

---

---

---

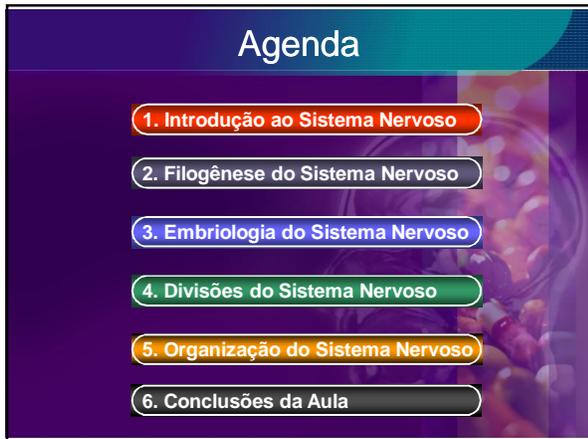
---

---

---

---

---



---

---

---

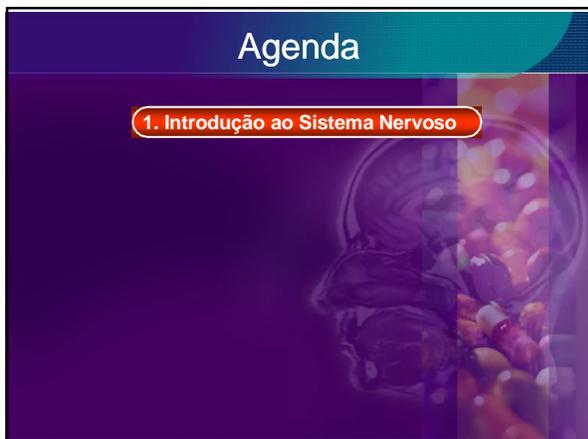
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

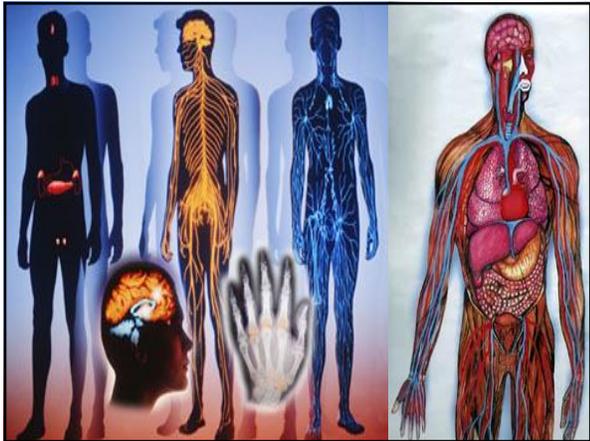
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



### Introdução

Sistema Endócrino	Sistema Nervoso
<ul style="list-style-type: none"><li>✓ Libera hormônios na corrente sanguínea</li><li>✓ Células alvo em todo organismo</li><li>✓ Provoca alterações metabólicas nos tecidos</li><li>✓ Obtenção da resposta de segundos até dias</li><li>✓ Efeito mais prolongado</li></ul>	<ul style="list-style-type: none"><li>✓ Impulsos elétricos através de neurônios</li><li>✓ Células alvo: músculos, glândulas, outros neurônios</li><li>✓ Provoca contração muscular, secreção glandular</li><li>✓ Resposta em milisegundos</li><li>✓ Efeito rápido</li></ul>



---

---

---

---

---

---

---

---

### Introdução

Sistema Endócrino	Sistema Nervoso
<ul style="list-style-type: none"><li>✓ Libera hormônios na corrente sanguínea</li><li>✓ Células alvo em todo organismo</li><li>✓ Provoca alterações metabólicas nos tecidos</li><li>✓ Obtenção da resposta de segundos até dias</li><li>✓ Efeito mais prolongado</li></ul>	<ul style="list-style-type: none"><li>✓ Impulsos elétricos através de neurônios</li><li>✓ Células alvo: músculos, glândulas, outros neurônios</li><li>✓ Provoca contração muscular, secreção glandular</li><li>✓ Resposta em milisegundos</li><li>✓ Efeito rápido</li></ul>



---

---

---

---

---

---

---

---

### Introdução

Sistema Endócrino	Sistema Nervoso
<ul style="list-style-type: none"><li>✓ Libera hormônios na corrente sanguínea</li><li>✓ Células alvo em todo organismo</li><li>✓ Provoca alterações metabólicas nos tecidos</li><li>✓ Obtenção da resposta de segundos até dias</li><li>✓ Efeito mais prolongado</li></ul>	<ul style="list-style-type: none"><li>✓ Impulsos elétricos através de neurônios</li><li>✓ Células alvo: músculos, glândulas, outros neurônios</li><li>✓ Provoca contração muscular, secreção glandular</li><li>✓ Resposta em milisegundos</li><li>✓ Efeito rápido</li></ul>



---

---

---

---

---

---

---

---

### Introdução



Papiro de Edwin Smith  
Egipto, 1600 aC



Cérebro



Imhotep

Trepanação para saída de maus espíritos

---

---

---

---

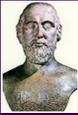
---

---

---

---

### Introdução



Alcmeon,  
Grécia  
560 - 500 aC

Primeira dissecação do cérebro

Impulsos nervosos conduzidos ao cérebro através de tubos que continham água e fogo.

---

---

---

---

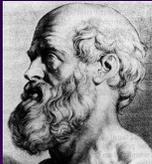
---

---

---

---

### Introdução



Hipócrates 400 a.C.

"o cérebro é dividido em 02 metades simétricas por uma membrana vertical, para onde convergem vários vasos delgados e 02 calibrosos: um originado no fígado e outro no baço"

---

---

---

---

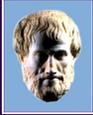
---

---

---

---

### Introdução



Aristóteles  
Grécia, 384-322 aC

Coração } **Inteligência**  
**Pensamento**

Cérebro } **Resfriamento sanguíneo**

Teoria Mentalista – A mente seria uma entidade extra-corpórea que controlaria o nosso comportamento e não o sistema nervoso (Kolb, 1998 – Neurociência do Comportamento)

---

---

---

---

---

---

---

---

### Introdução

Egito Antigo

Mumificação

Cérebro retirado pela narina e desprezado



---

---

---

---

---

---

---

---

### Introdução



Alexandria, Egito  
323 dC

Anatomia — Disciplina

Cérebro — sede da inteligência

---

---

---

---

---

---

---

---

### Introdução

Galeno 130-200

da Vinci 1472-1519

Vesalius 1514-1564

Descartes 1596-1650

---

---

---

---

---

---

---

---

### Introdução

Da Vinci

Vesalius

Descartes

Teoria Dualista – Mente e Cérebro – ligados pela pineal

---

---

---

---

---

---

---

---

### Introdução

Século XVIII

Microscopia do Sistema Nervoso

---

---

---

---

---

---

---

---

### Introdução

- Vida: Vegetativo x Relacional
- Peso: 3% do peso corpóreo
- Tamanho: menor sistema do corpo humano
- Função: manutenção da homeostase



---

---

---

---

---

---

---

---

### Introdução

IRRITABILIDADE



---

---

---

---

---

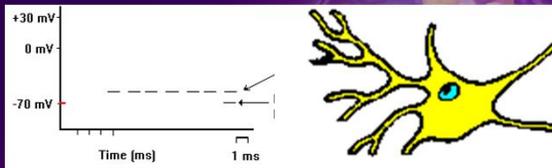
---

---

---

### Introdução

IRRITABILIDADE



---

---

---

---

---

---

---

---

### Introdução

CONDUTIBILIDADE



A photograph showing a hand holding a glowing pink ball in a levitating ball game. The ball is suspended in the air by a magnetic field, and the hand is positioned to catch it. The background is a dimly lit room.

---

---

---

---

---

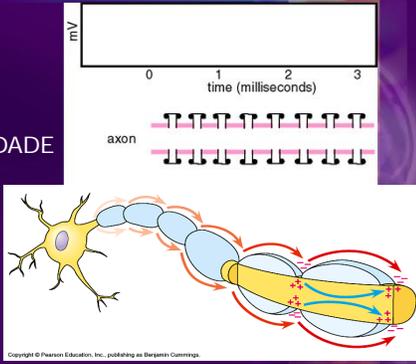
---

---

---

### Introdução

CONDUTIBILIDADE



The diagram illustrates an action potential on an axon. It shows a graph of membrane potential (mV) over time (milliseconds) from 0 to 3. The graph shows a sharp rise in potential followed by a sharp fall. Below the graph, an axon is shown with arrows indicating the direction of the action potential. A neuron is also shown with its axon extending to the axon. The text 'Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.' is visible at the bottom.

---

---

---

---

---

---

---

---

### Introdução

CONTRATILIDADE



A black and white photograph of a person sitting on a gym machine, possibly a leg press or similar exercise equipment. The person is wearing a white tank top and shorts. The background shows a gym setting with other equipment.

---

---

---

---

---

---

---

---

### Introdução

O sistema nervoso coordena todas as atividades do organismo; integra sensações e idéias; congrega fenômenos de consciência e adapta o organismo às condições de momento.

É formado por elementos altamente diferenciados em excitabilidade e condutibilidade, as **CÉLULAS NERVOSAS**, e por diferentes elementos de sustentação e função trófica que, em conjunto, constituem a **NEUROGLIA**

Eros Abrantes Erhart

---

---

---

---

---

---

---

---

### Introdução

O Sistema Nervoso nos permite:

**Sentir**  **Mover-se**  **Pensar** 

---

---

---

---

---

---

---

---

### Introdução

➤ **FUNÇÕES:**

- Coordena todas as atividades orgânicas
- Coordena todas as vísceras
- Integra as atividades orgânicas
- Integra o meio interno com o meio externo

---

---

---

---

---

---

---

---

## Agenda

**2. Filogênese do Sistema Nervoso**

---

---

---

---

---

---

---

---

## Filogênese

... "a chave para o entendimento da complexa anatomia do encéfalo adulto, é entender como ele se desenvolve"

**Martin**

**Ontogenia**

*Desenvolvimento de um indivíduo desde a concepção até a idade adulta.*

**Filogenia**

*História evolutiva de uma espécie ou qualquer outro grupo taxonômico*

---

---

---

---

---

---

---

---

## Filogênese

(a) *Hydra* (cnidarian)

Nerve net

(b) *Sea star* (echinoderm)

Radial nerve  
Nerve ring

(c) *Planarian* (flatworm)

Eye  
Brain  
Nerve cord  
Transverse nerve

(d) *Leech* (annelid)

Brain  
Ventral nerve cord  
Segmental ganglion

(e) *Insect* (arthropod)

Brain  
Ventral nerve cord  
Ganglia

(f) *Chiton* (mollusk)

Anterior nerve ring  
Longitudinal nerve cords  
Ganglia

(g) *Squid* (mollusk)

Brain  
Giant axon

(h) *Salamander* (chordate)

Brain  
Spinal cord (dorsal nerve cord)  
Sensory ganglion

Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

---

---

---

---

---

---

---

---

### Filogênese

AMEBA



---

---

---

---

---

---

---

---

### Filogênese

PORÍFEROS

Célula Muscular Primitiva



---

---

---

---

---

---

---

---

### Filogênese

CELENERADOS

Dispositivo Neuromuscular



**Primeiros animais com SN**  
**Células em cadeia**  
**Sem controle central**

---

---

---

---

---

---

---

---

## Filogênese

**ANELÍDEOS** Arco Reflexo Intra-segmentar

Nervous system of the annelid (earthworm)

© 2002 Encyclopædia Britannica, Inc.

---

---

---

---

---

---

---

---

## Filogênese

**Desenvolvimento das espécies**

↓

**Surgimento dos vertebrados**

↓

**SN complexo**  
Estojo ósseo de proteção  
Divisão: encéfalo e medula

↓

**Encefalização**

TUBARÃO SALAMANDRA LAGARTO GATINHO MACACO HOMEM

---

---

---

---

---

---

---

---

## Filogênese

**HOMEM** Arco Reflexo Intra-Segmentar

FIGURE 12.19 Reflex Arc

---

---

---

---

---

---

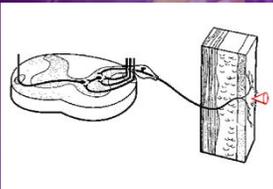
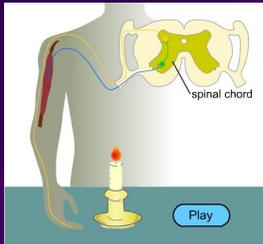
---

---

### Filogenese

HOMEM

Arco Reflexo Inter-Segmentar



spinal chord

Play

---

---

---

---

---

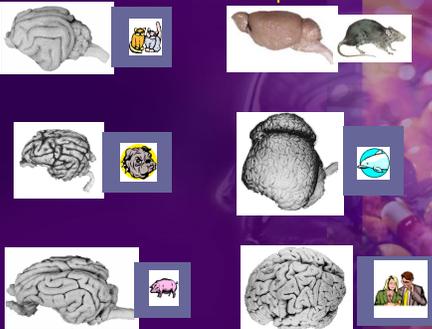
---

---

---

### Filogenese

Neuroanatomia Comparada



---

---

---

---

---

---

---

---

### Agenda

3. Embriologia do Sistema Nervoso

---

---

---

---

---

---

---

---

### Embriologia

**The Human Embryo** —



This movie has been "constructed" from the Kyoto collection of human Carnegie stages. The embryo on this current page is actual size for stage 23.

**Cell Biology Lab**  
Anatomy, UNSW ©M.A. Hill

---

---

---

---

---

---

---

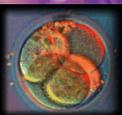
---

### Embriologia

**FECUNDAÇÃO**  
1 dia pós-ovulação  
0,1-0,15 mm



**1ª DIVISÃO - BLASTOMEROS**  
2 dias pós-fecundação  
0,1-0,2 mm  
3 dias pós-fec: mórula



**BLASTOCISTO**  
4 dias pós-fecundação  
0,1-0,2 mm



---

---

---

---

---

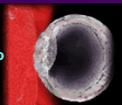
---

---

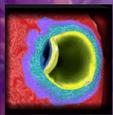
---

### Embriologia

**IMPLANTAÇÃO**  
6-7 dias pós-fecundação  
0,1-0,2 mm



**IMPLANTAÇÃO COMPLETA**  
8-13 dias pós-fecundação  
0,1-0,2 mm



---

---

---

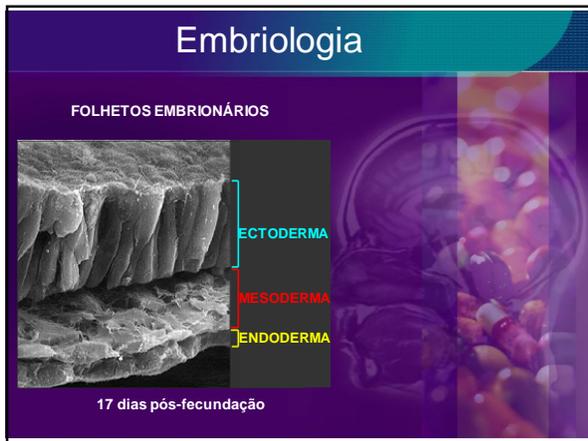
---

---

---

---

---



---

---

---

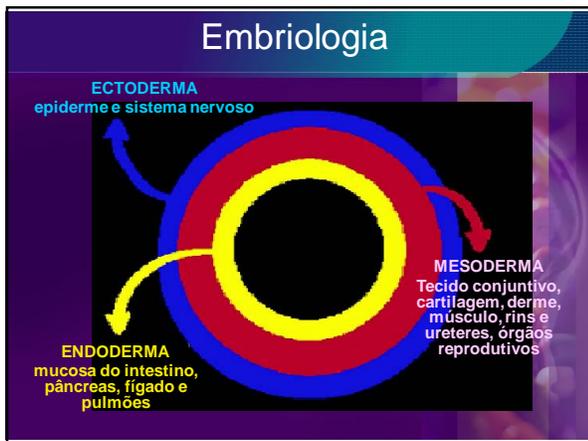
---

---

---

---

---



---

---

---

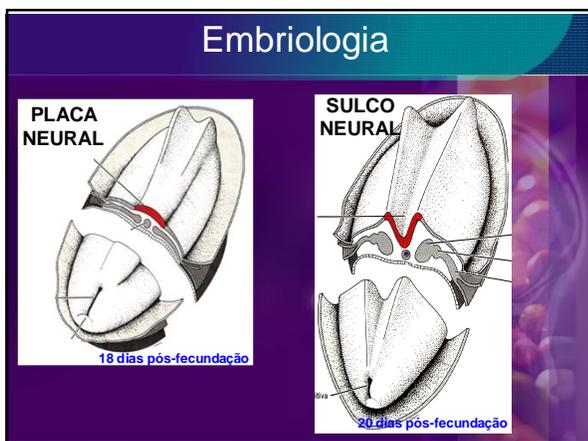
---

---

---

---

---



---

---

---

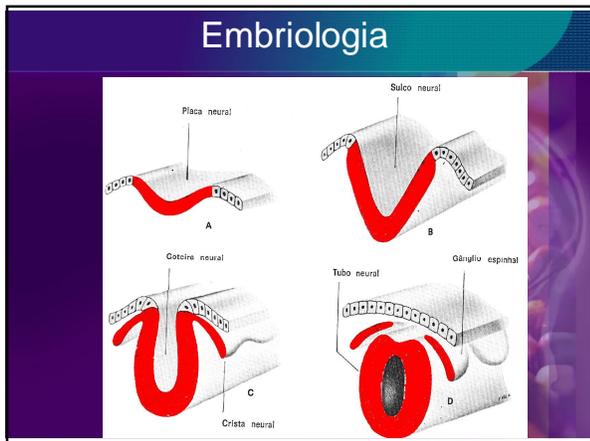
---

---

---

---

---



---

---

---

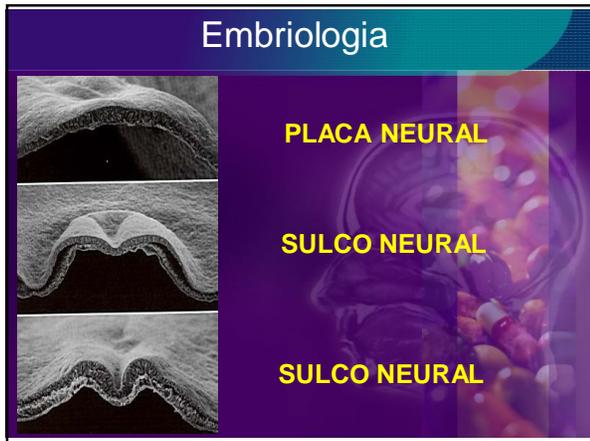
---

---

---

---

---



---

---

---

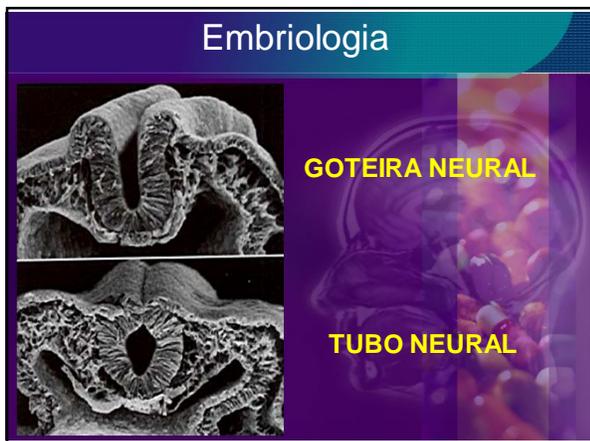
---

---

---

---

---



---

---

---

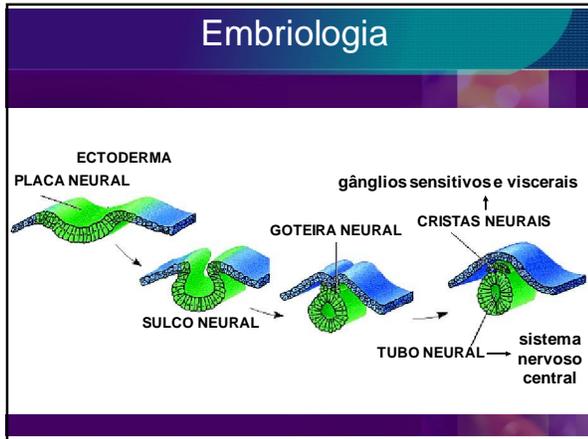
---

---

---

---

---



---

---

---

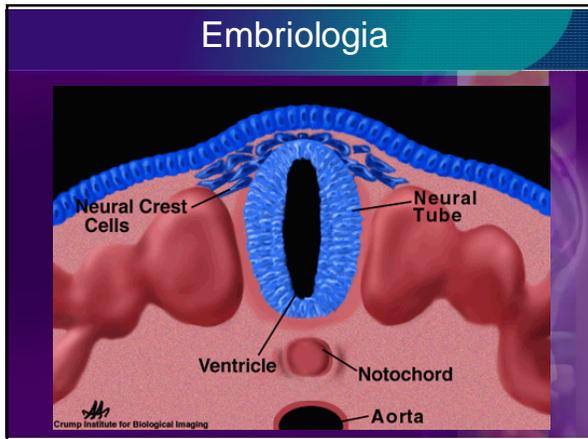
---

---

---

---

---



---

---

---

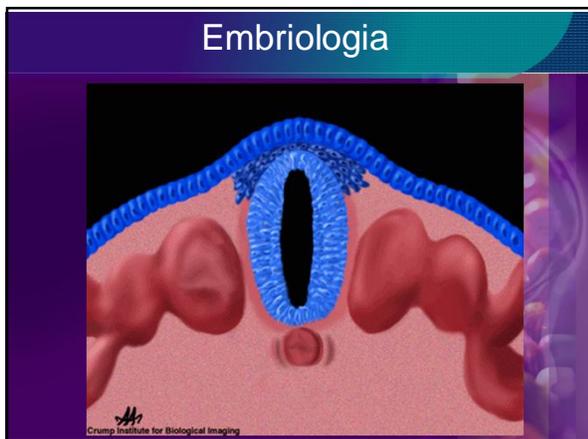
---

---

---

---

---



---

---

---

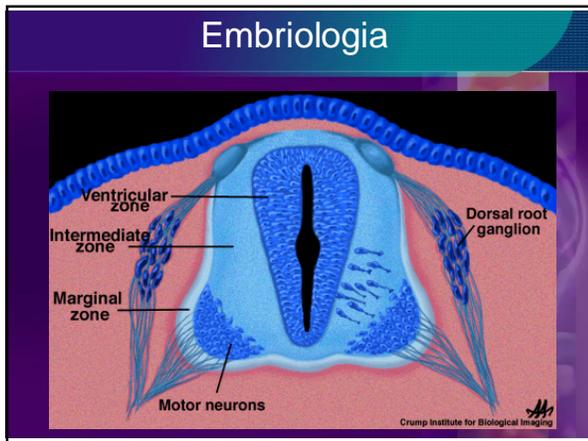
---

---

---

---

---




---

---

---

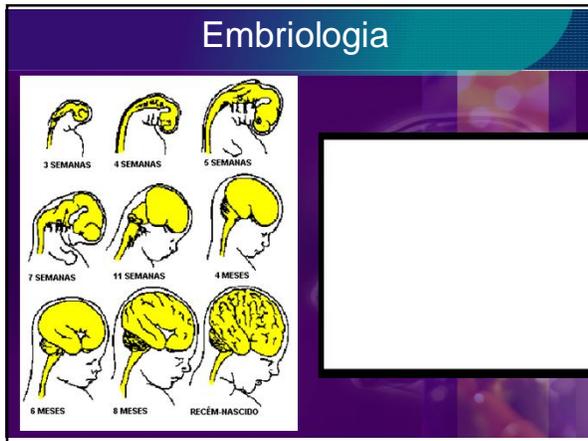
---

---

---

---

---




---

---

---

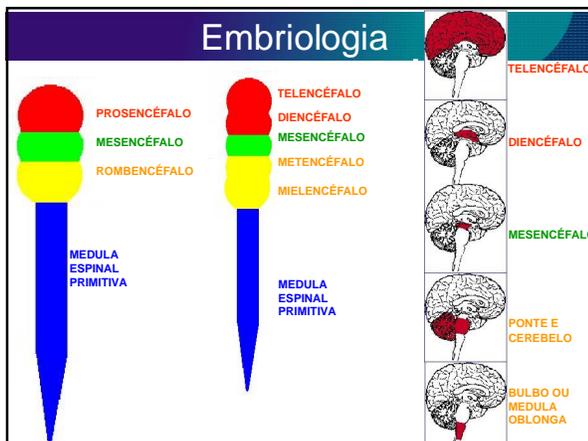
---

---

---

---

---




---

---

---

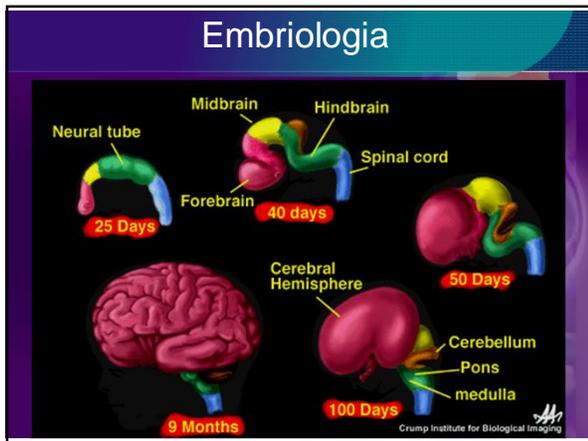
---

---

---

---

---



---

---

---

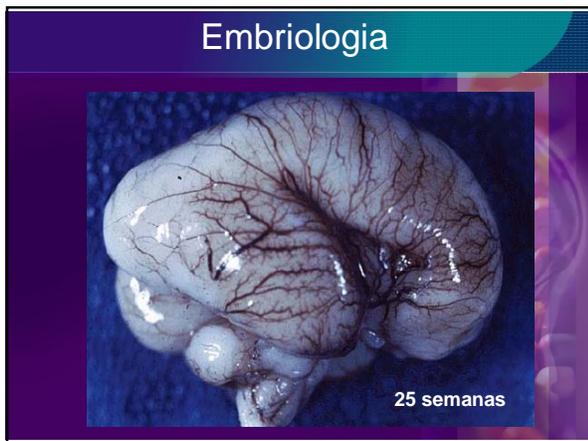
---

---

---

---

---



---

---

---

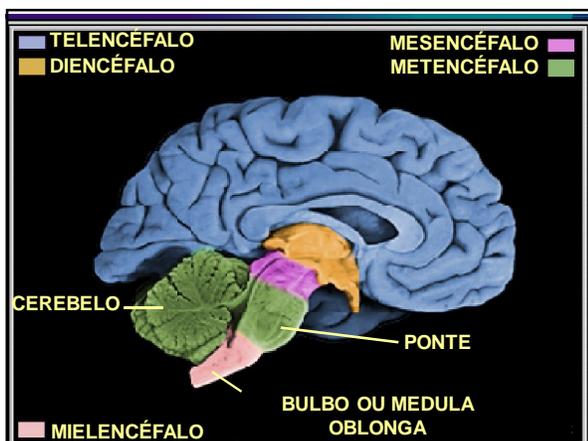
---

---

---

---

---



---

---

---

---

---

---

---

---

## Agenda



**4. Divisões do Sistema Nervoso**

---

---

---

---

---

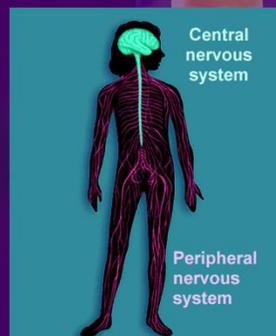
---

---

---

## Divisões do Sistema Nervoso

**CRITÉRIO ANATÔMICO**



Central nervous system

Peripheral nervous system

---

---

---

---

---

---

---

---

## Divisões do Sistema Nervoso

SISTEMA NERVOSO CENTRAL (ENCÉFALO)	ENCÉFALO (S.N. SUPRASEGMENTAR)	TELENCEFALO (MEMBRÊNCOS COERENÇA)	CORTEX (CAMADAS)	U
				Q
				S
				CENTRO CEREBRAL
				BRANCO MEDULAR
				S
				NÚCLEOS DA BASE
				TALAMUS
				DENCEFALO
				DIENCEFALO
TRONCO ENCEFÁLICO	MESENFÉALO			
TRONCO ENCEFÁLICO	PONTE			
TRONCO ENCEFÁLICO	BULBO			
TRONCO ENCEFÁLICO	CEREBELO			
SISTEMA NERVOSO PERIFÉRICO	MEDULA ESPINHAL (S.N. SEGMENTAR)	RAÍZES NERVIOSAS	NERVOS PERIFÉRICOS	RECEPTORES PERIFÉRICOS
				CRANIANOS
				ESPINHAIS
				NERVOS PERIFÉRICOS
				CRANIANOS
				ESPINHAIS
				NERVOS PERIFÉRICOS
				CRANIANOS
				ESPINHAIS
				NERVOS PERIFÉRICOS
CRANIANOS				

**Quadro 1**

---

---

---

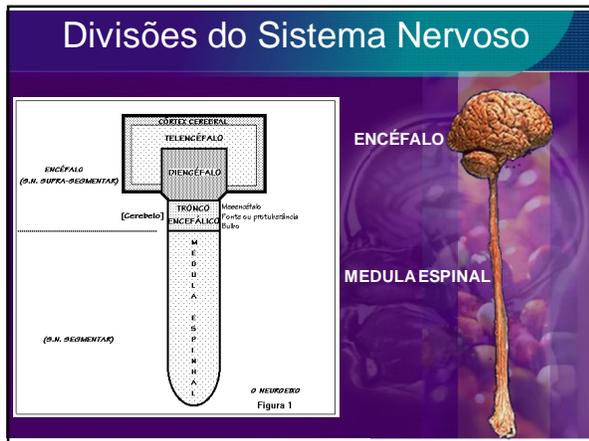
---

---

---

---

---



---

---

---

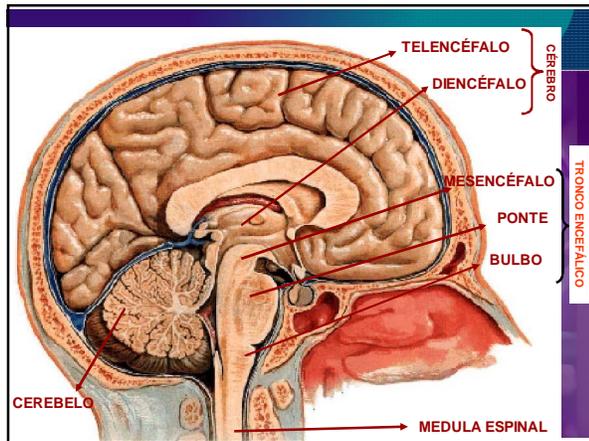
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

### Divisões do Sistema Nervoso

#### CRITÉRIO FUNCIONAL

SISTEMA NERVOSO SOMÁTICO

- PORÇÃO AFERENTE (SENSITIVA)
- PORÇÃO EFERENTE (MOTORA)

SISTEMA NERVOSO VISCERAL

- PORÇÃO AFERENTE (SENSITIVA)
- PORÇÃO EFERENTE (MOTORA)

SISTEMA NERVOSO AUTÔNOMO

- S.N. SIMPÁTICO
- S.N. PARASSIMPÁTICO

---

---

---

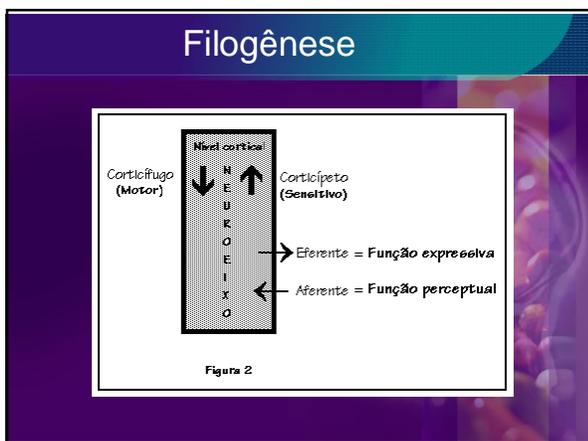
---

---

---

---

---



---

---

---

---

---

---

---

---