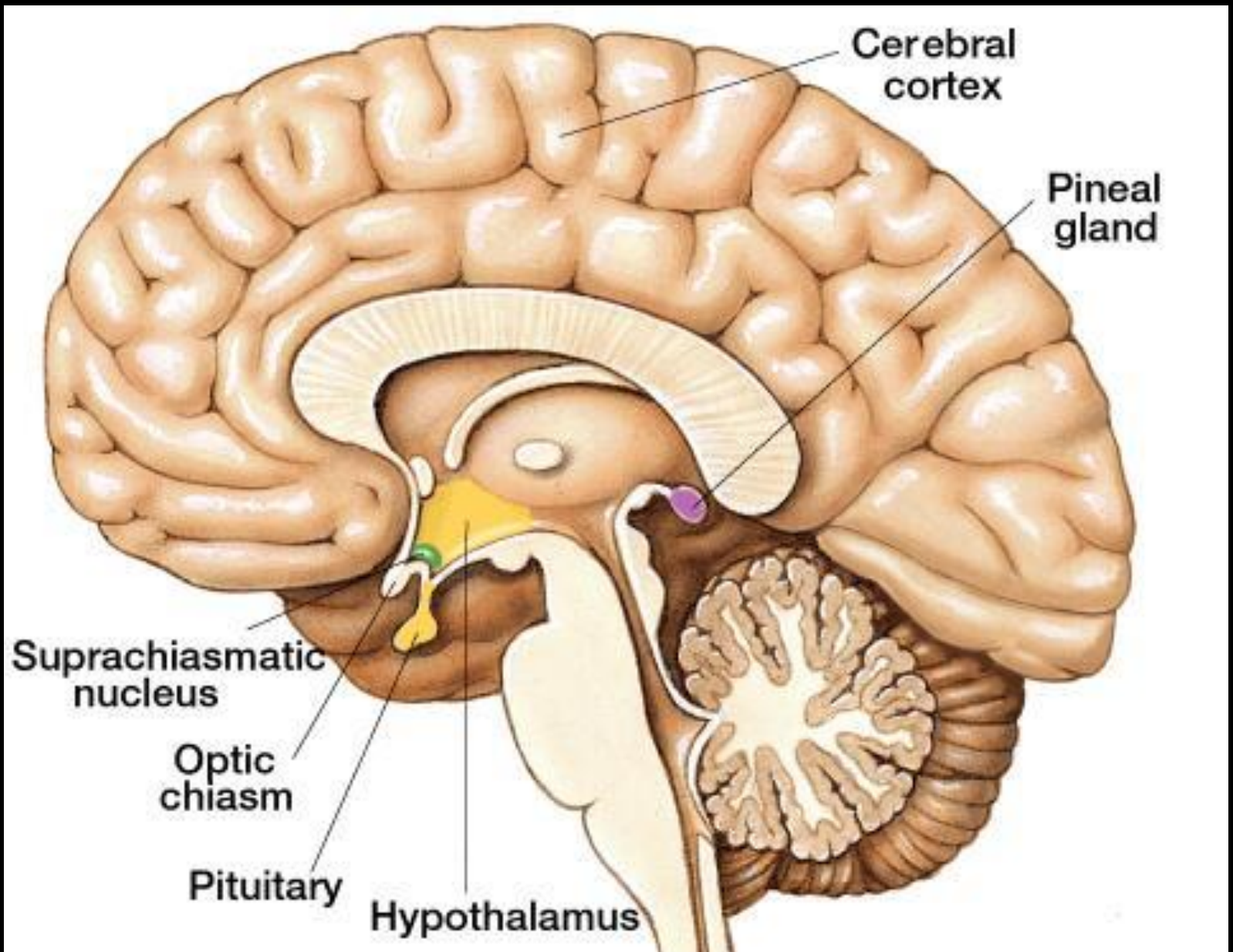
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# Pineal - Aspectos Anatômicos



# Pineal - Aspectos Filogenéticos

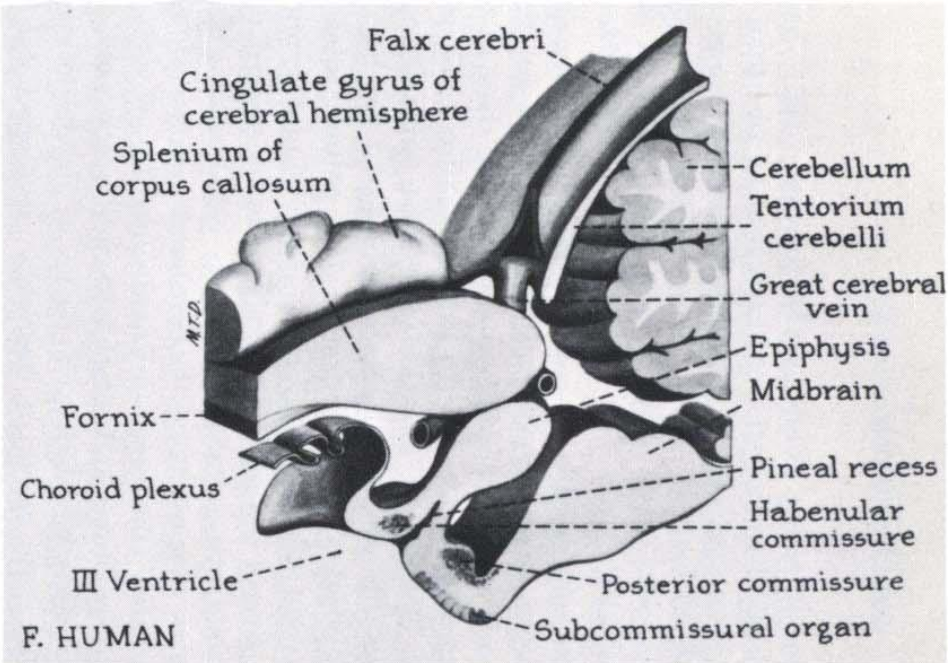
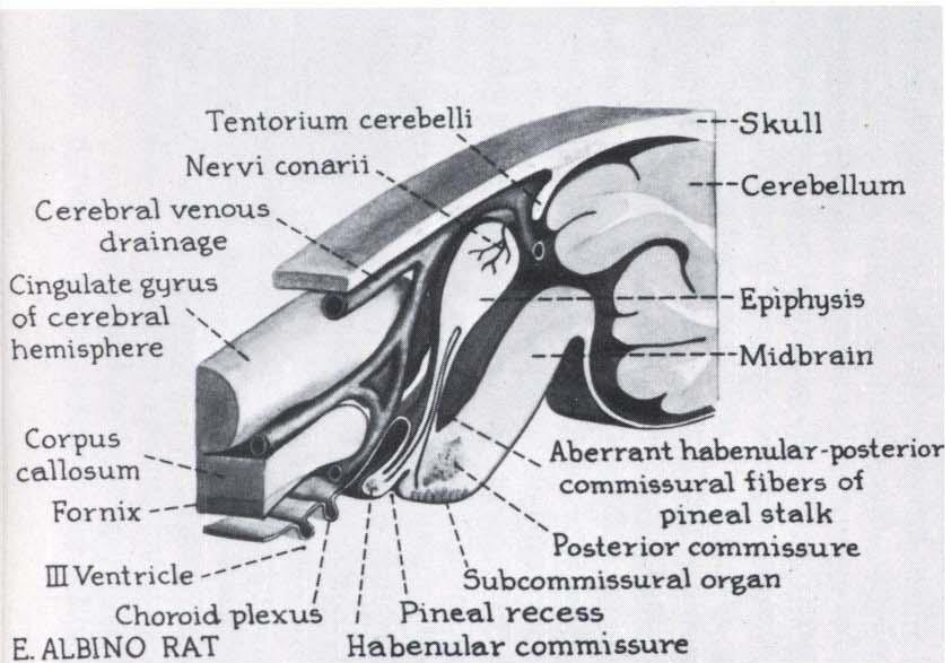
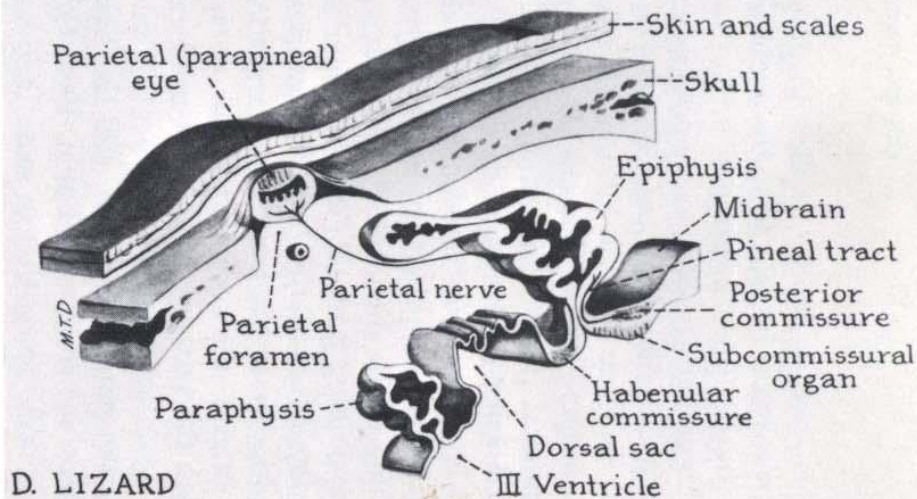
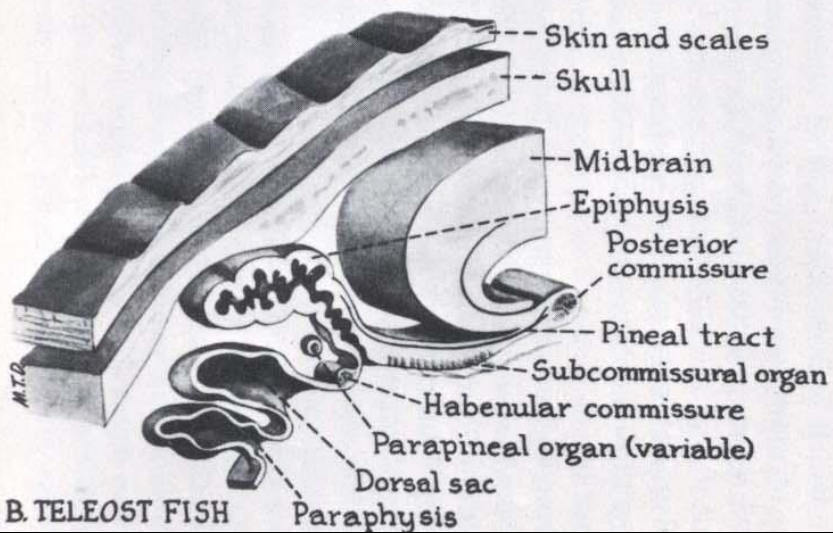
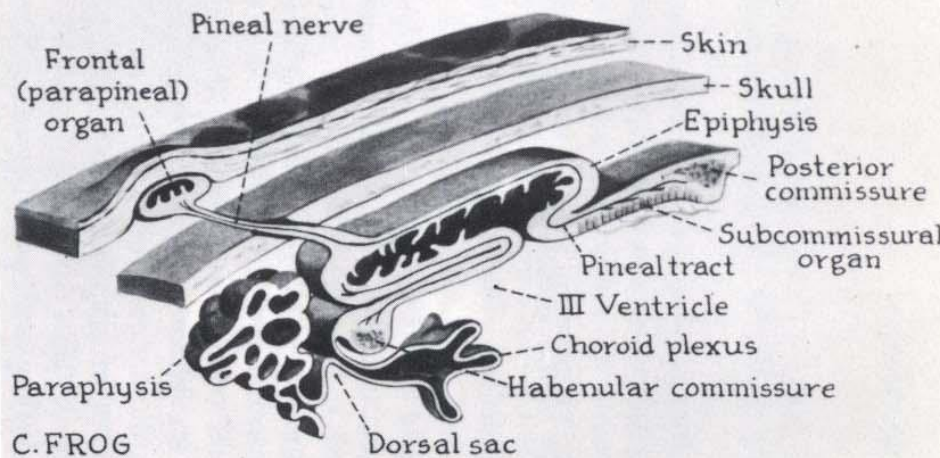
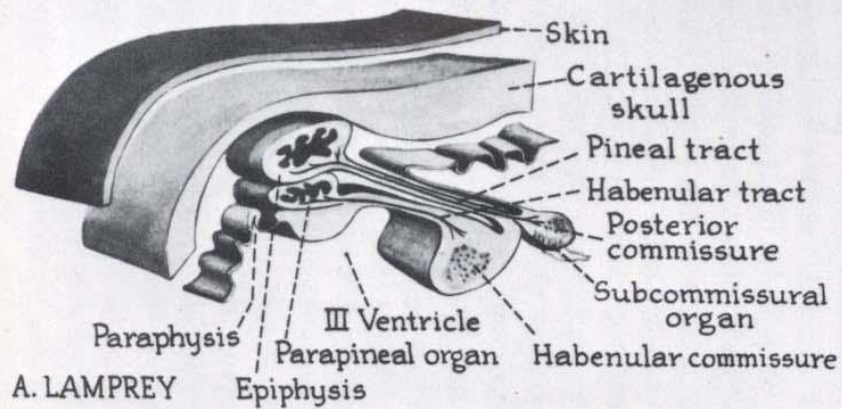
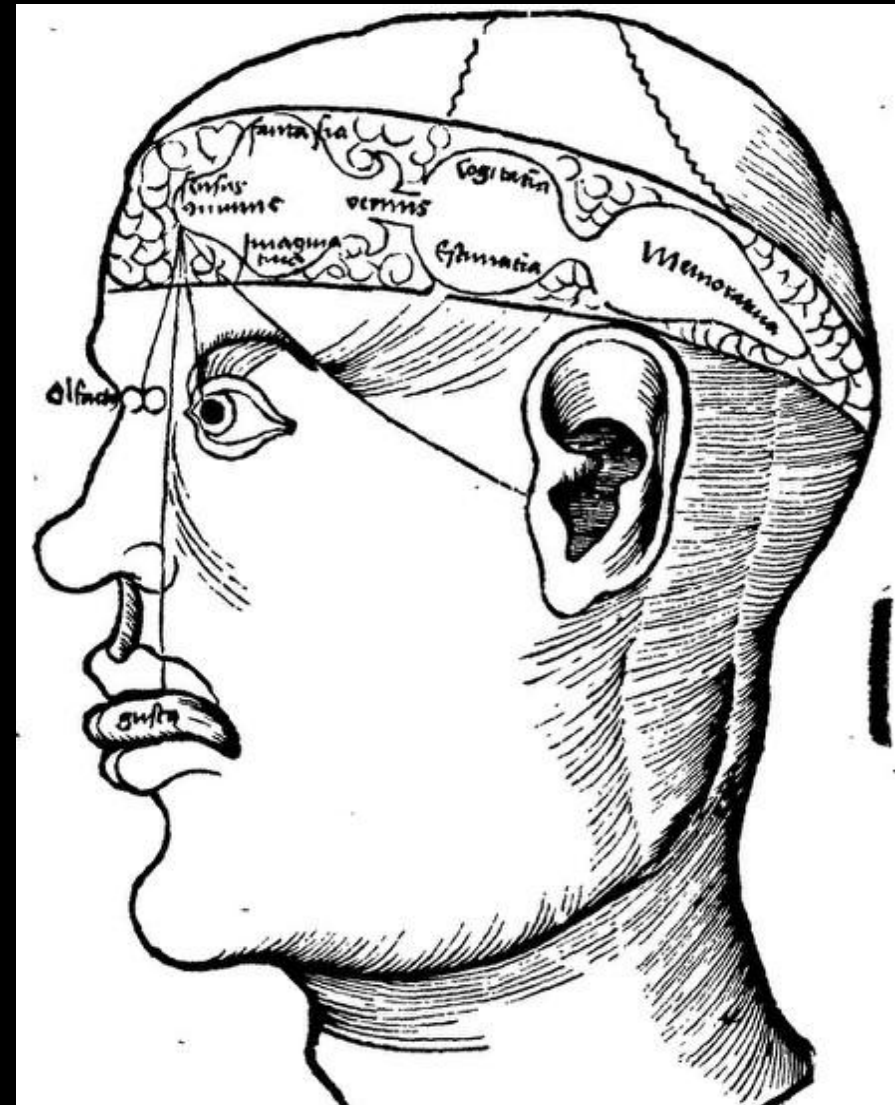
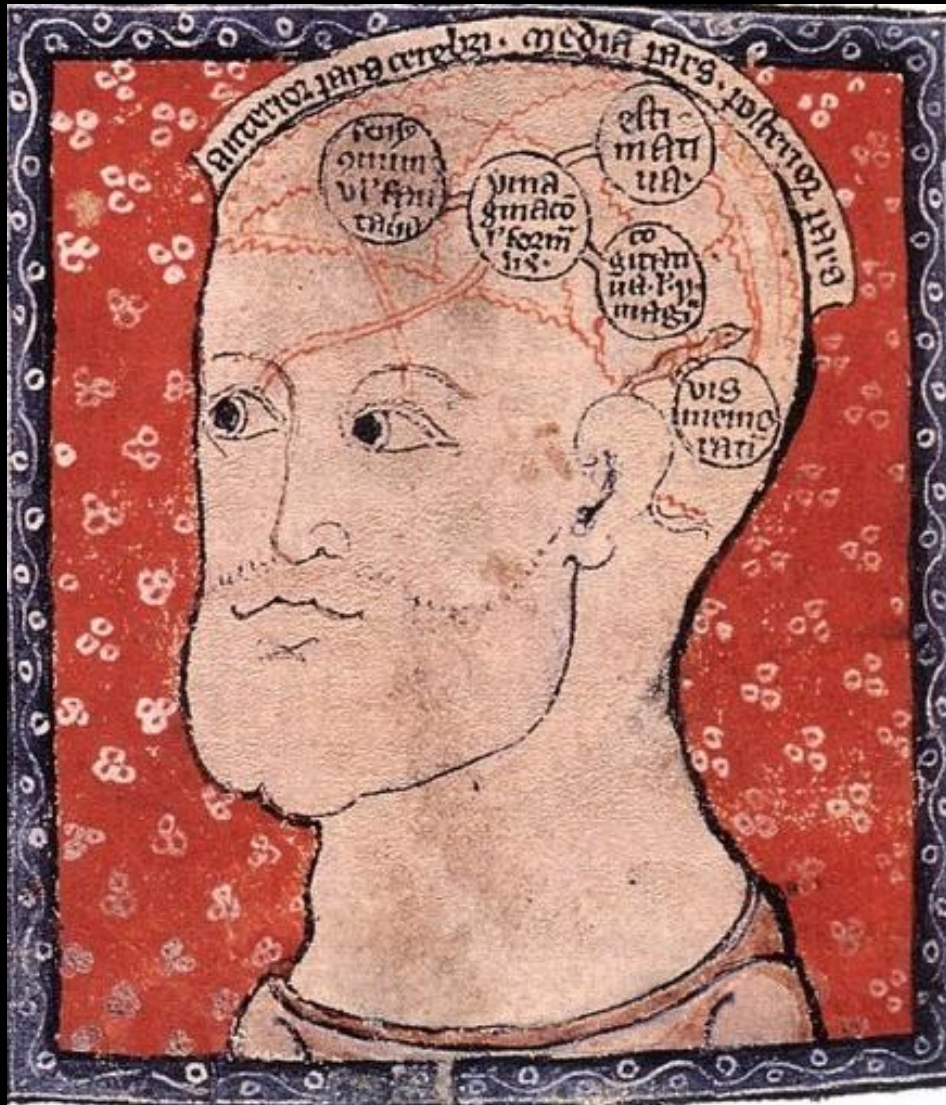


FIG. 1. A through F. Diagrammatic representations depicting longitudinal slices from the diencephalic roof region of the brains of several vertebrates. The facing surface of each slice has been taken at or near the median sagittal plane of the brain. Overlying cranial and/or integumental components are shown, particularly in relation to several pineal derivatives. These diagrams serve to illustrate the various pineal components as they appear in different species, their innervation, their vascularization, and their relationship to other diencephalic circumventricular organs. The significance of these anatomical features is discussed in the text.

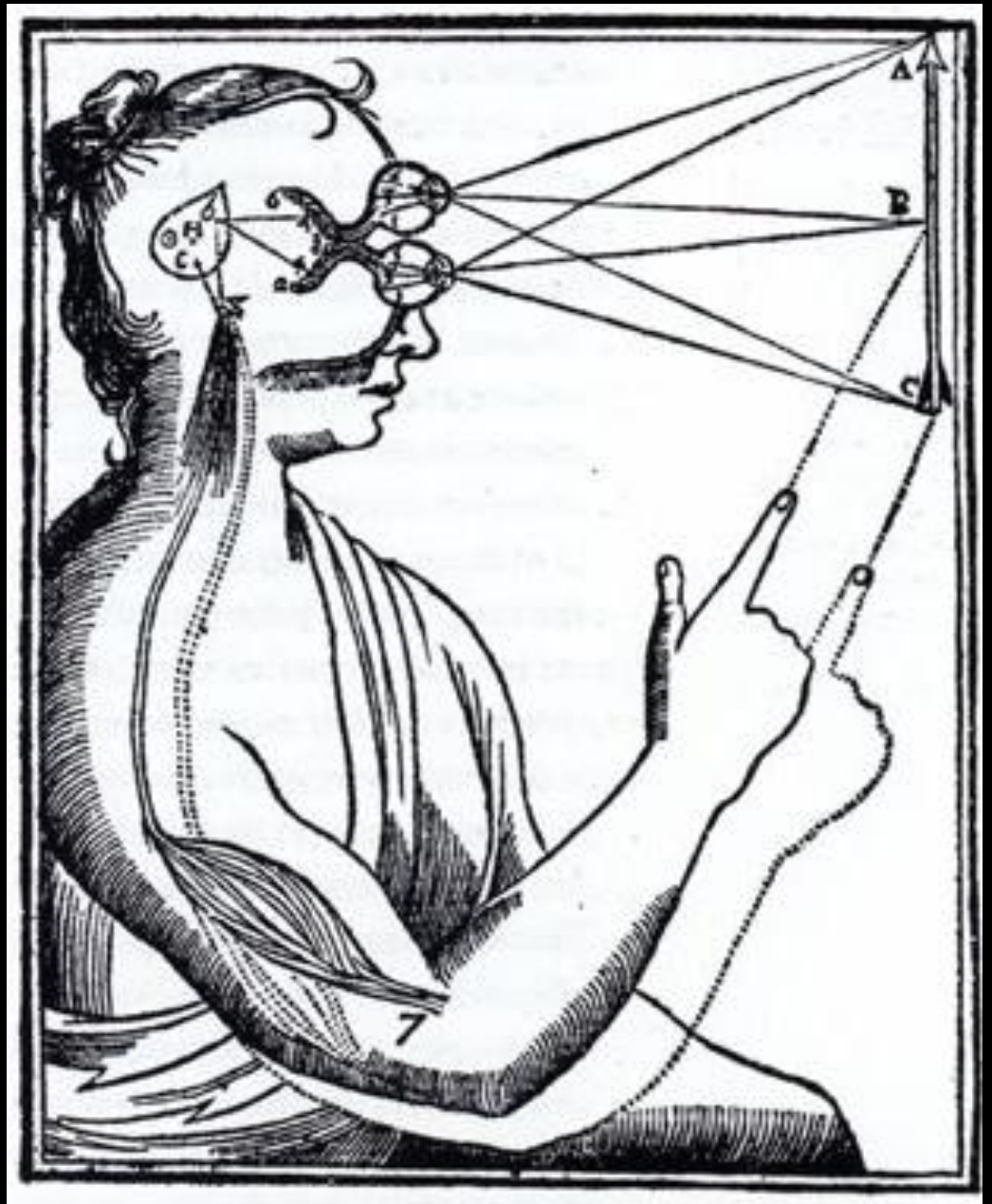
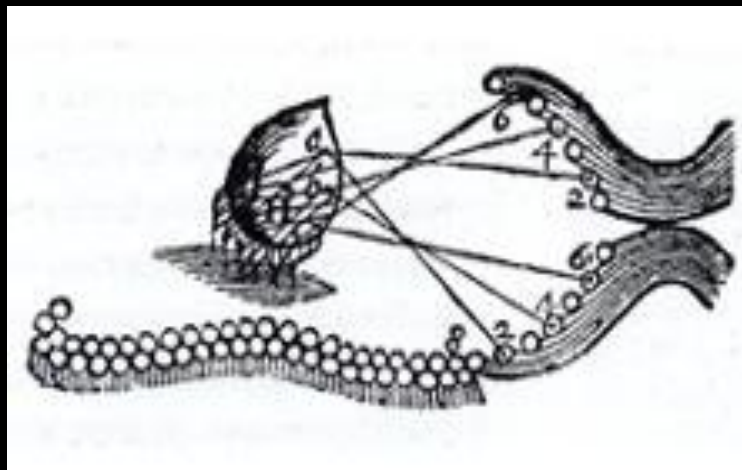
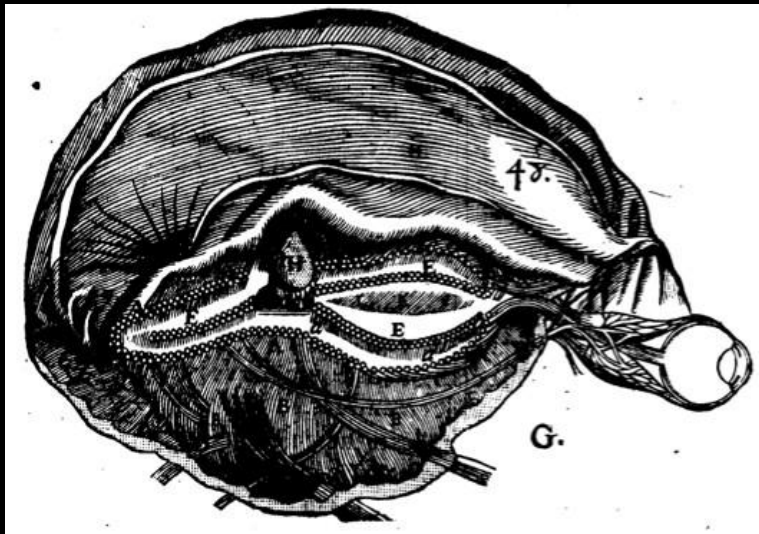




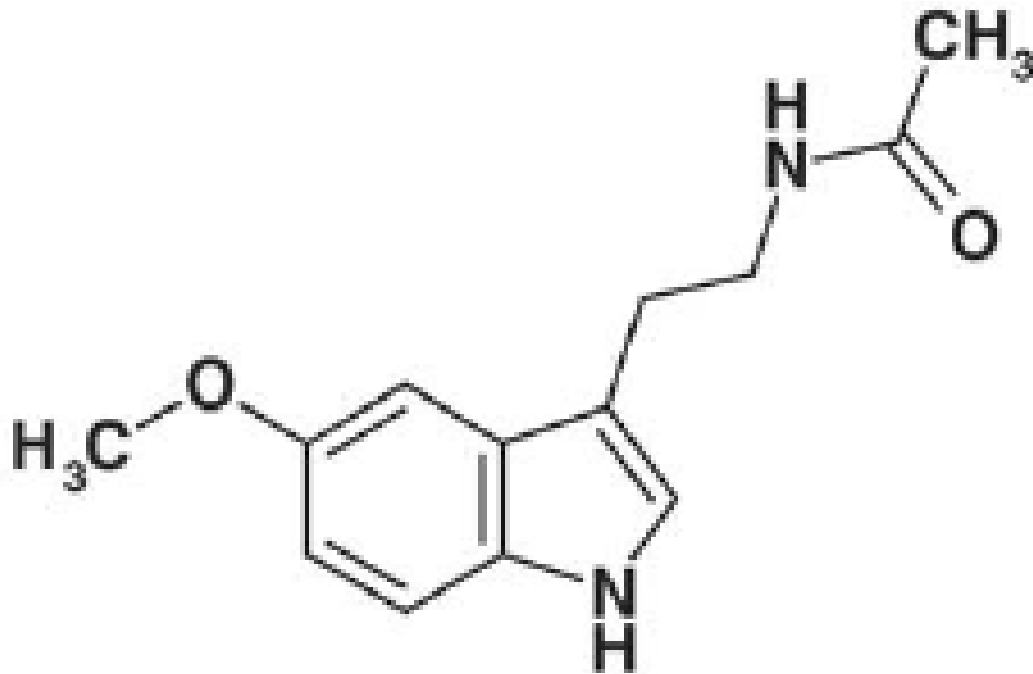
# Pineal - Aspectos Históricos



*Vermis Pineal* – controle de fluxo de pensamento (1300-1306)



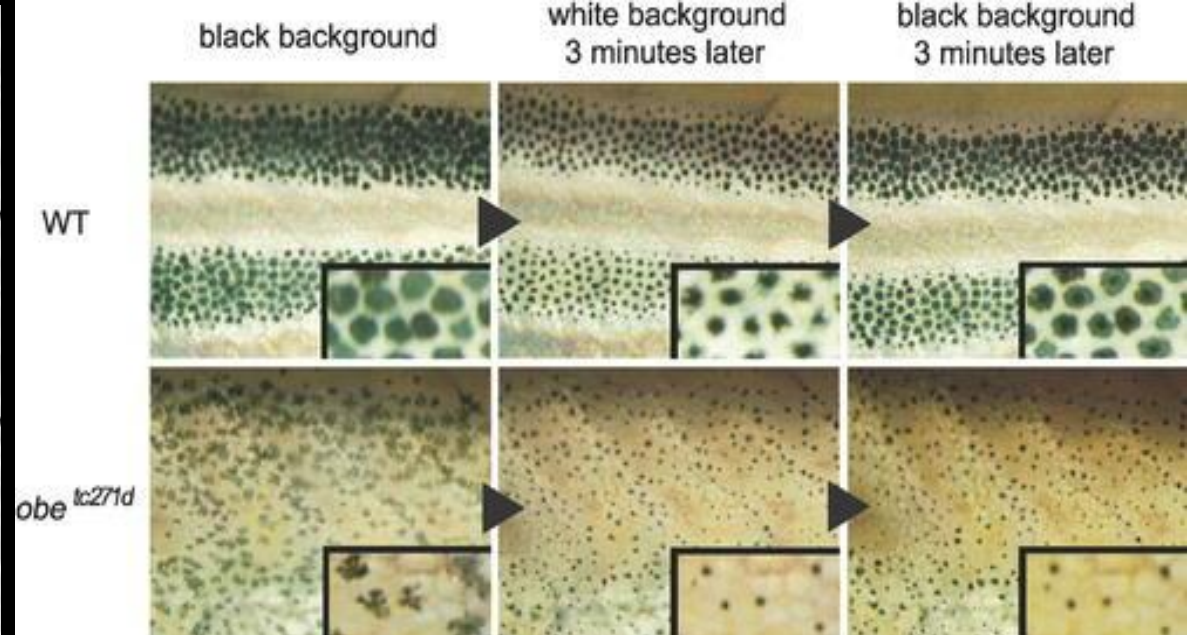
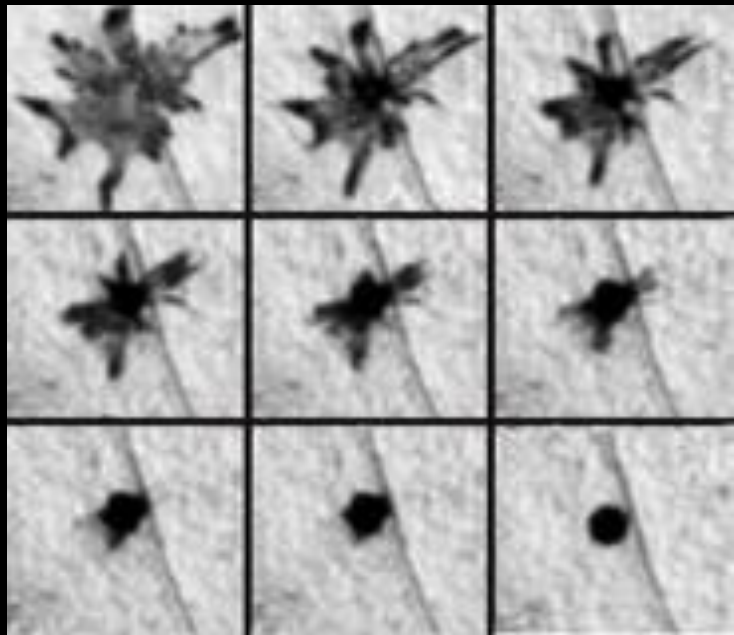
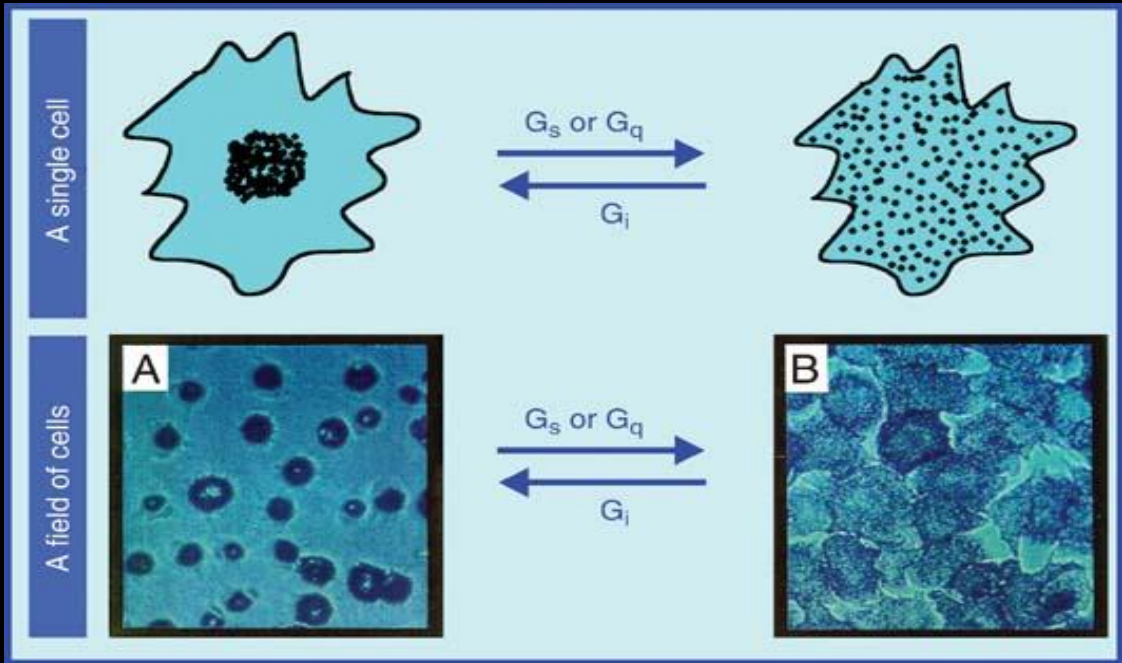
René Descartes - 1664



Melatonin (N-acetyl-5-methoxytryptamine)

Aaron Lerner – 1958

Melanophore-contracting (melatonin)



# MELATONINA

Classe Química: Indolamina

derivado de aminoácido (Triptofano)

Característica

hidro e lipossolúvel (não há armazenamento)

Transporte no plasma

livre (30%) e combinado com albumina

Receptores

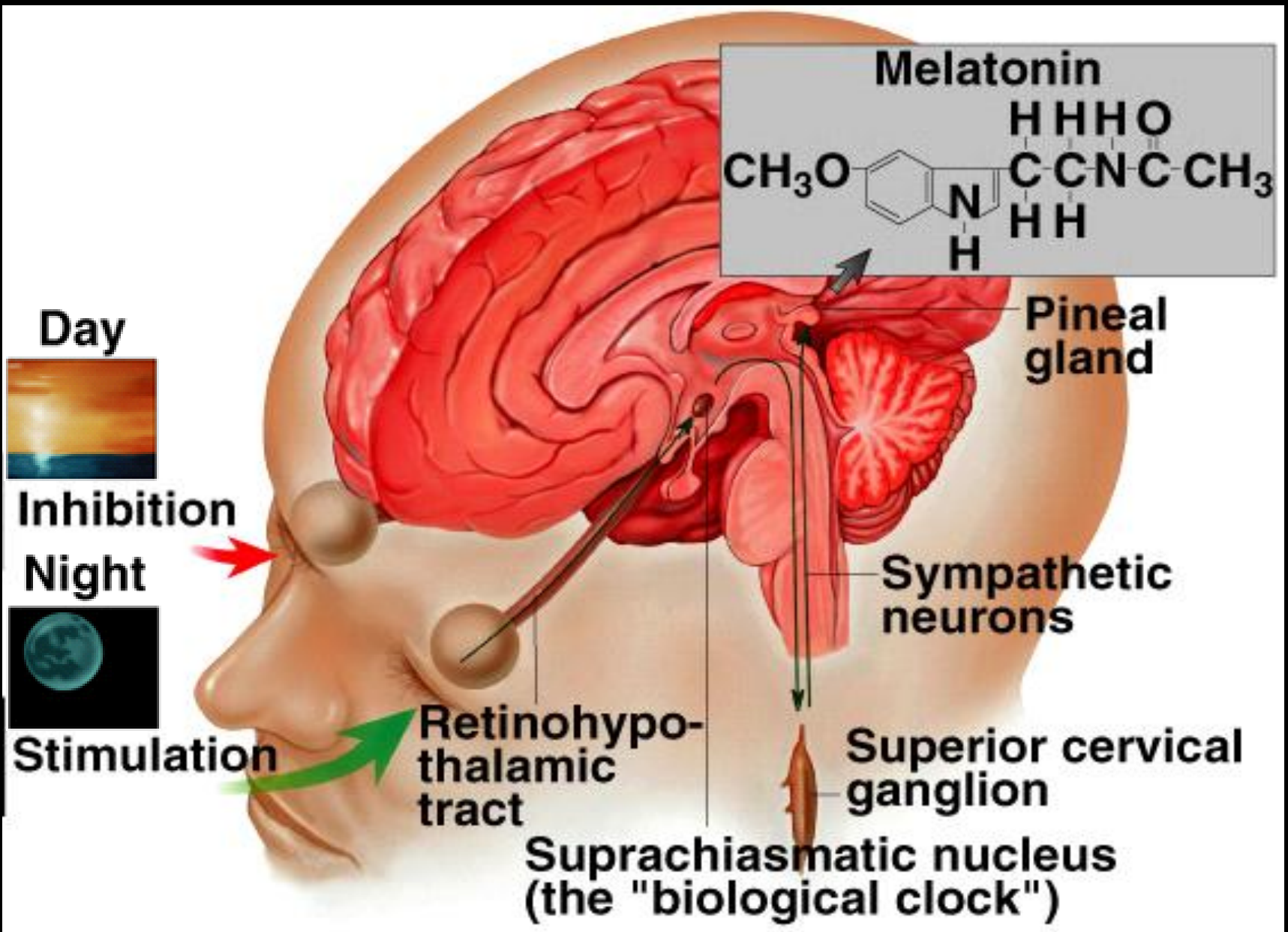
na membrana e intracelulares

Controle da secreção

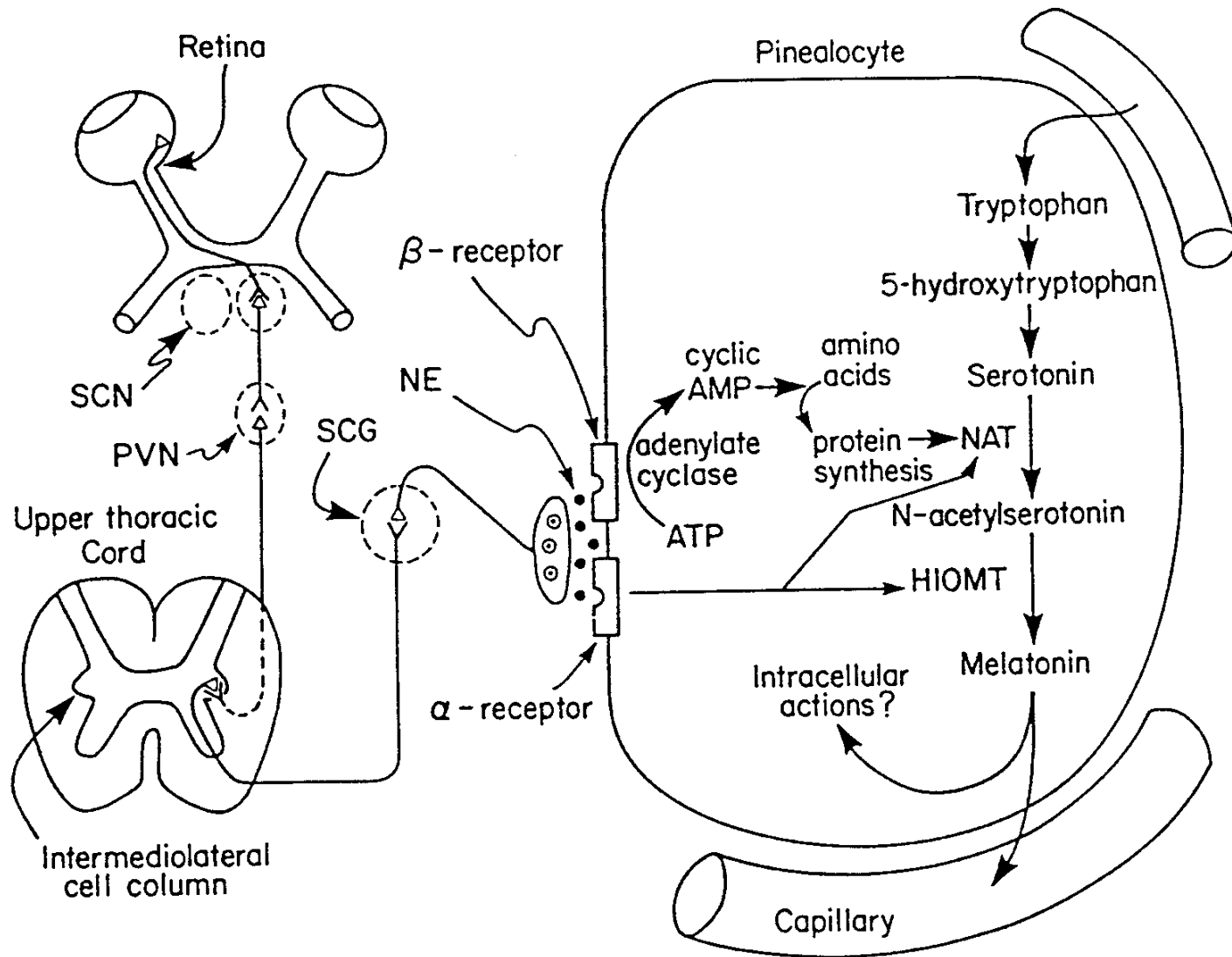
cronotrópico – ritmo claro/escuro

Metabolização / eliminação

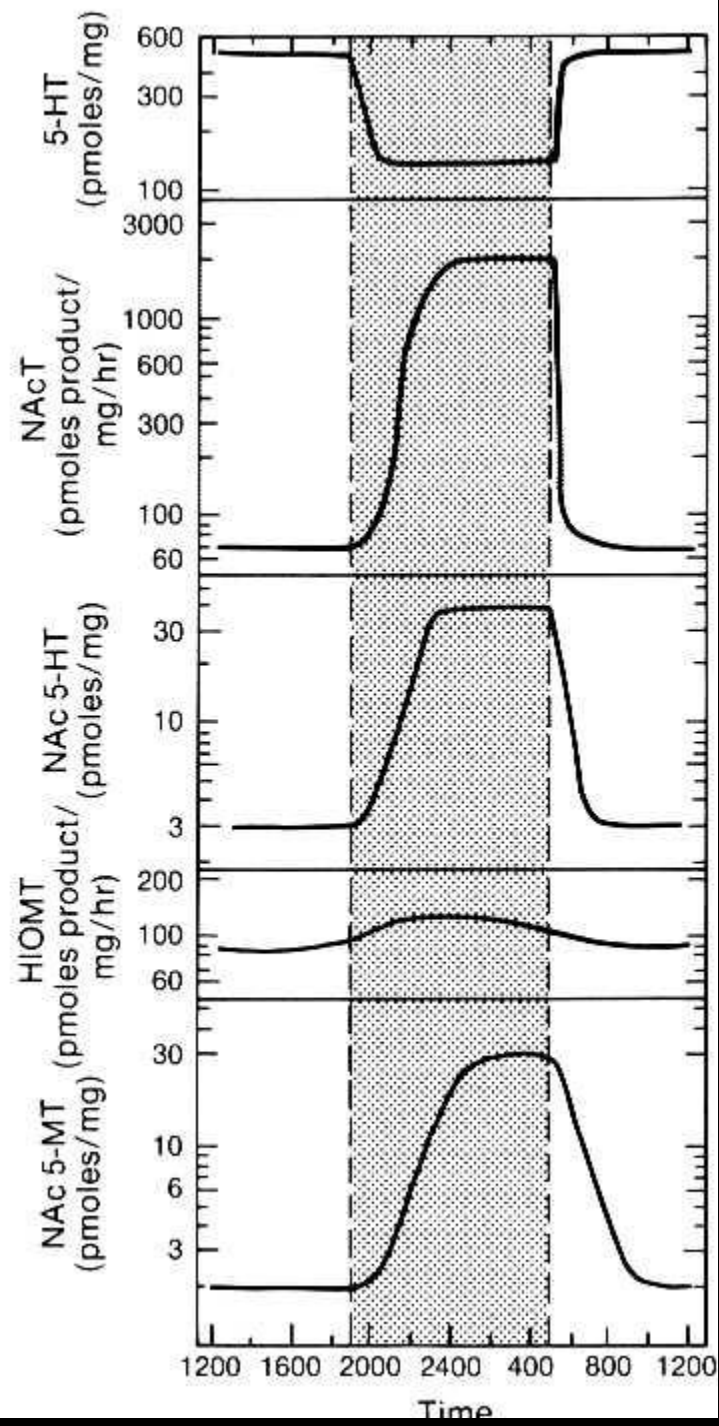
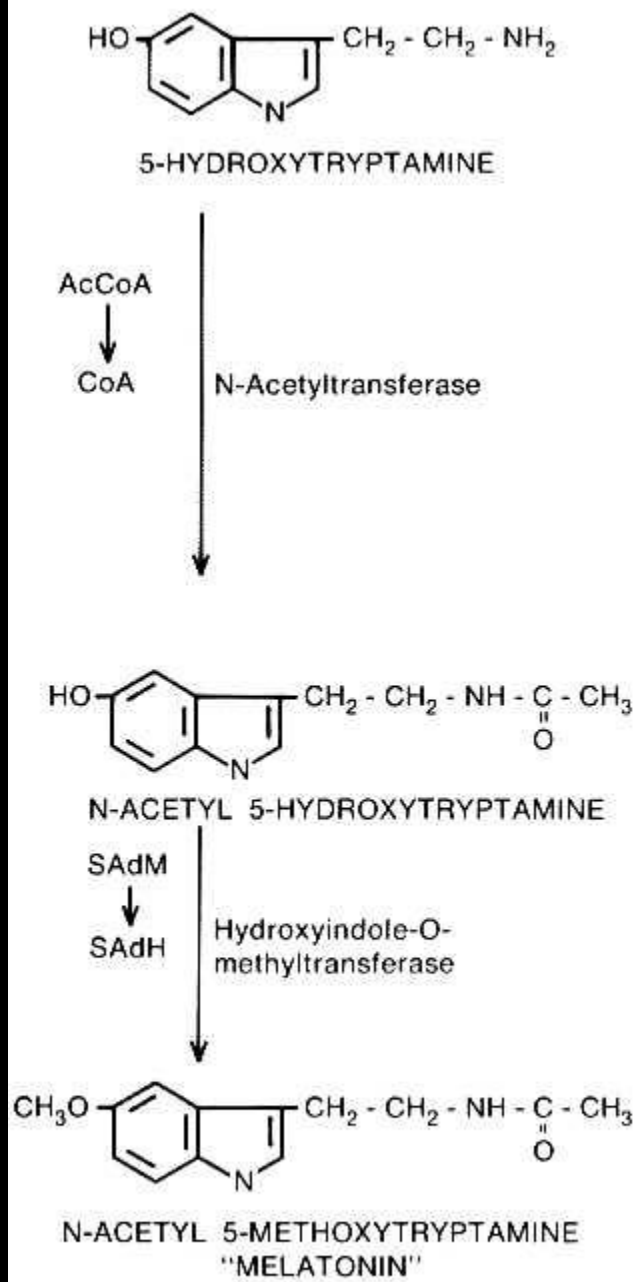
fígado (glicuronídeos/sulfato) – bile e urina



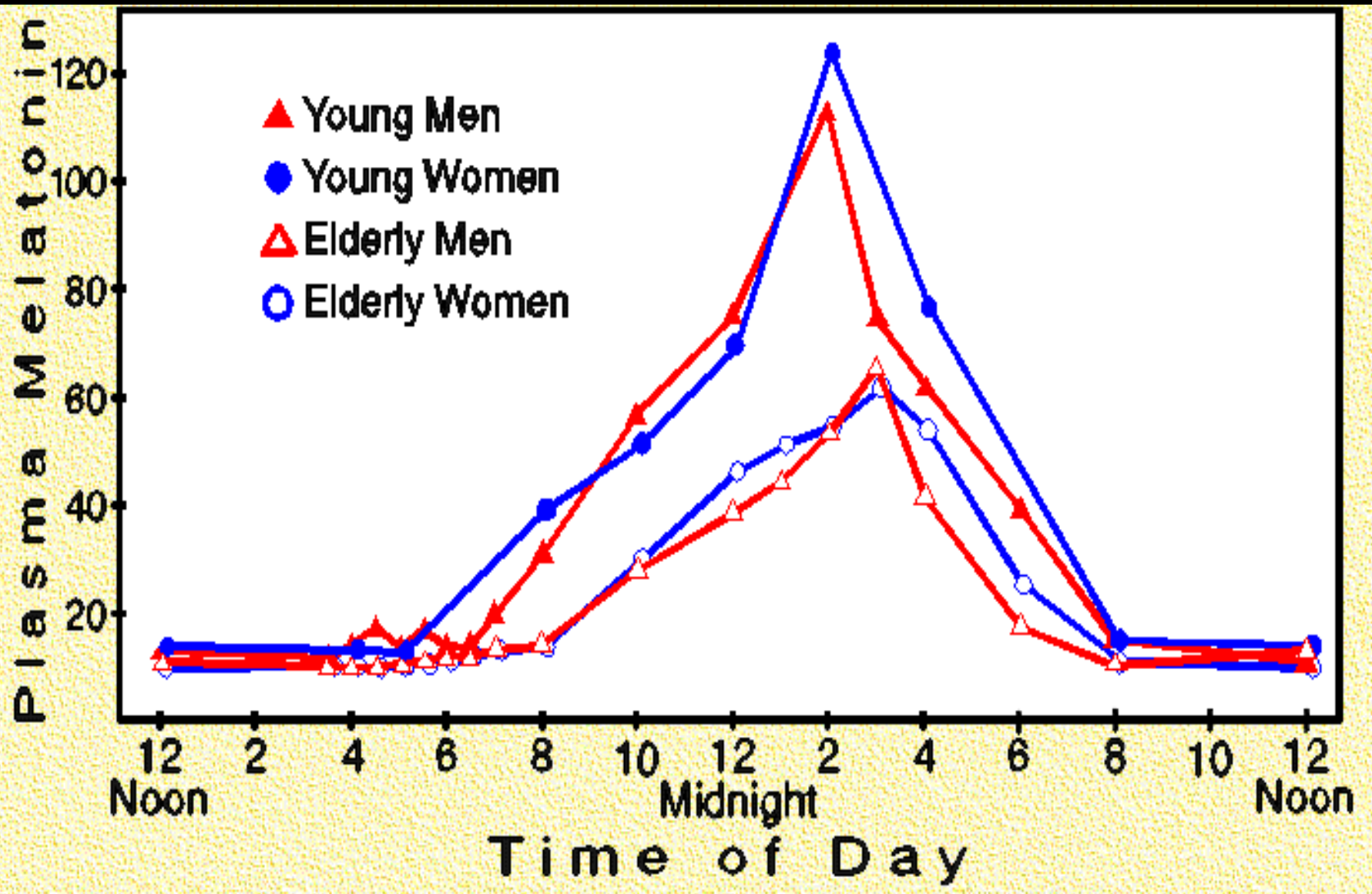
# Melatonina – controle da secreção



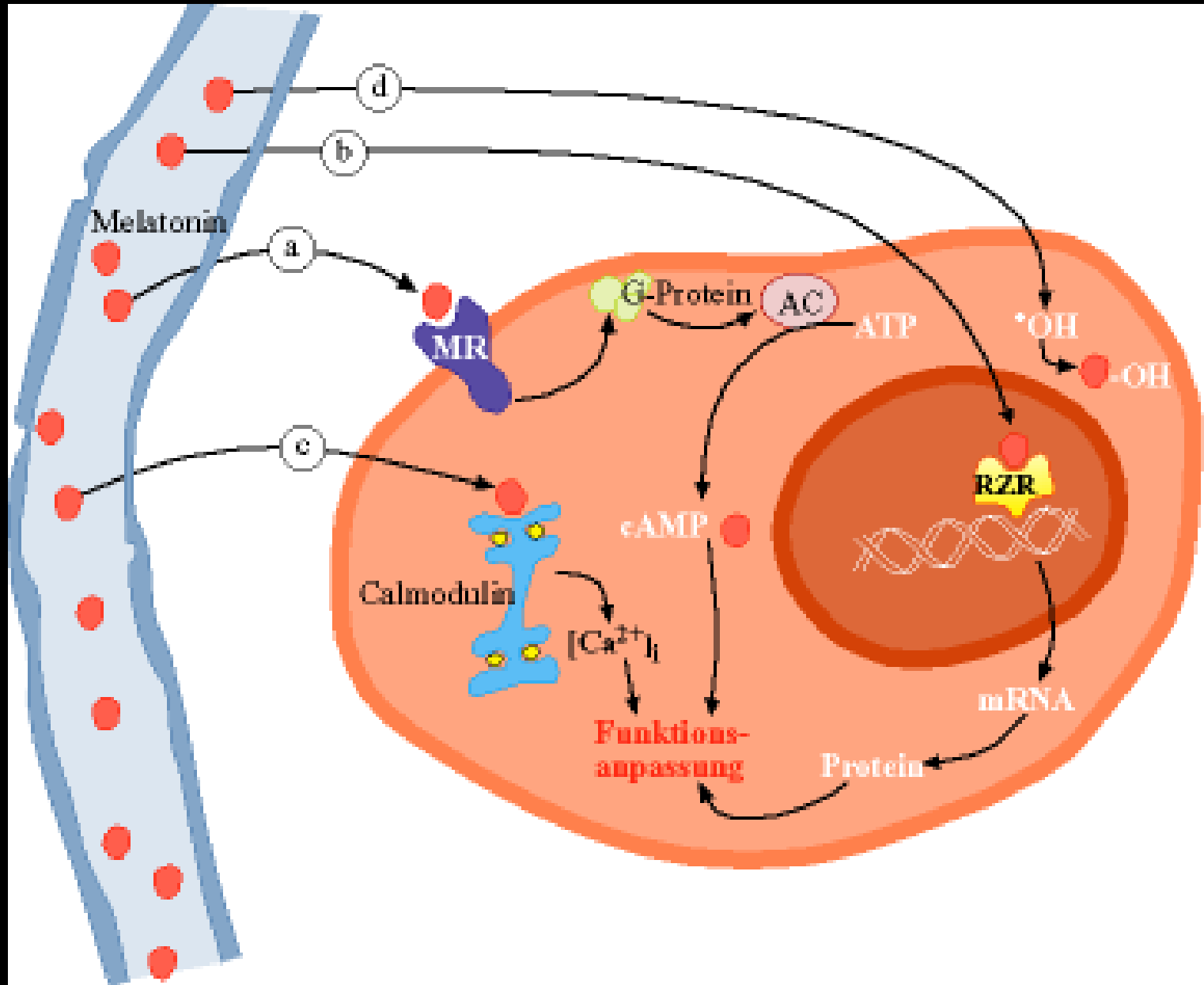




# Melatonina - Ritmo de secreção

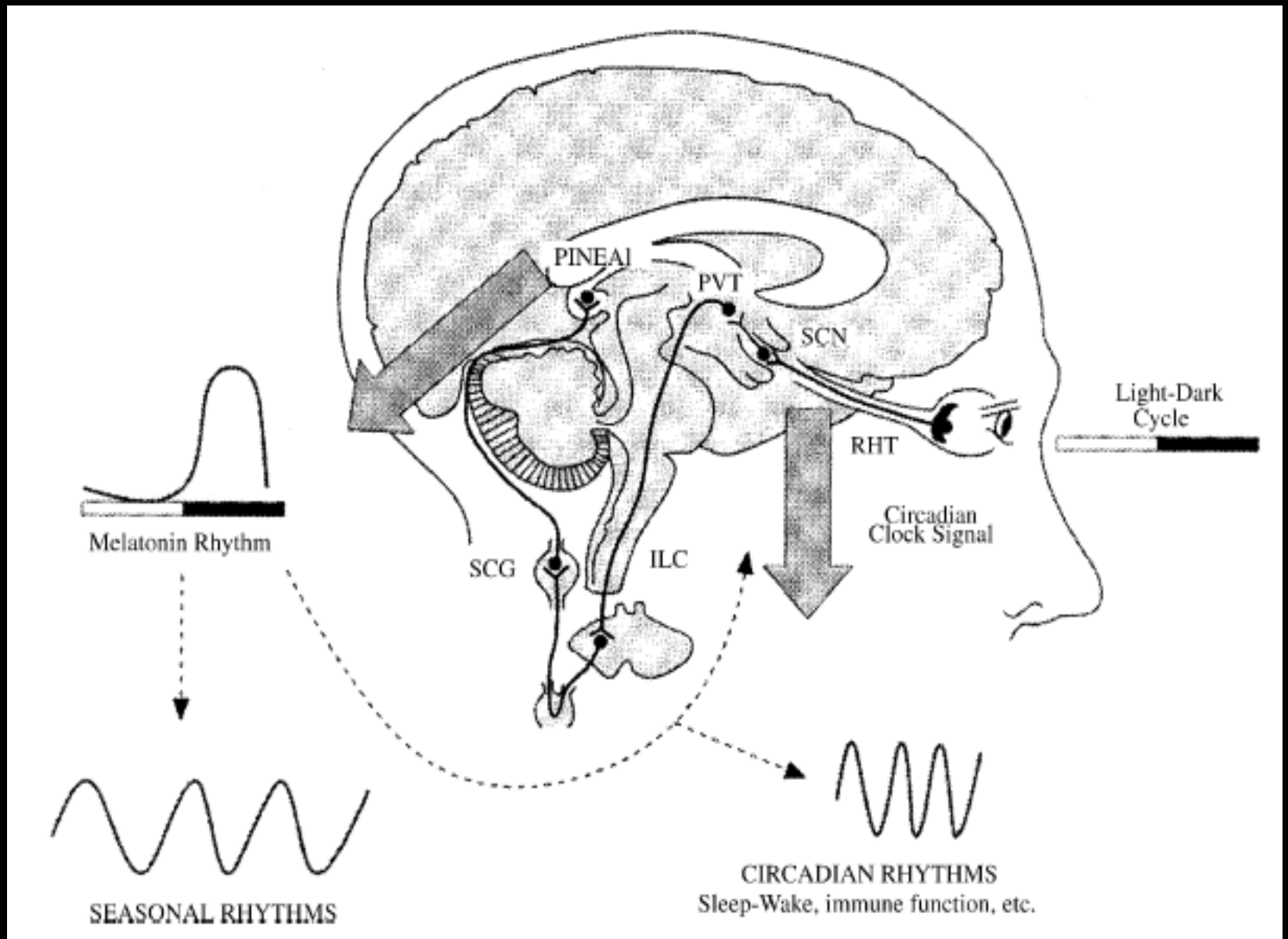


# Melatonina - Mecanismo de Ação

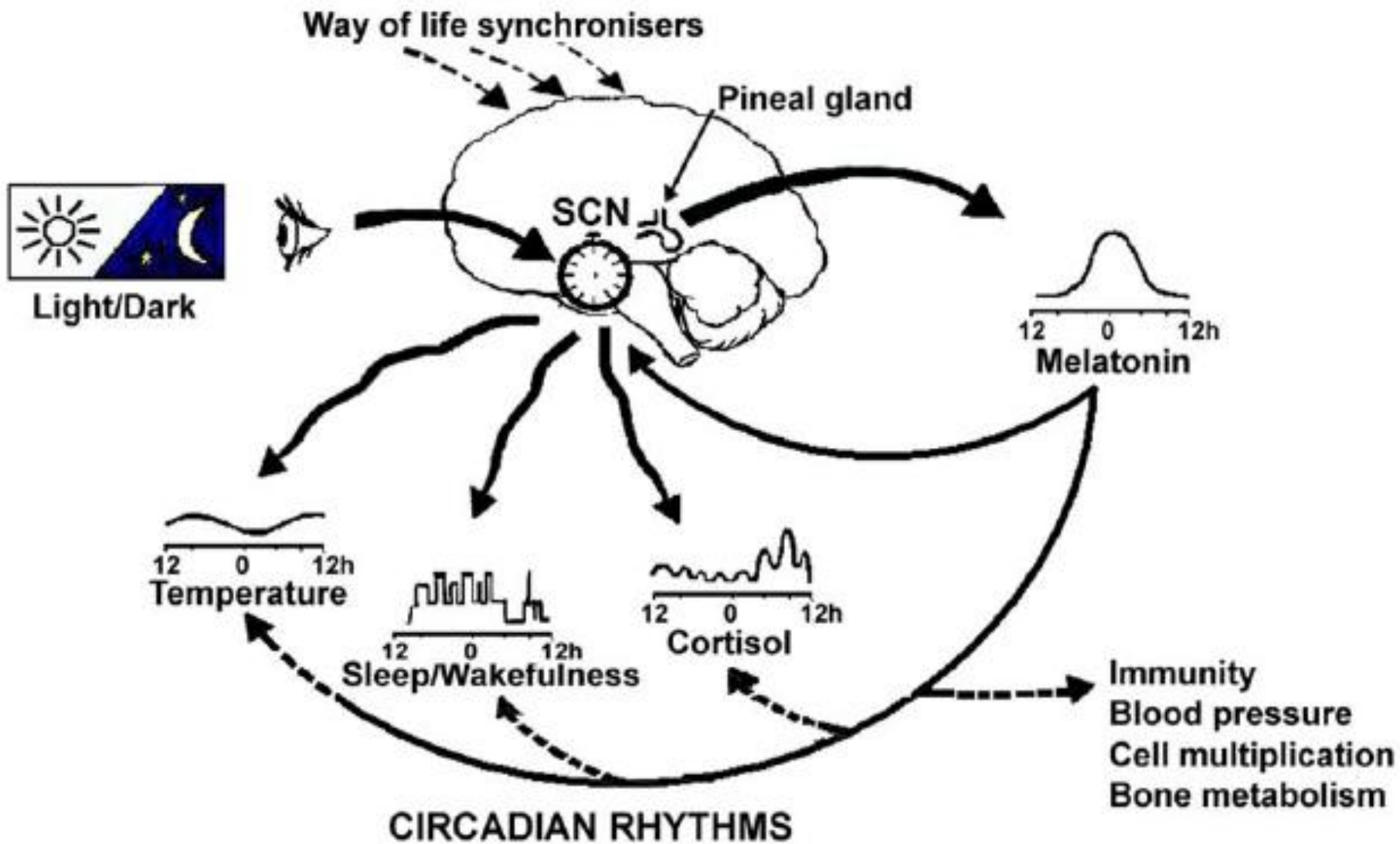


# Efeitos da Melatonina

- sincronização de ritmos biológicos



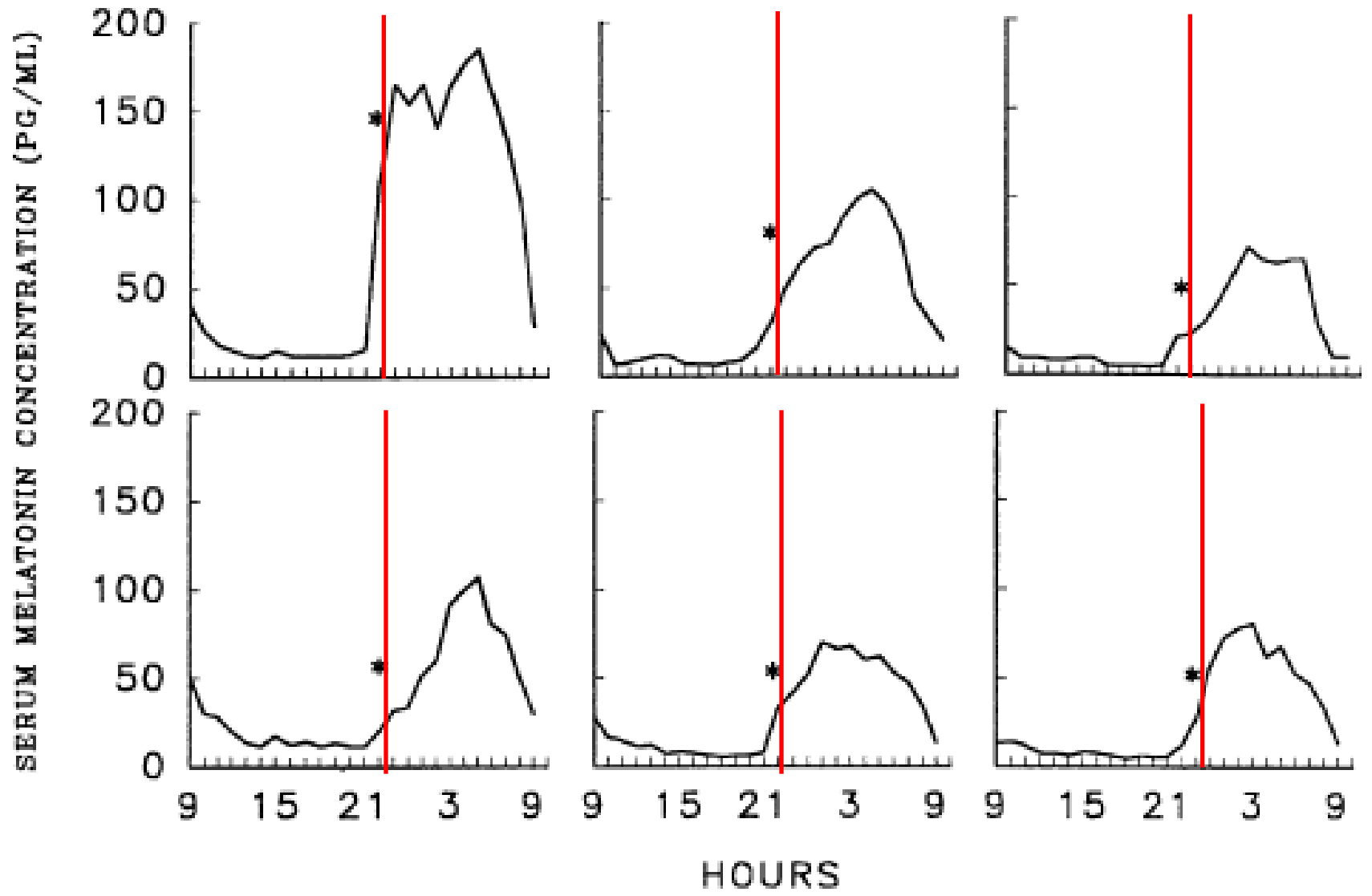


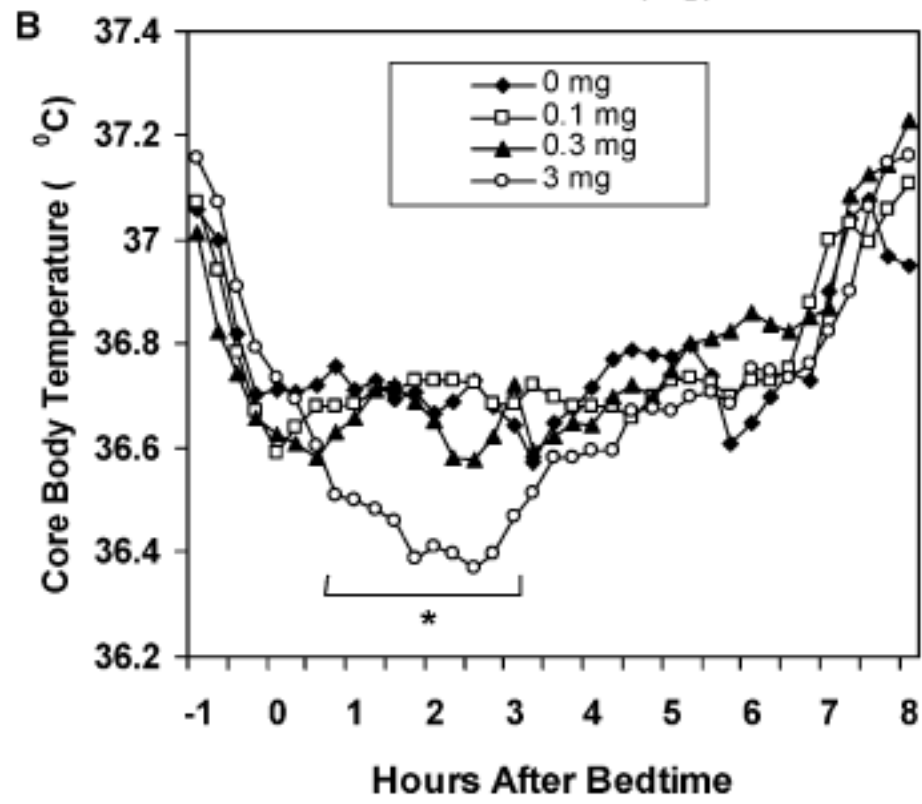
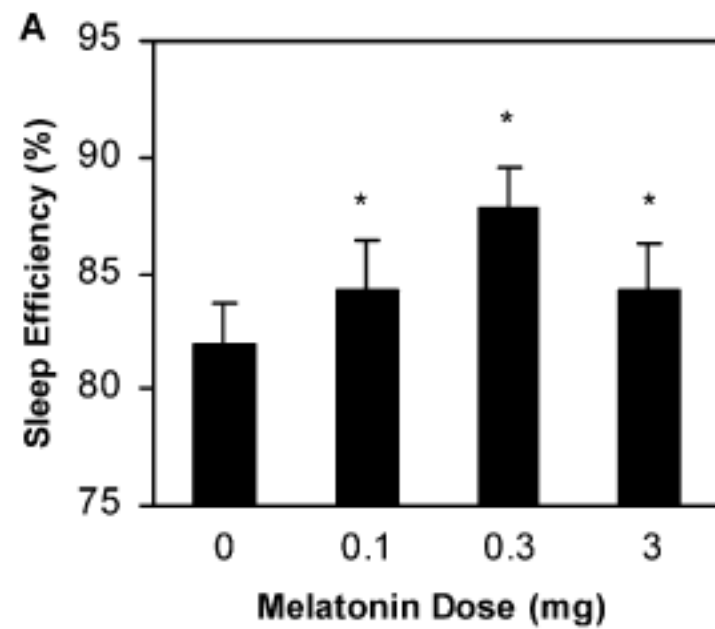


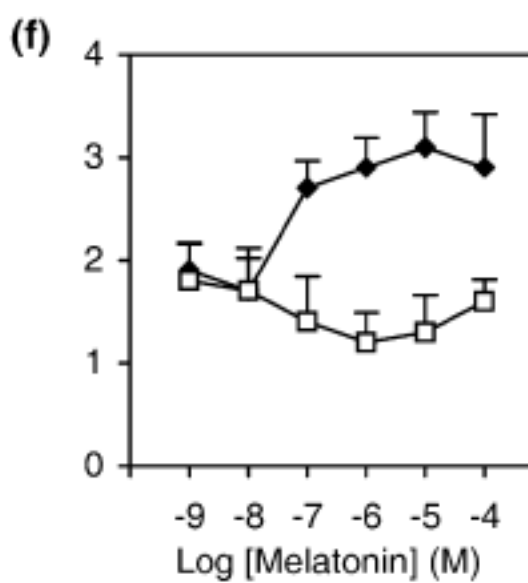
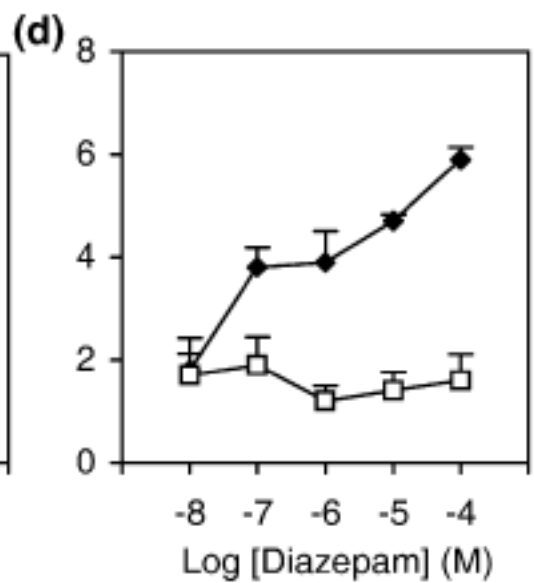
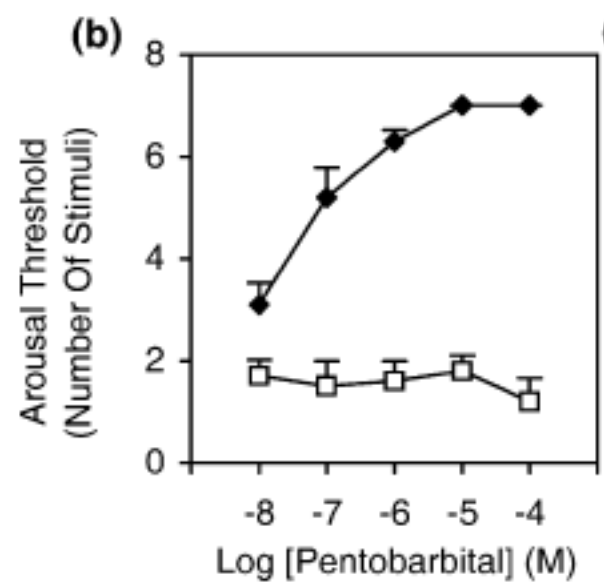
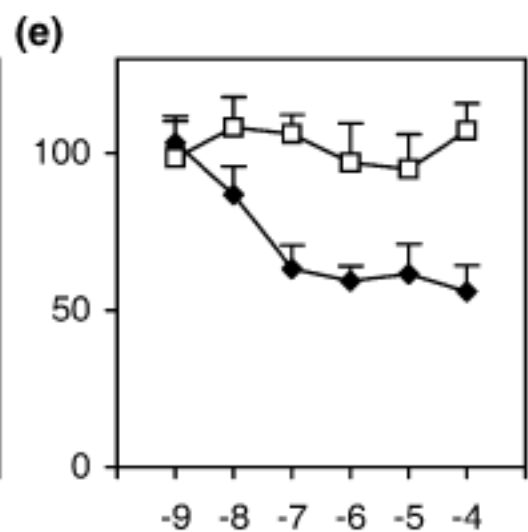
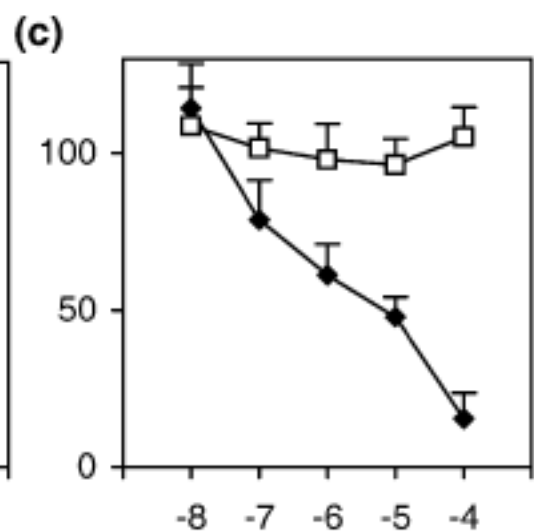
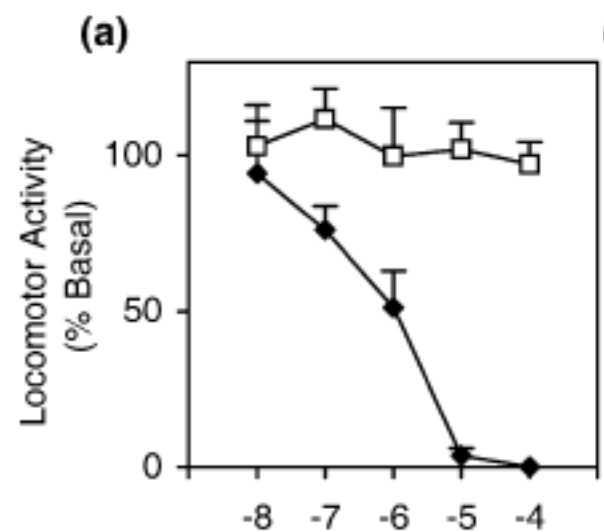
# Efeitos da Melatonina

- sincronização de ritmos biológicos
- indução do sono





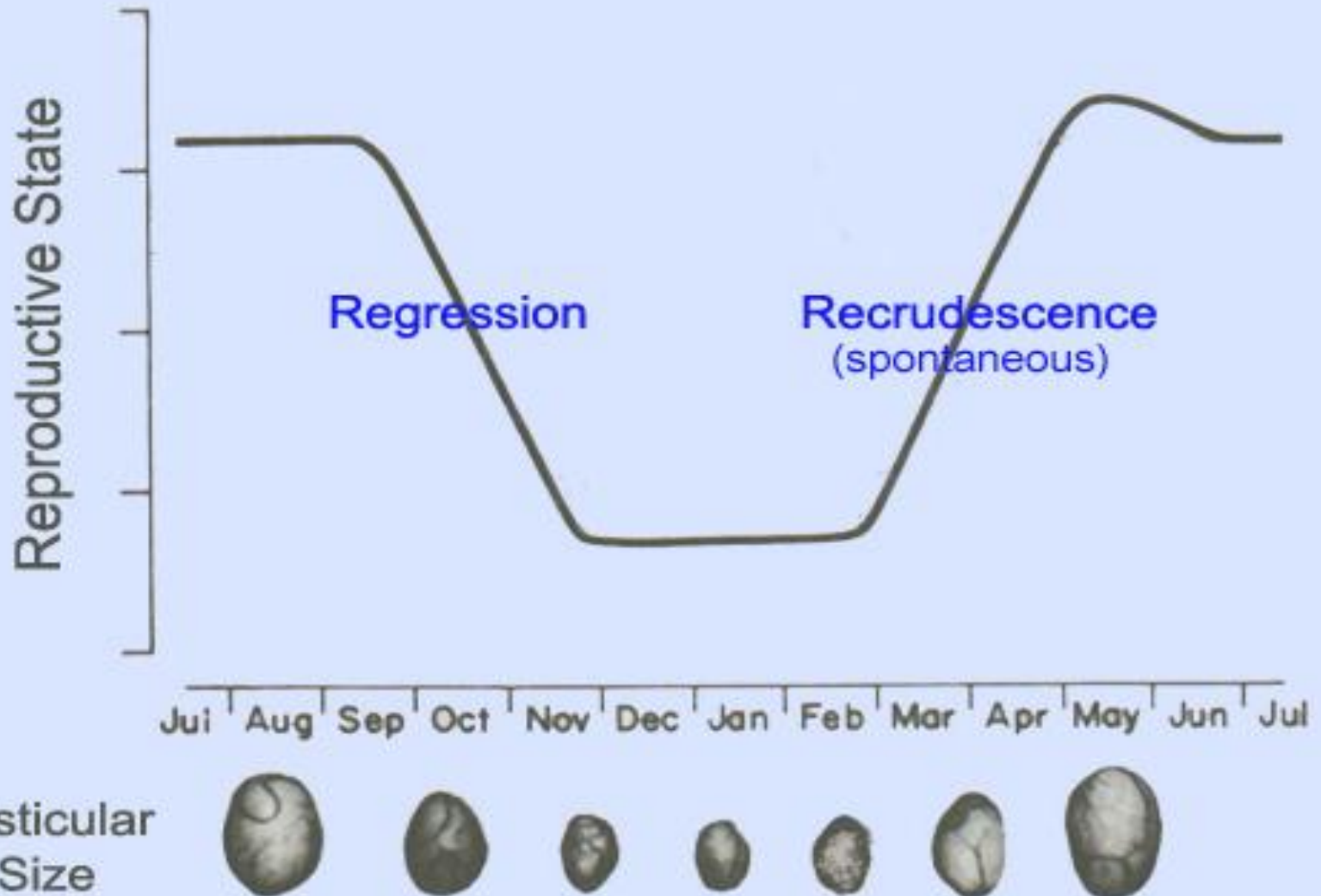


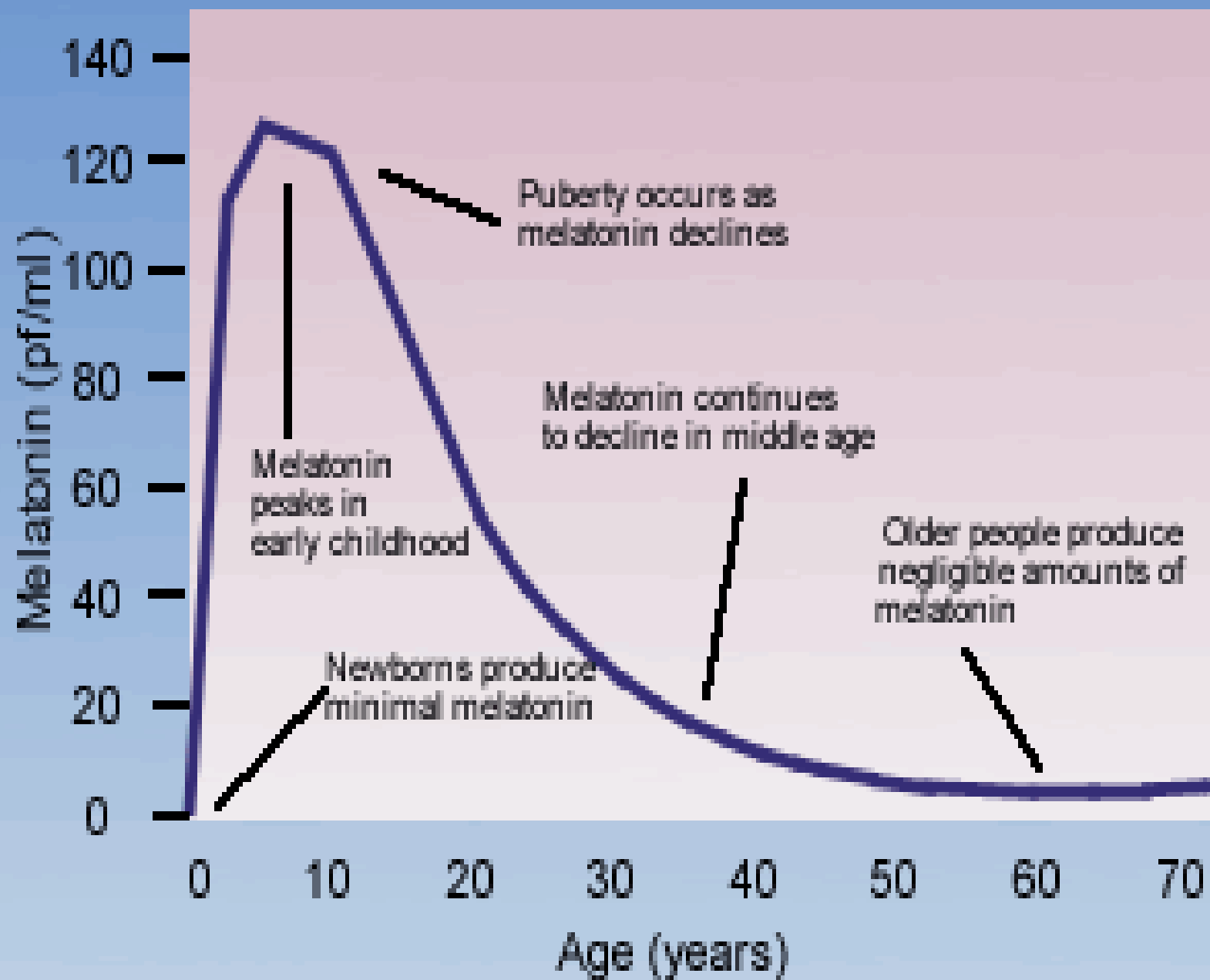


# Efeitos da Melatonina

- sincronização de ritmos biológicos
- indução do sono
- atividade antigonadotrófica

# Seasonal Cycle of a Long Day Breeder





# Efeitos da Melatonina

- sincronização de ritmos biológicos
- indução do sono
- atividade antigonadotrófica
- anti-envelhecimento

# Efeitos da Melatonina

- sincronização de ritmos biológicos
- indução do sono
- atividade antigonadotrófica
- anti-envelhecimento
  - ação antioxidante
  - ação imunoestimulante
  - auxilia na prevenção de câncer



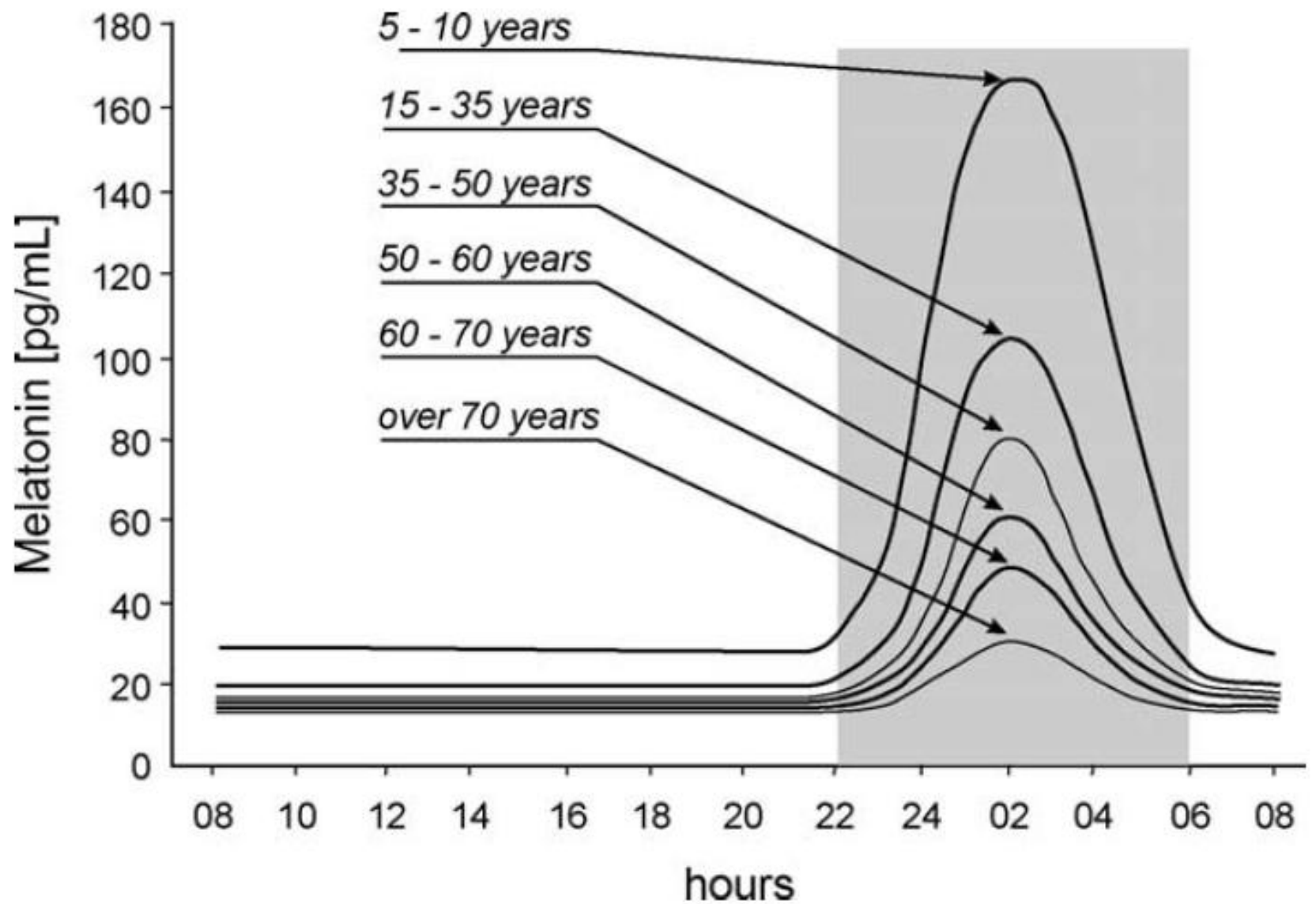
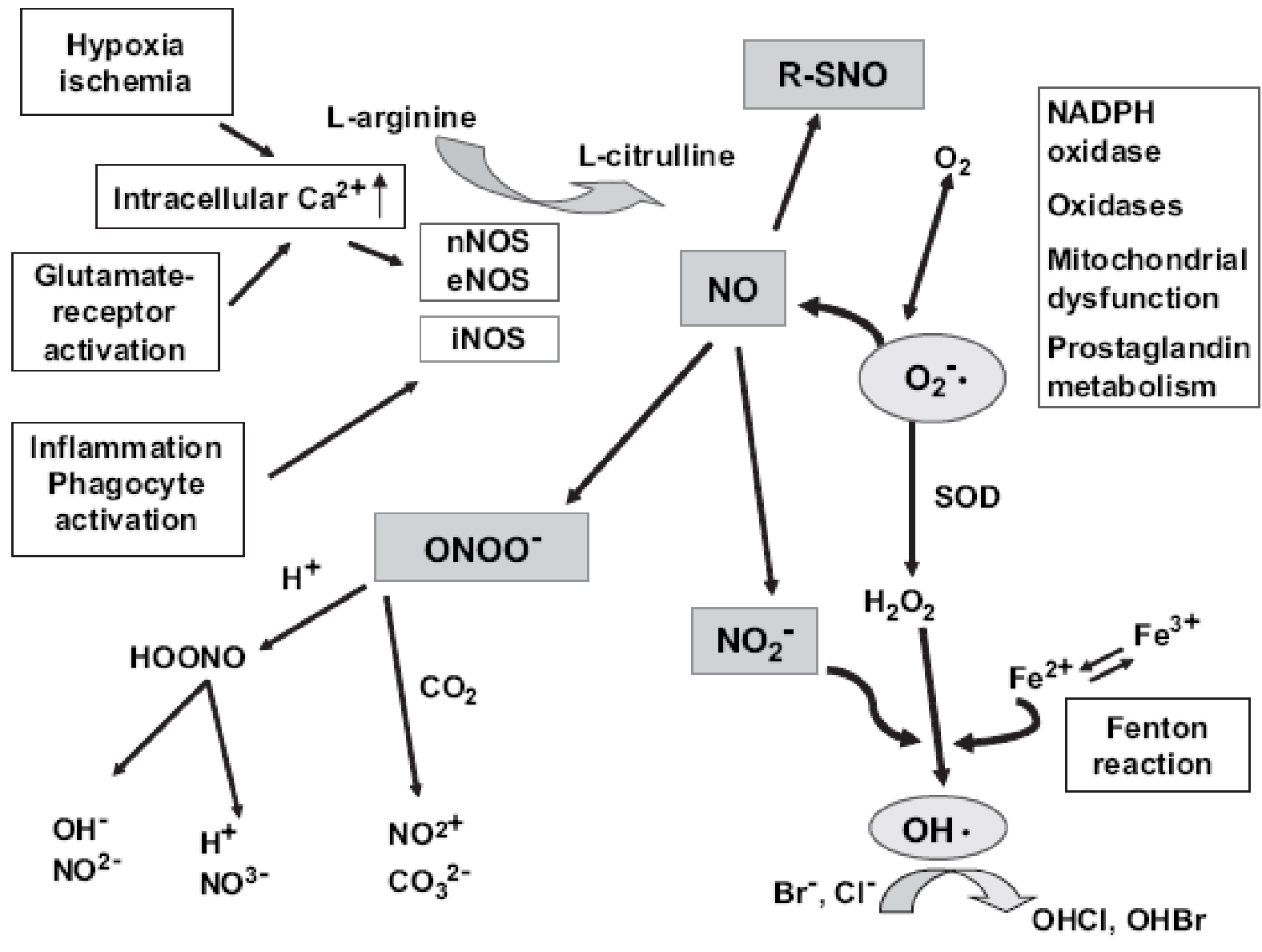
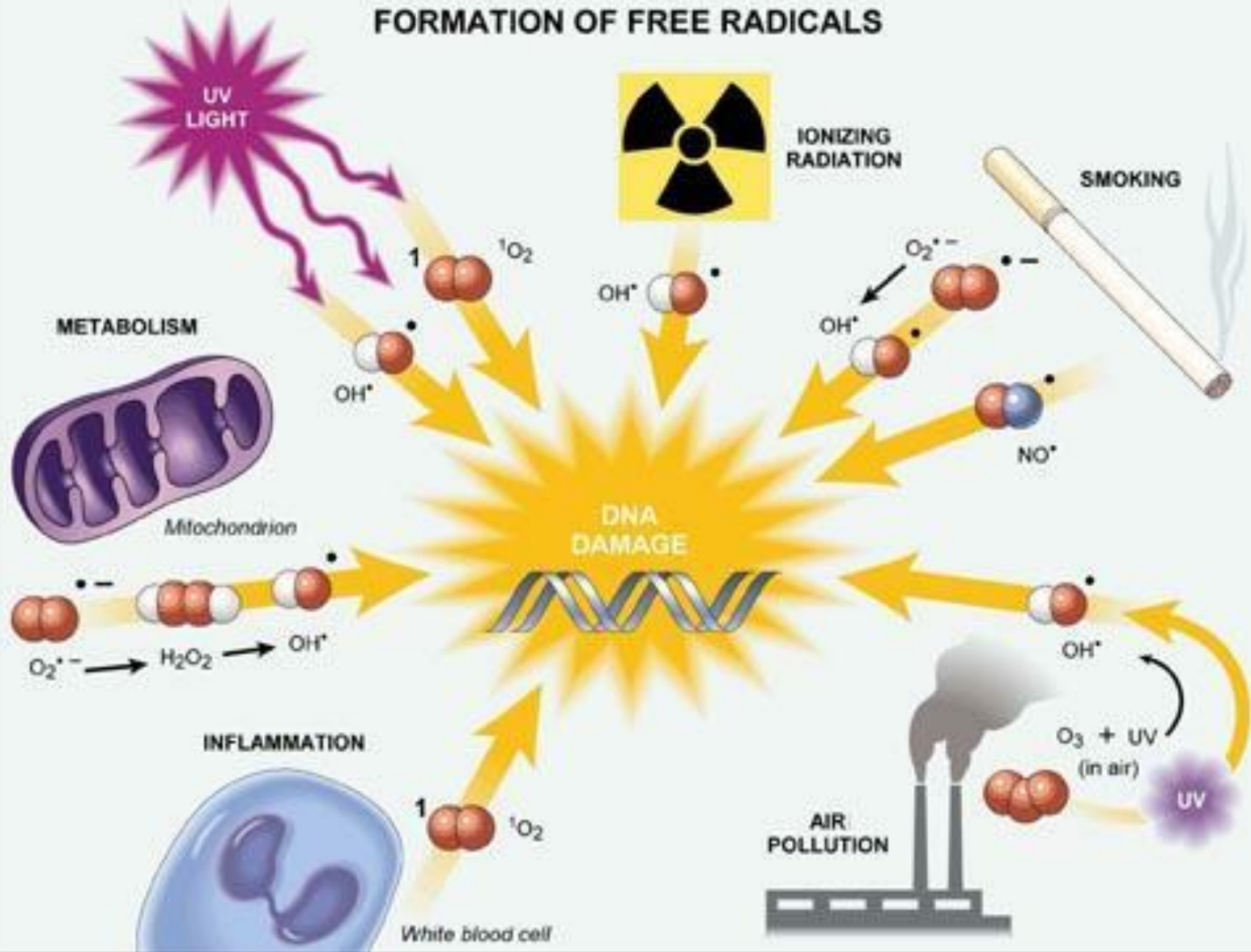
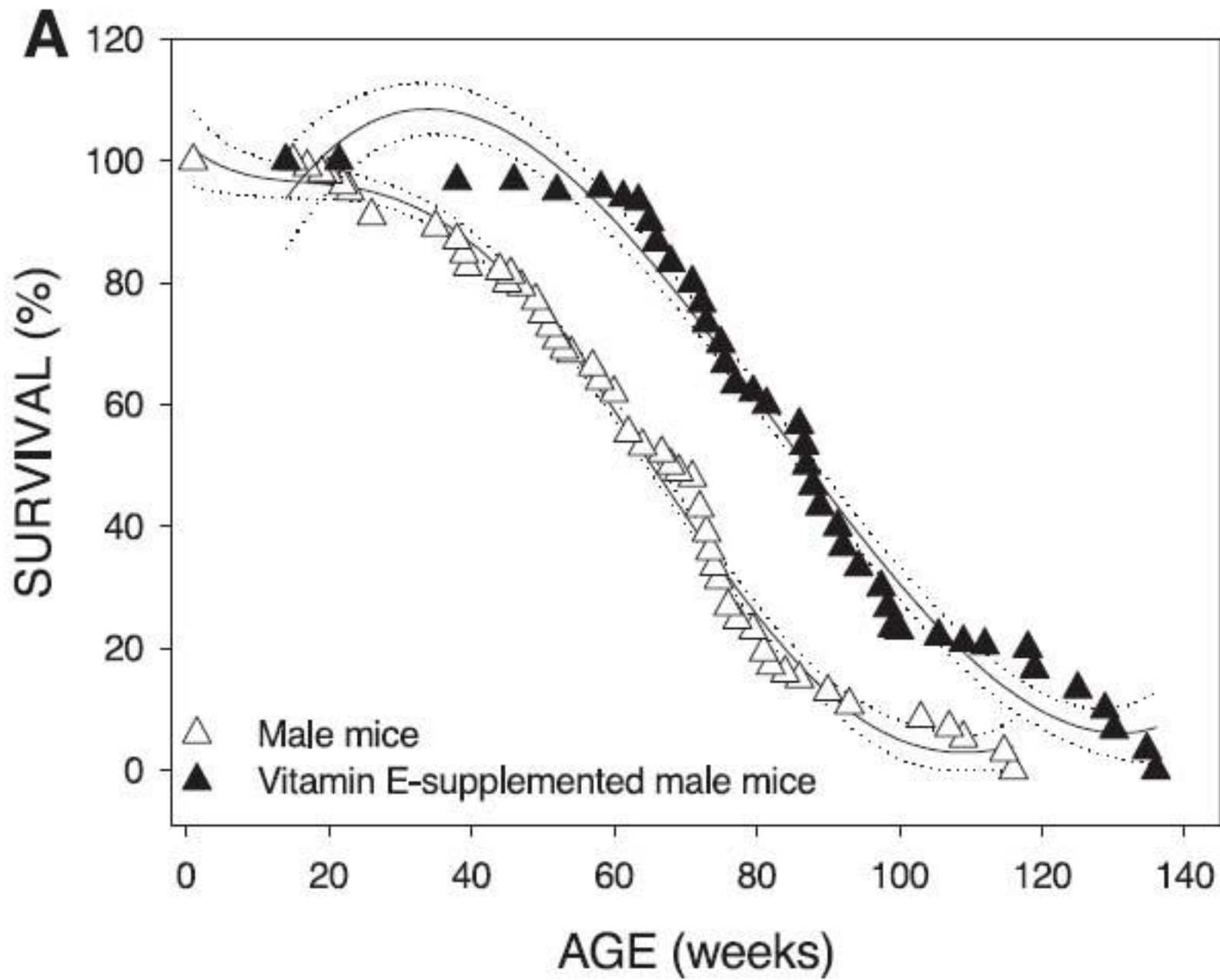


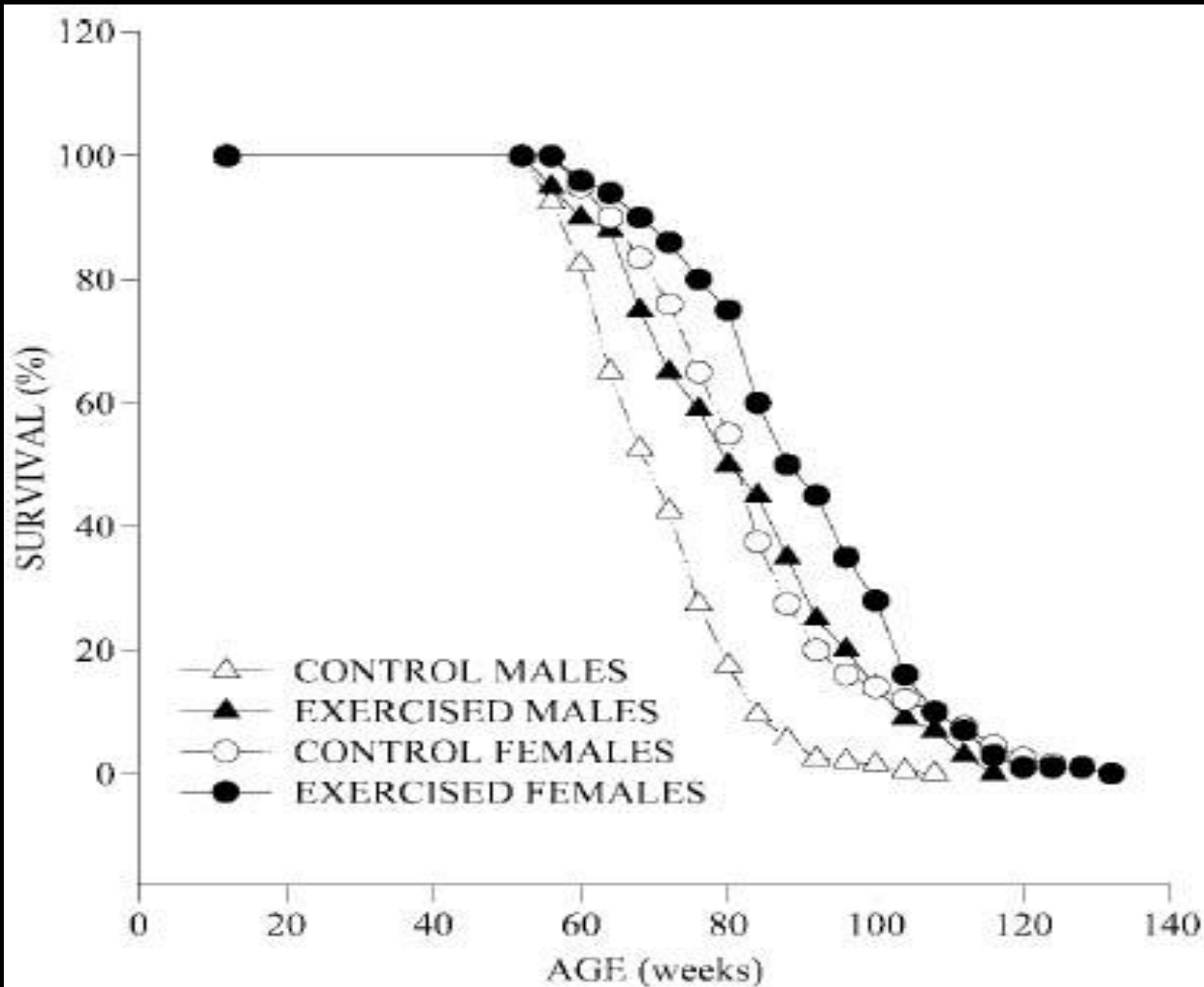
Fig. 1. Circadian profiles of serum melatonin concentrations at various age;



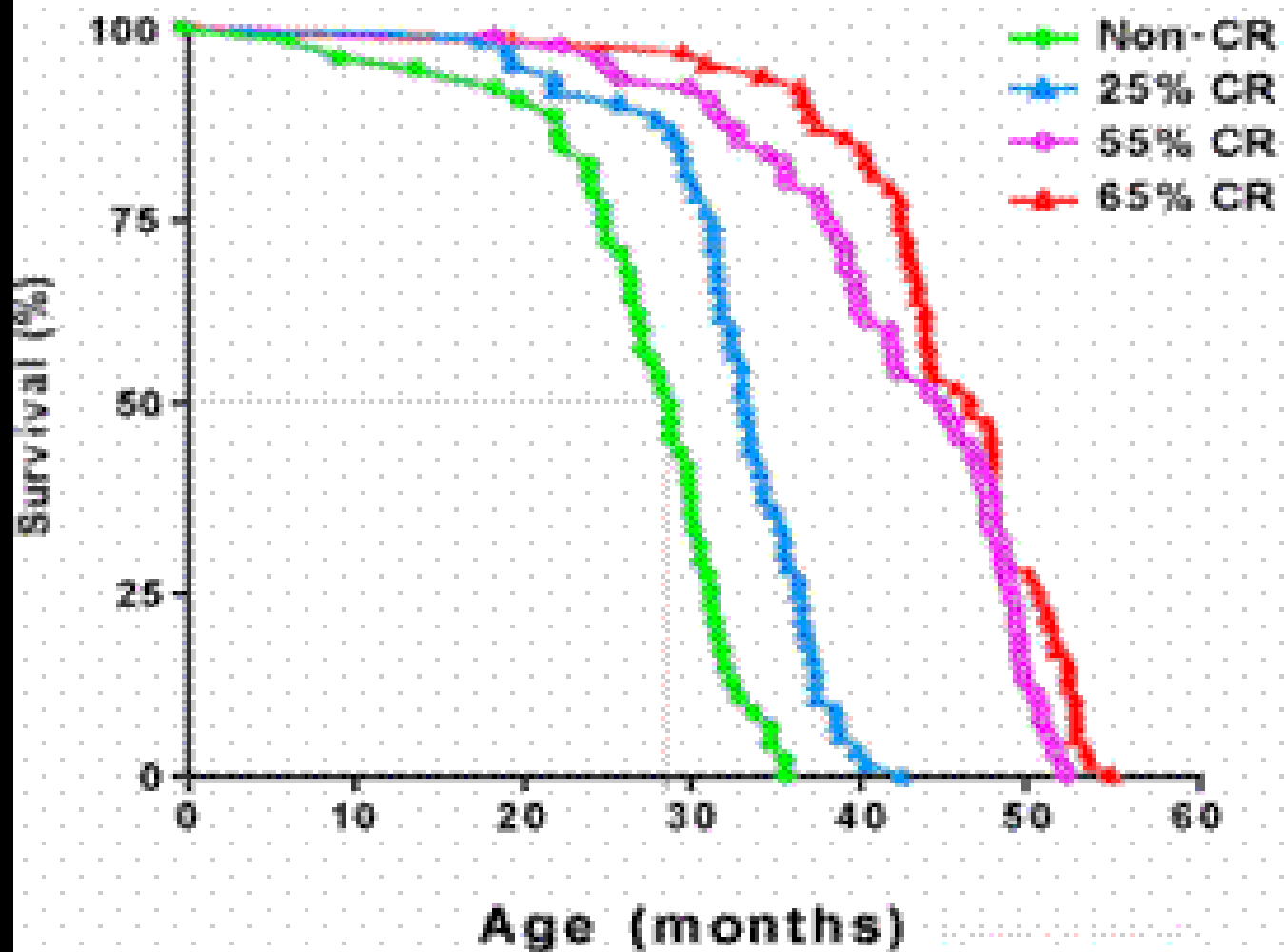
# FORMATION OF FREE RADICALS





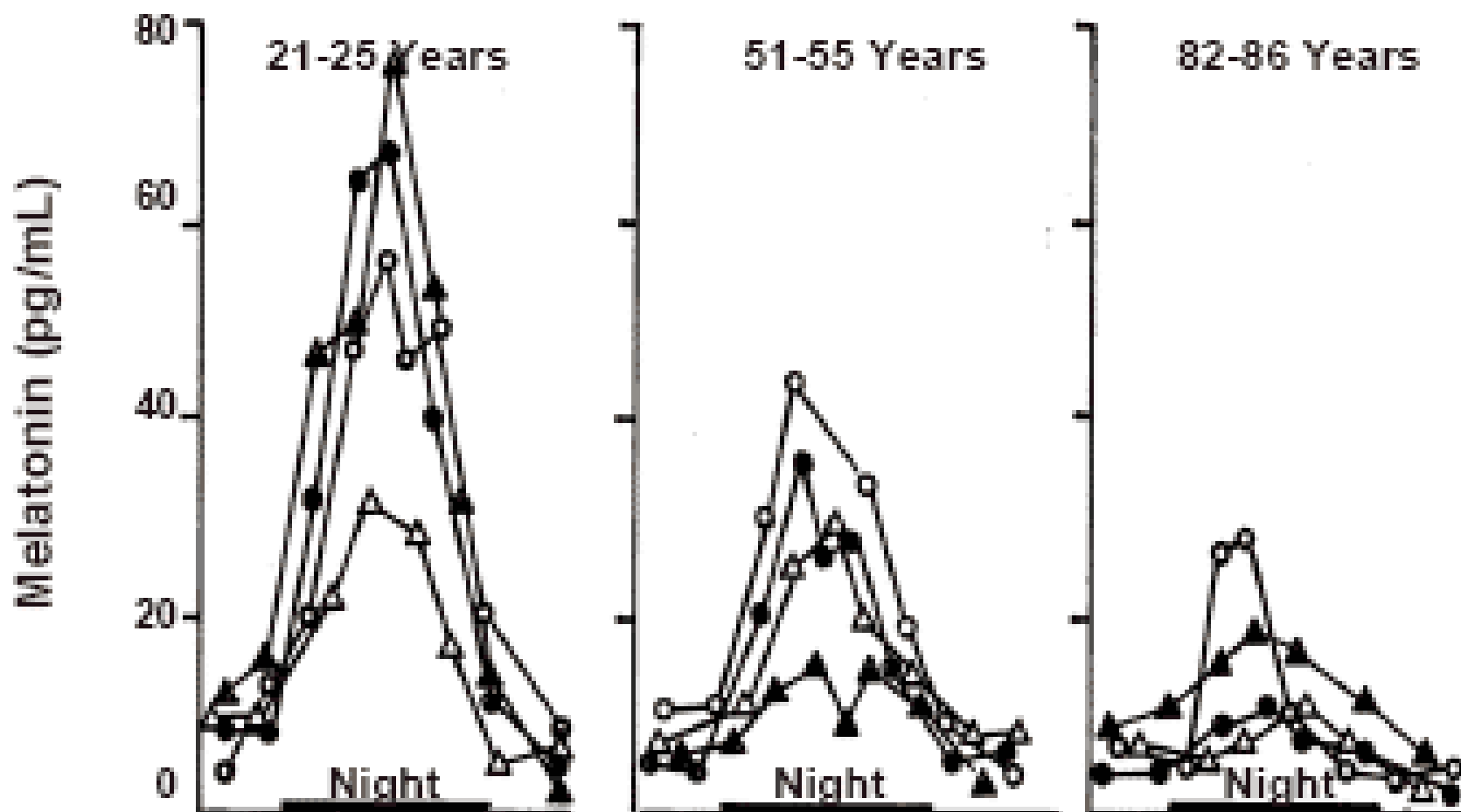


# LIFESPAN OF CR MICE vs NON-CR MICE



(B)

### Age-related diminution of night MT rise



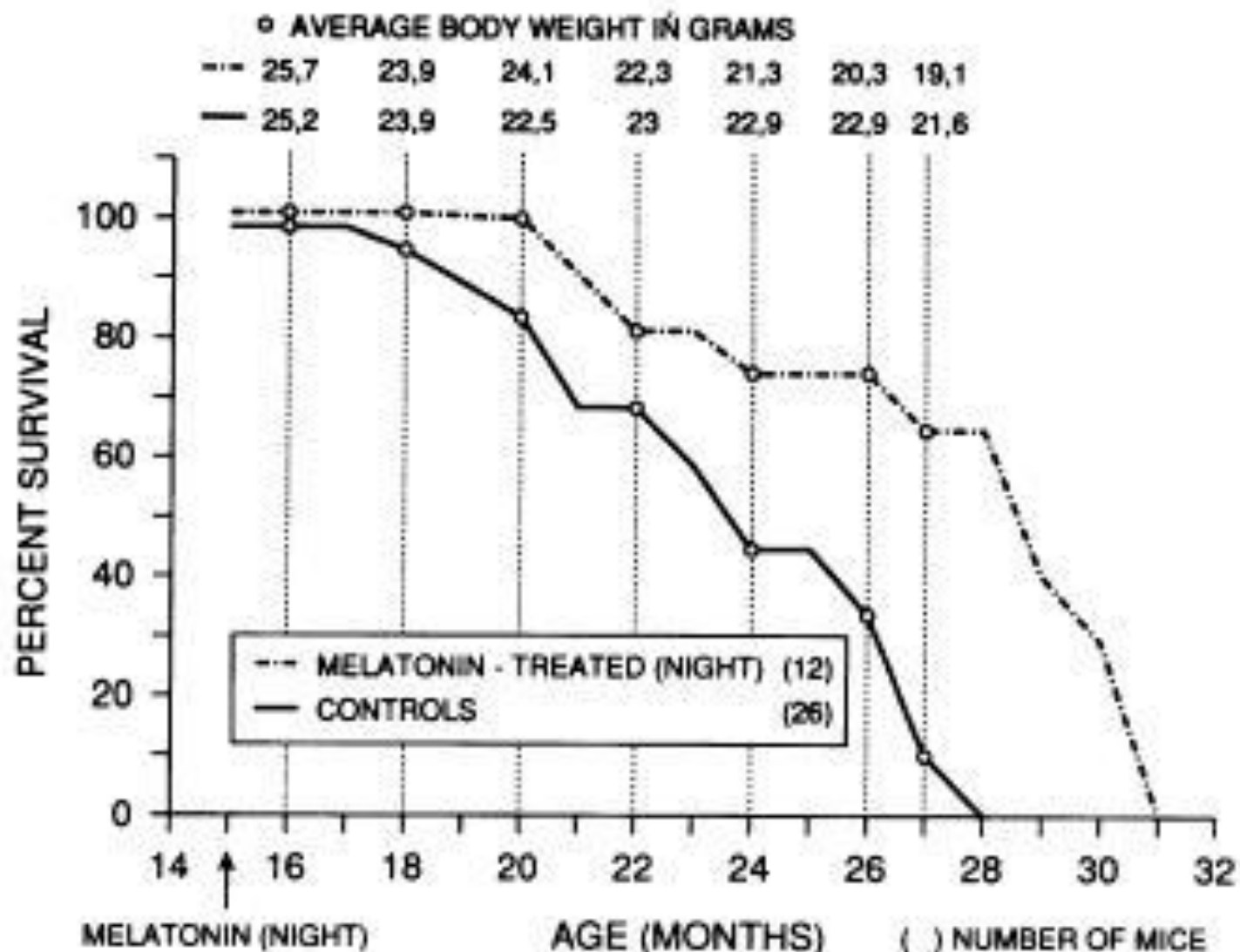
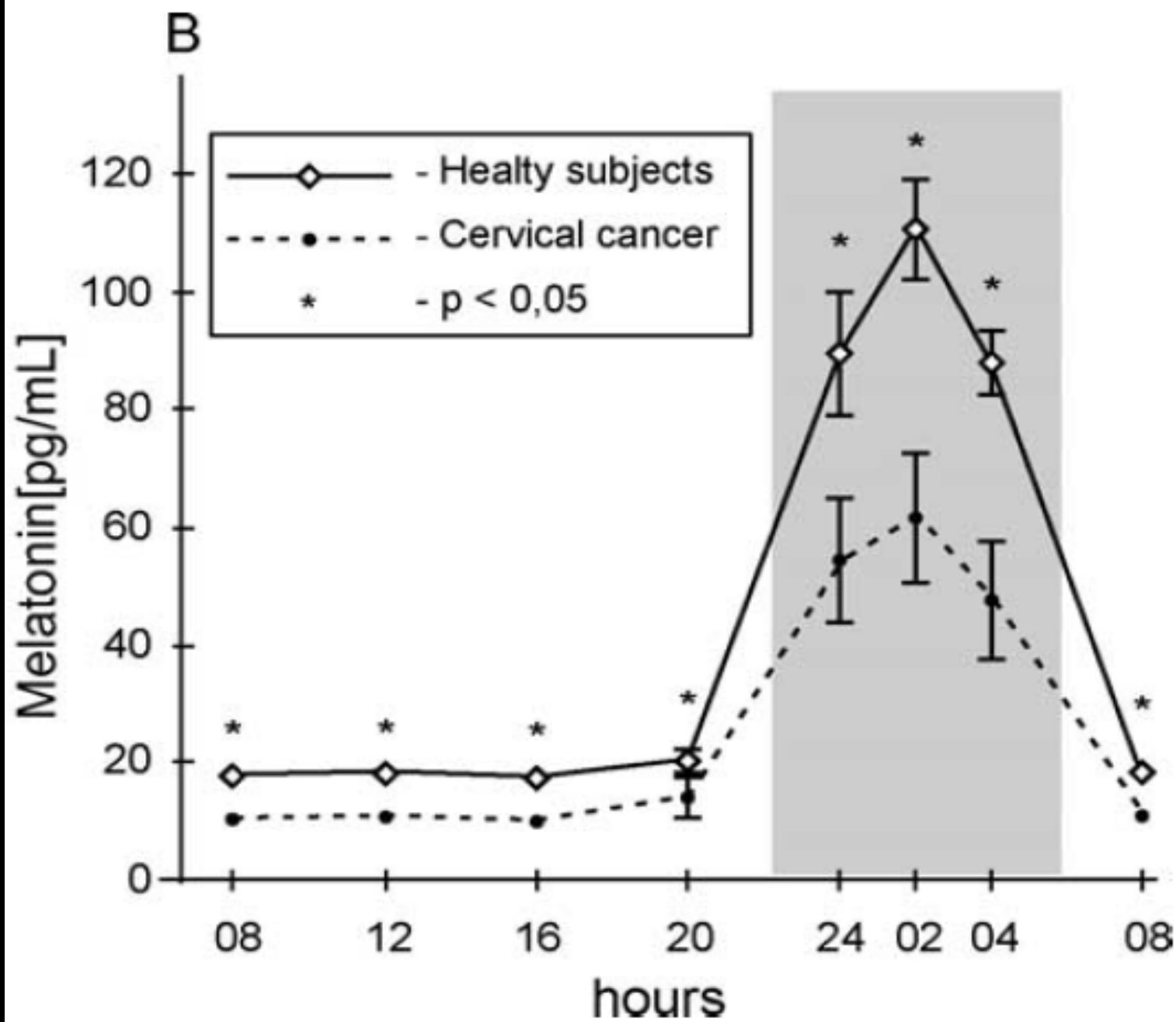


FIG. 1. Aging postponement and/or life prolongation in BALB/c female mice consequent to night administration of melatonin.



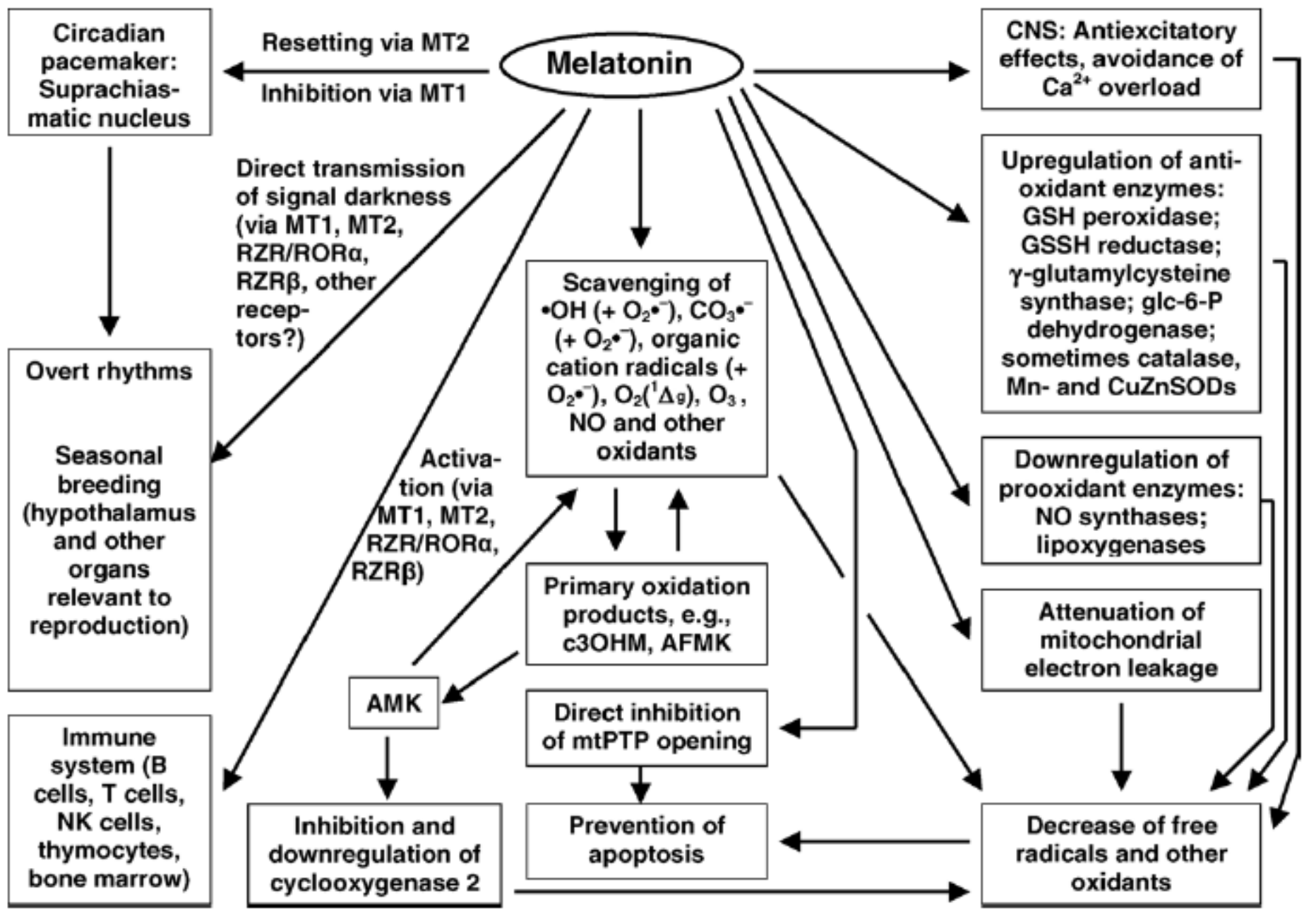


# Efeitos da Melatonina

- sincronização de ritmos biológicos
- indução do sono
- atividade antigonadotrófica
- anti-envelhecimento
  - ação antioxidante
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U.S. News & World Report

A QUESTION-AND-ANSWER GUIDE TO THE  
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# MELATONIN

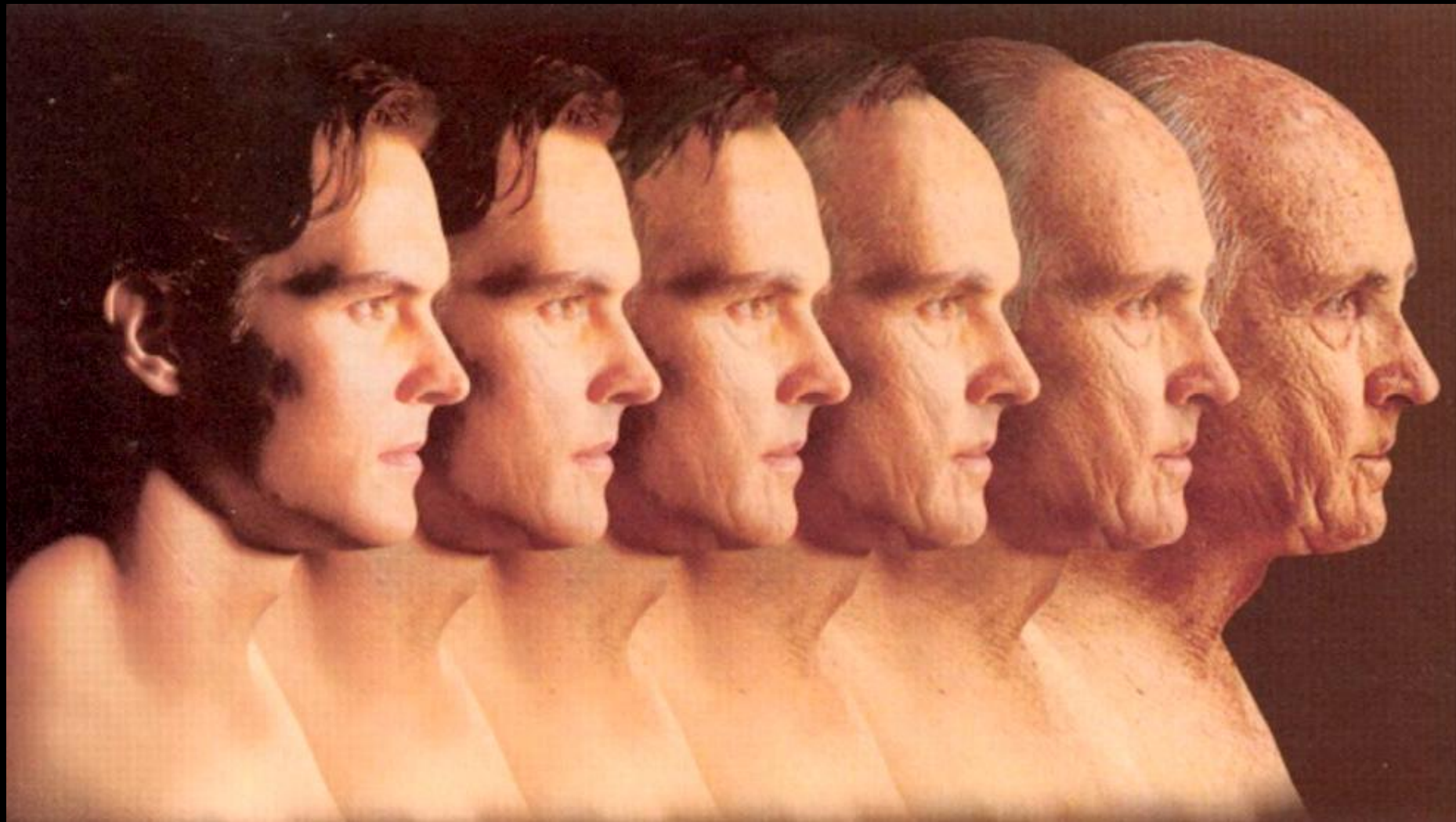
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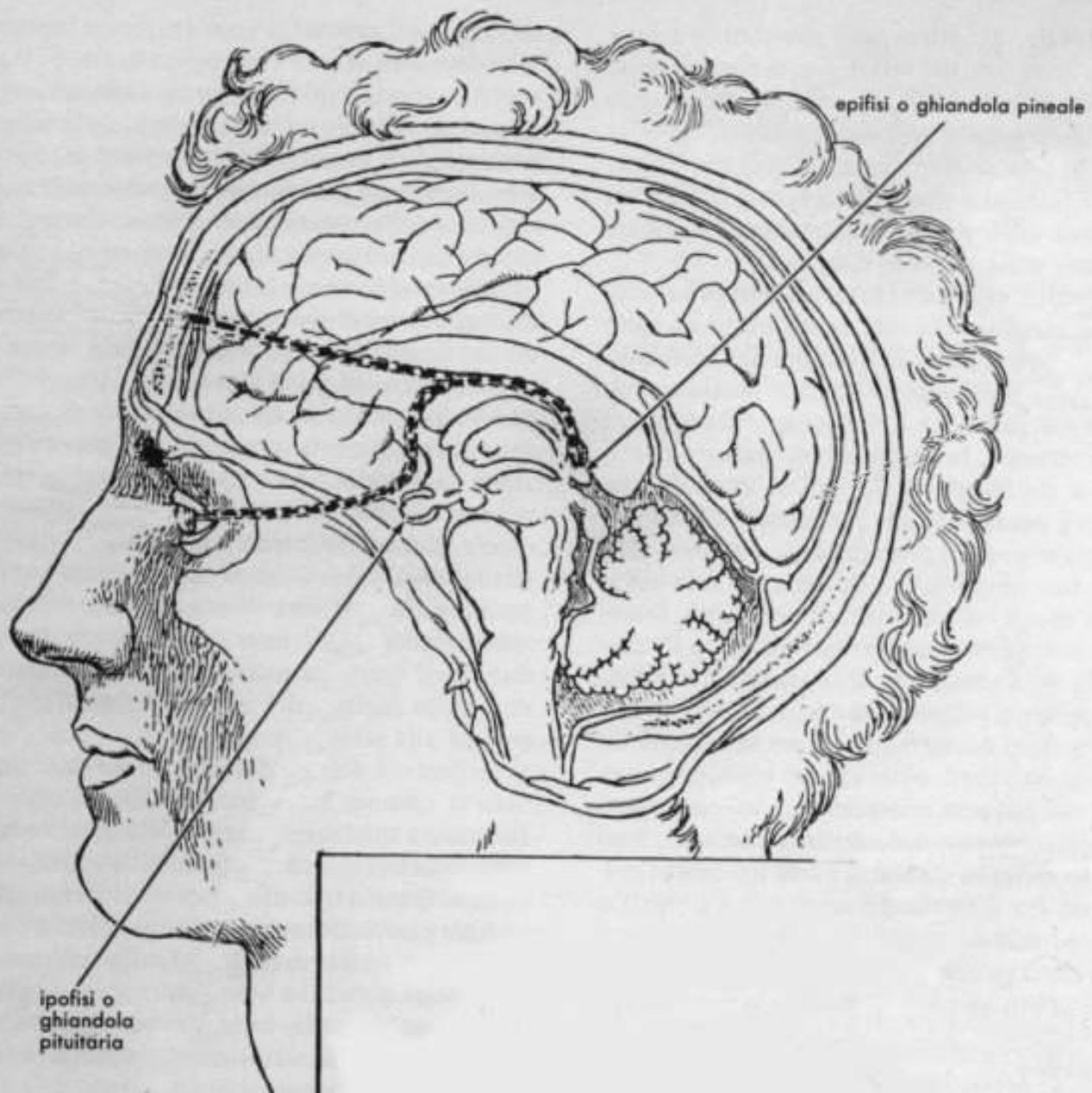
**SUZANNE LeVERT**











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ipofisi o  
ghiandola  
pituitaria

