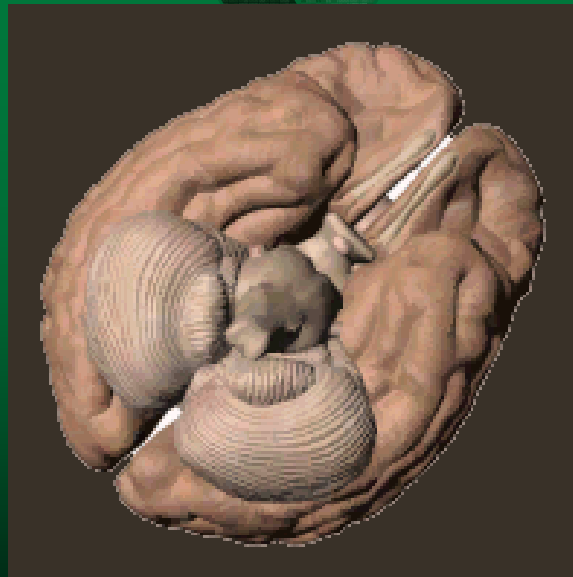


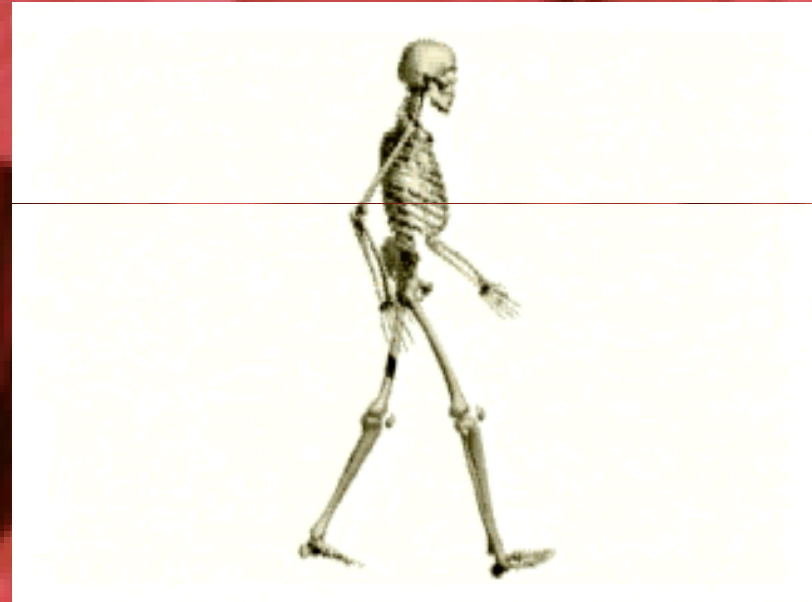
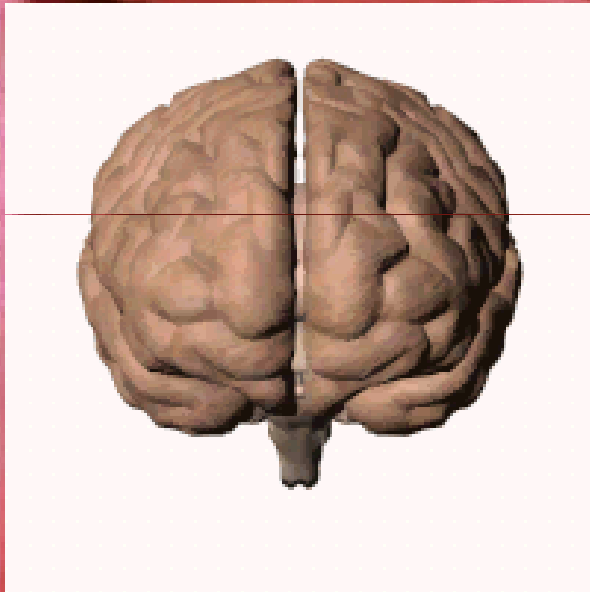
OTAK DAN OLAHRAGA

Dr. dr. BM Wara Kushartanti



Yogyakarta, 14 Maret 2011

HUBUNGAN TIMBAL BALIK OTAK ↔ OLAHRAGA



Otak berhubungan timbal balik dengan olahraga

MEMUKUL BOLA GOLF

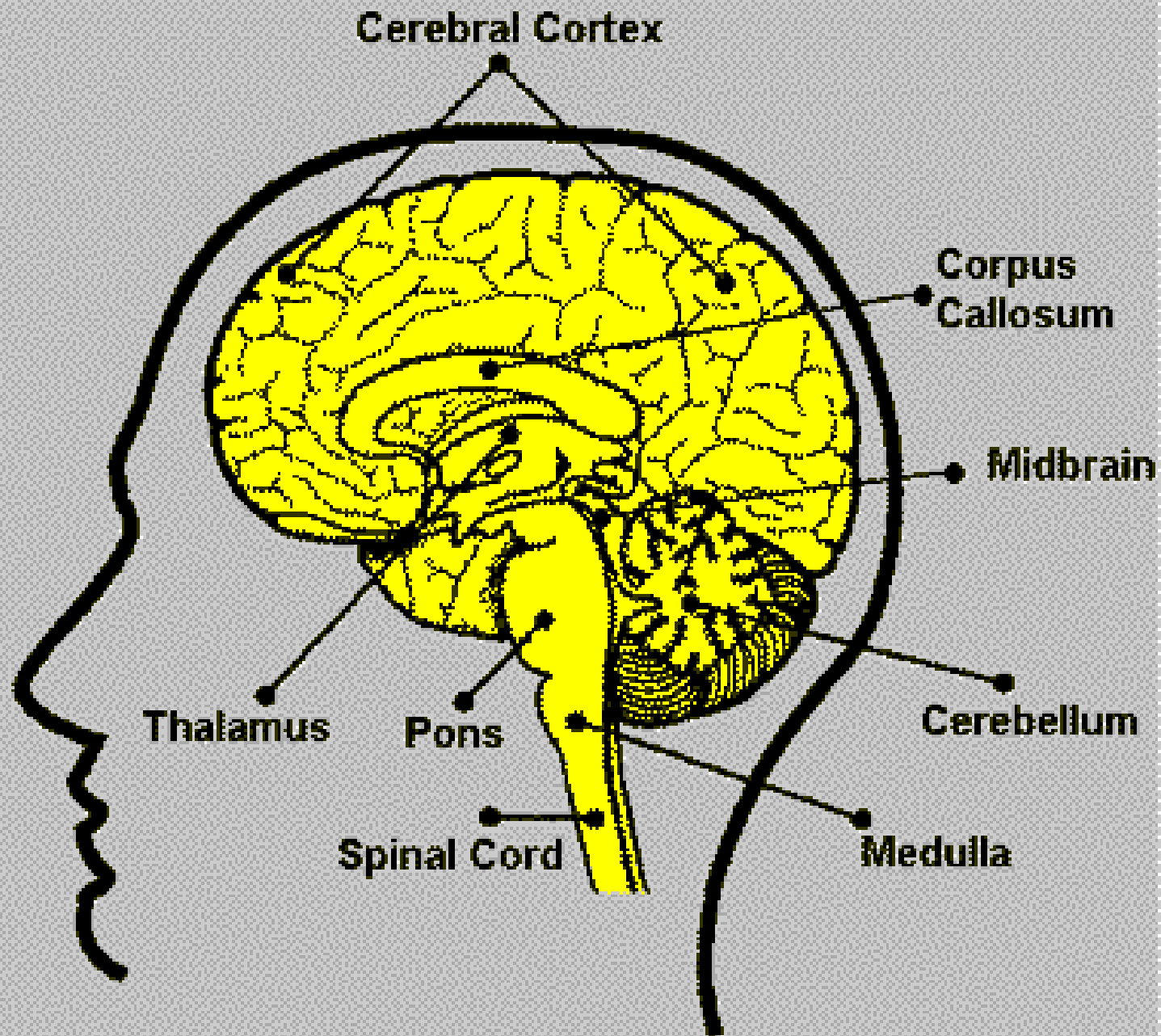
KEMANA? SEBERAPA KUAT?



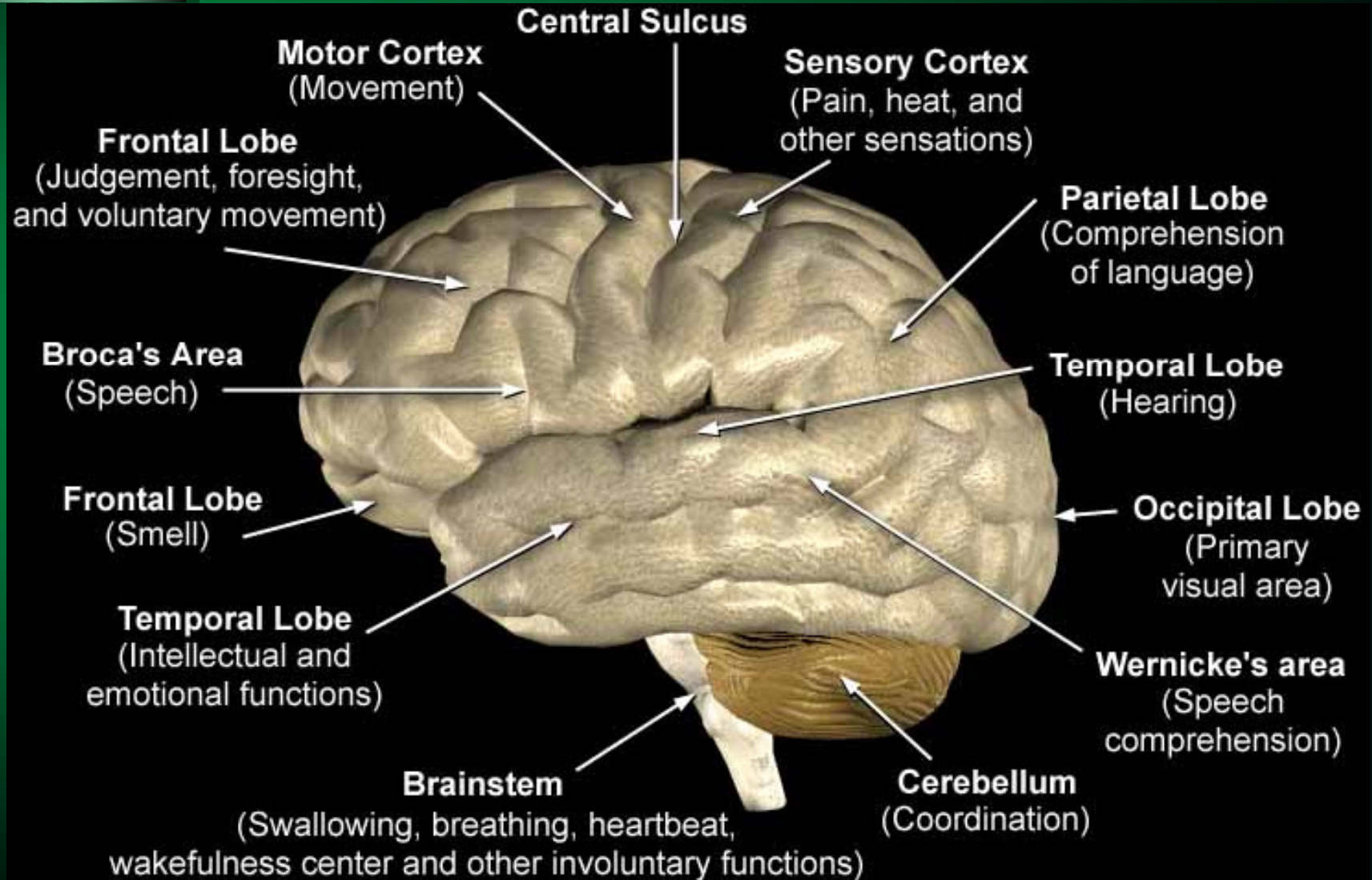
ALTERNATIF:

1. LANGSUNG KE LUBANG
ATAU MENDEKAT DULU?
2. SEBERAPA KUAT
SEHINGGA SAMPAI KE
TEMPAT YANG DIINGINKAN
3. TENANG, FOKUS,
BAYANGKAN
4. EKSEKUSI DENGAN
MANTAP

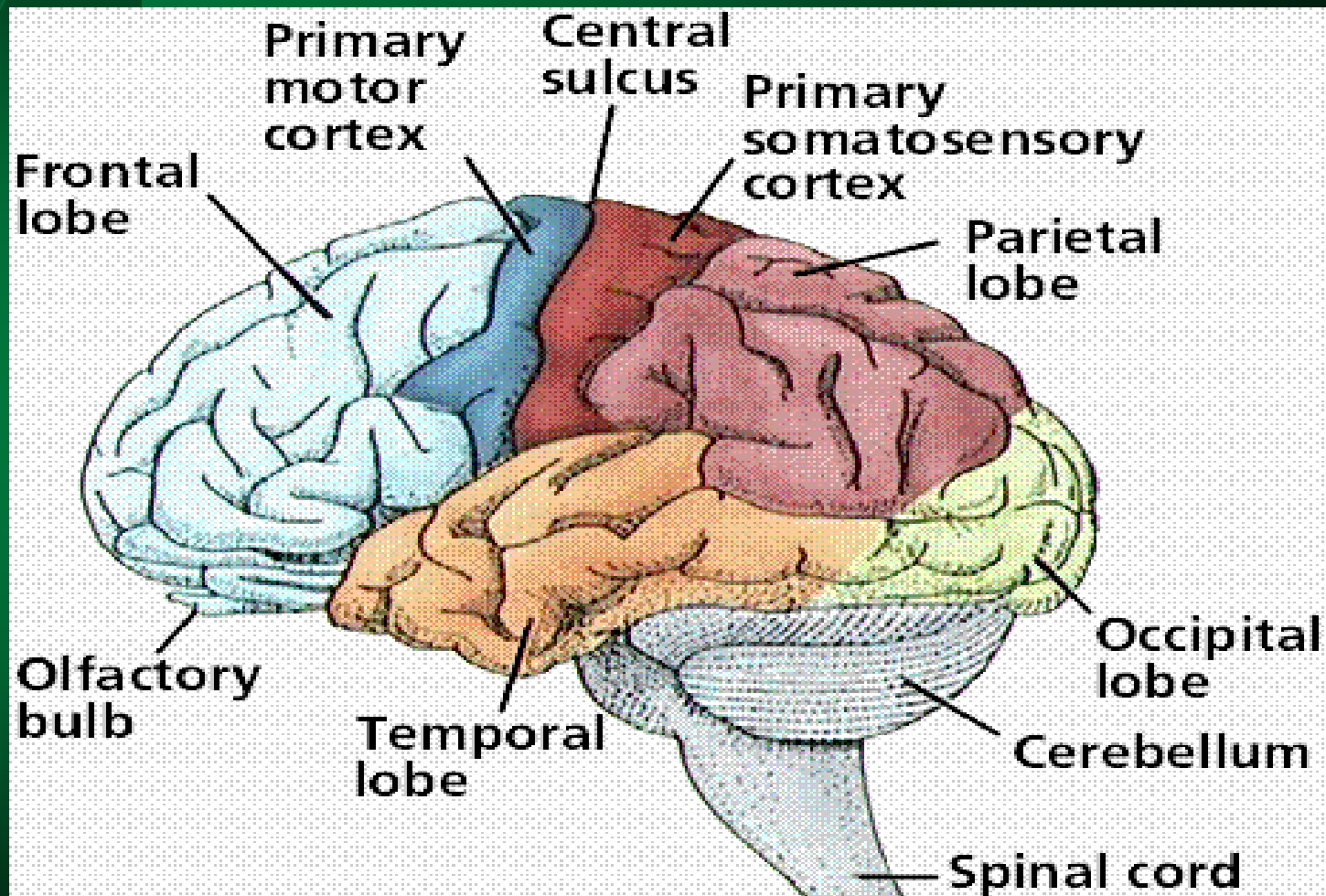




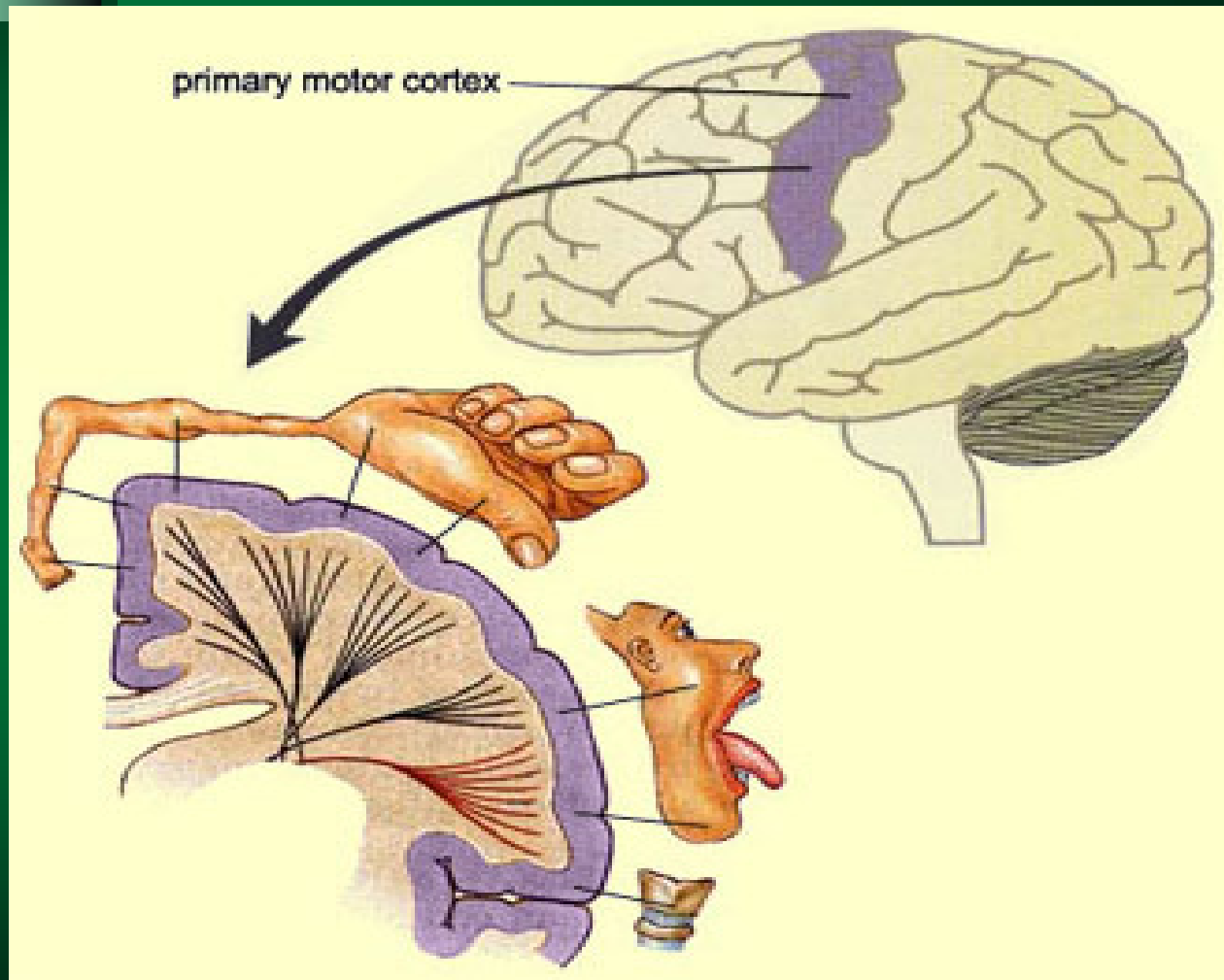
CONTROL CENTER OF BRAIN



LOBUS-LOBUS OTAK

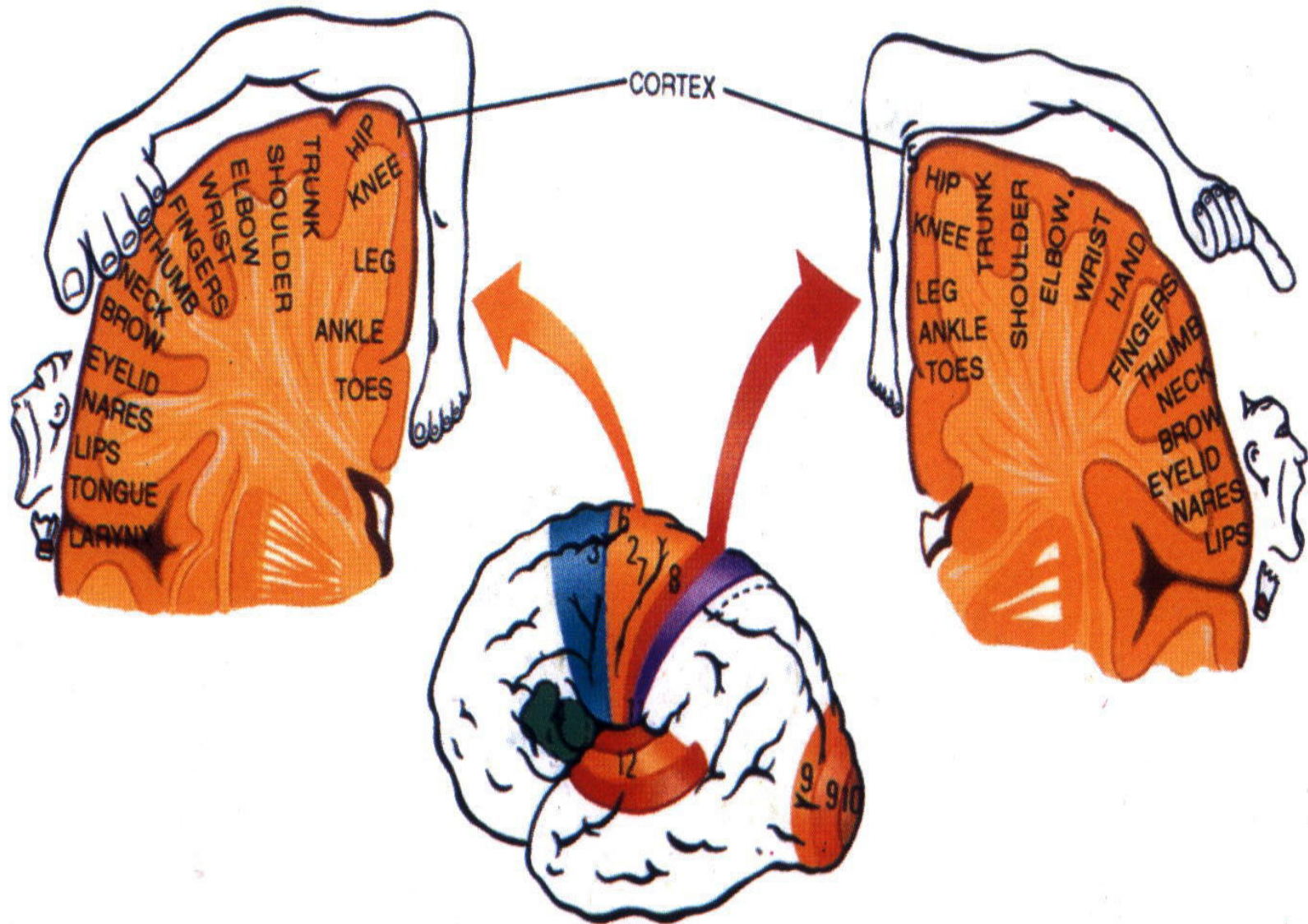


HOMUNCULUS CEREBRI

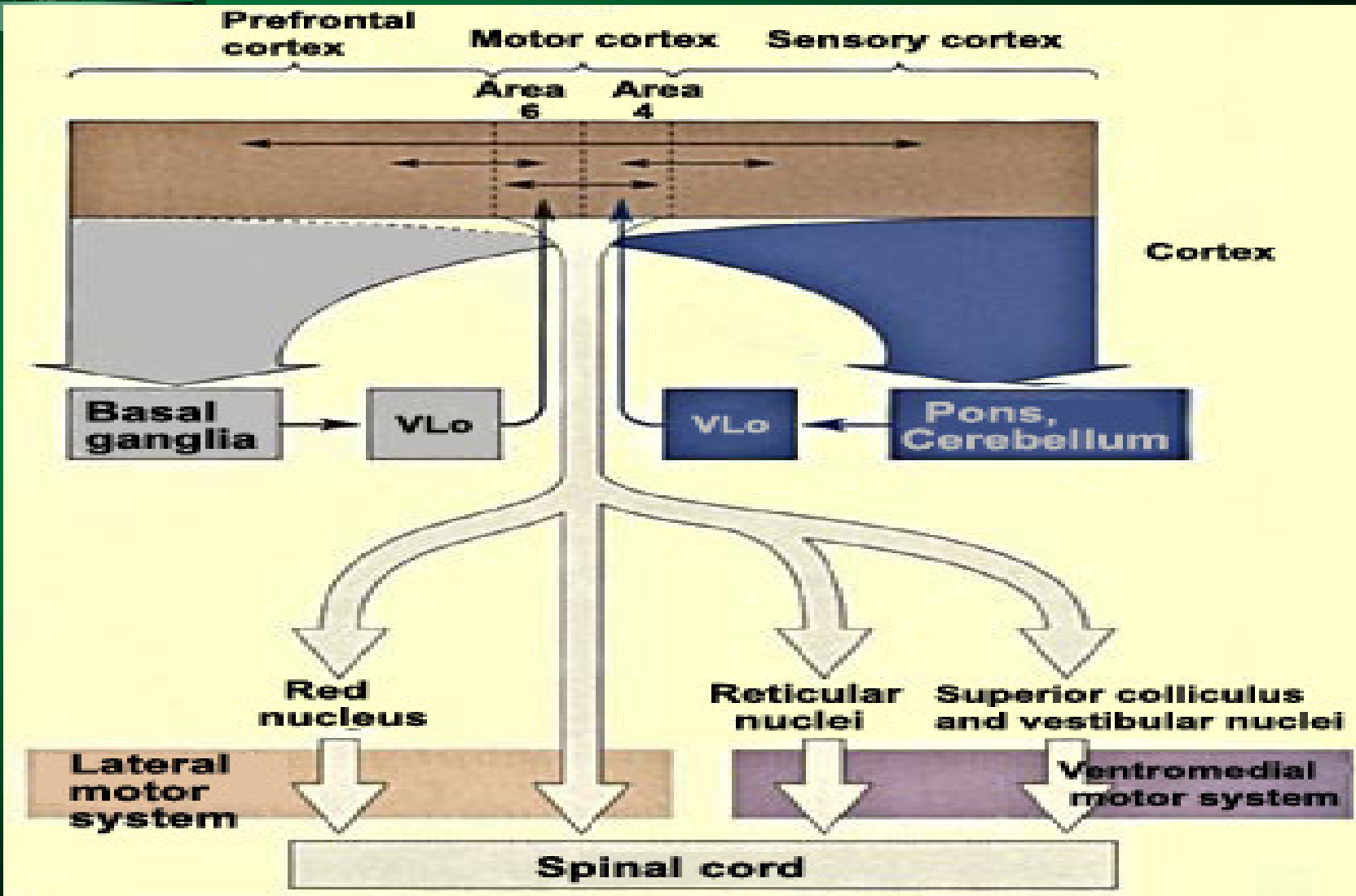


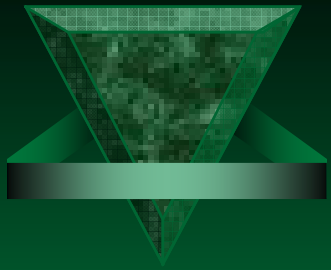
MOTOR ACTIVITY

SENSORY ACTIVITY

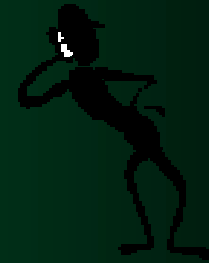


Kontrol Gerak (motor control)



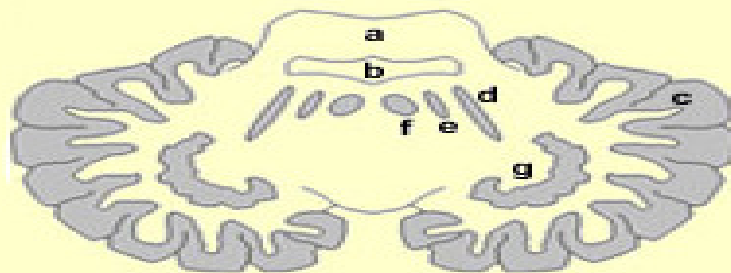
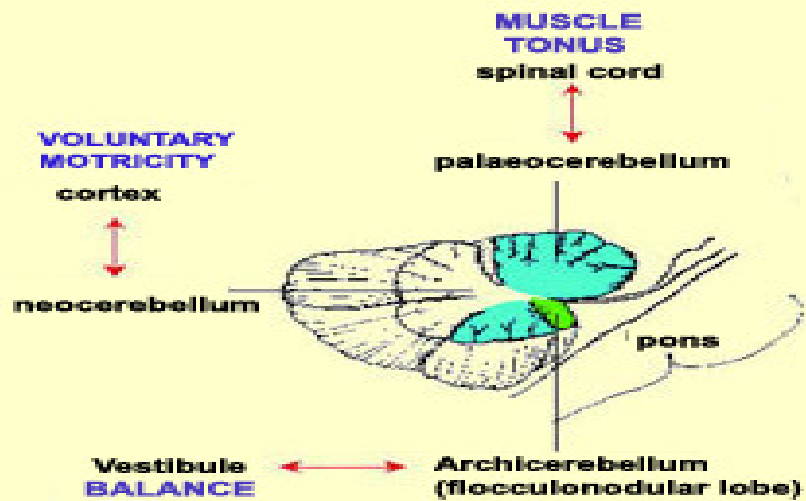


Cerebellum



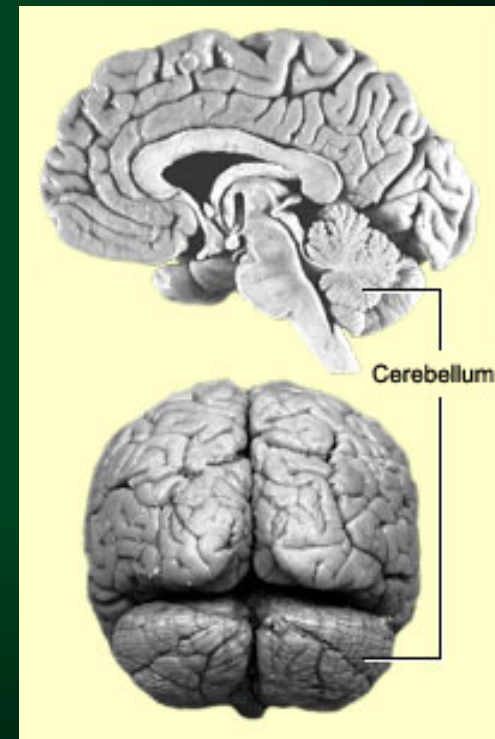
- ✓ Terletak di bawah lobus occipital
- ✓ Dihubungkan ke otak melalui pedunculus cerebri.
- ✓ **Fungsi:** gerakan (movement), keseimbangan (balance), postur (posture).

Otak Kecil

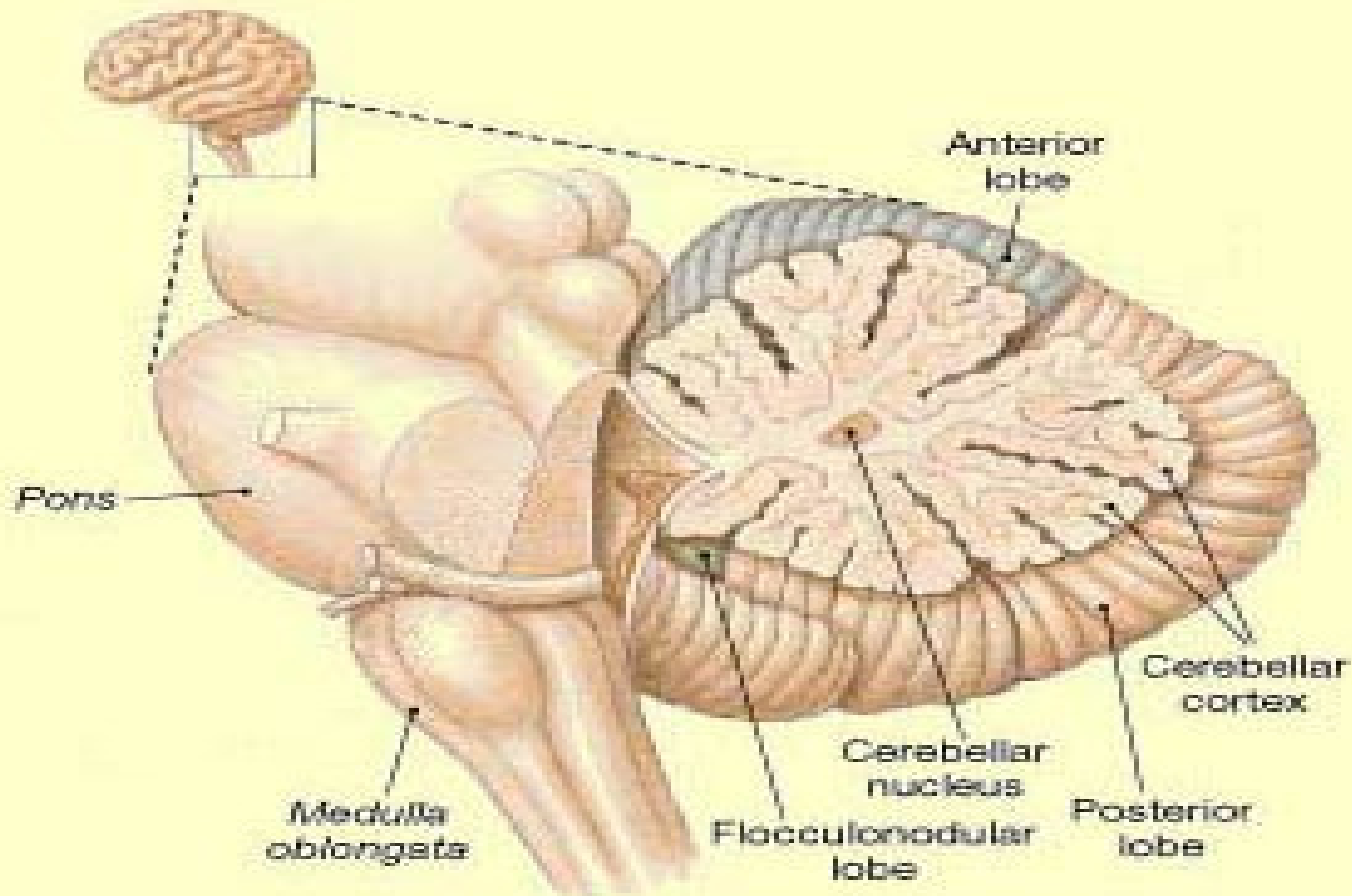


Horizontal section of cerebellum

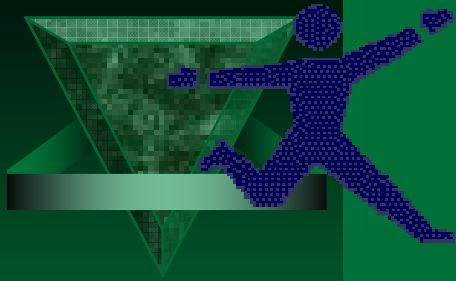
- a: pons
- b: cavity of 4th ventricle
- c: cerebellar cortex
- d: emboliform nucleus
- e: globose nucleus
- f: fastigial nucleus
- g: dentate nucleus



OTAK BELAKANG



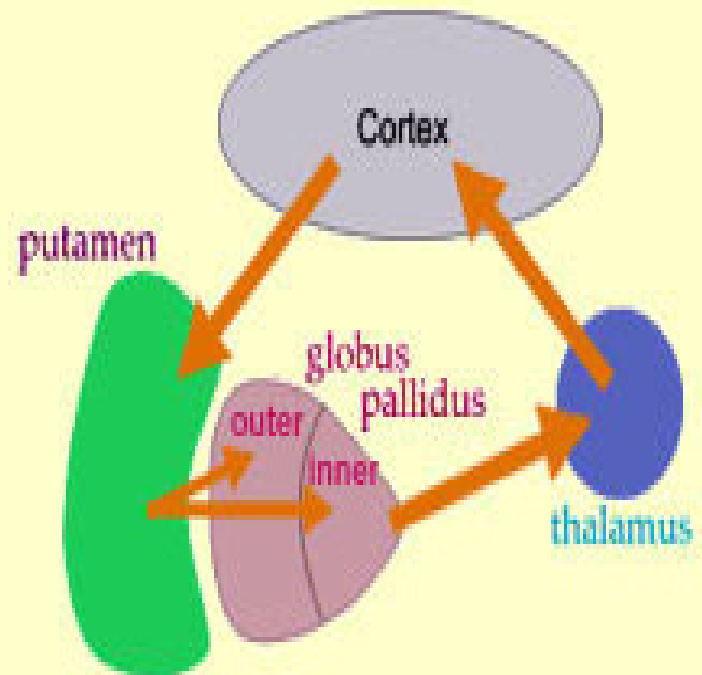
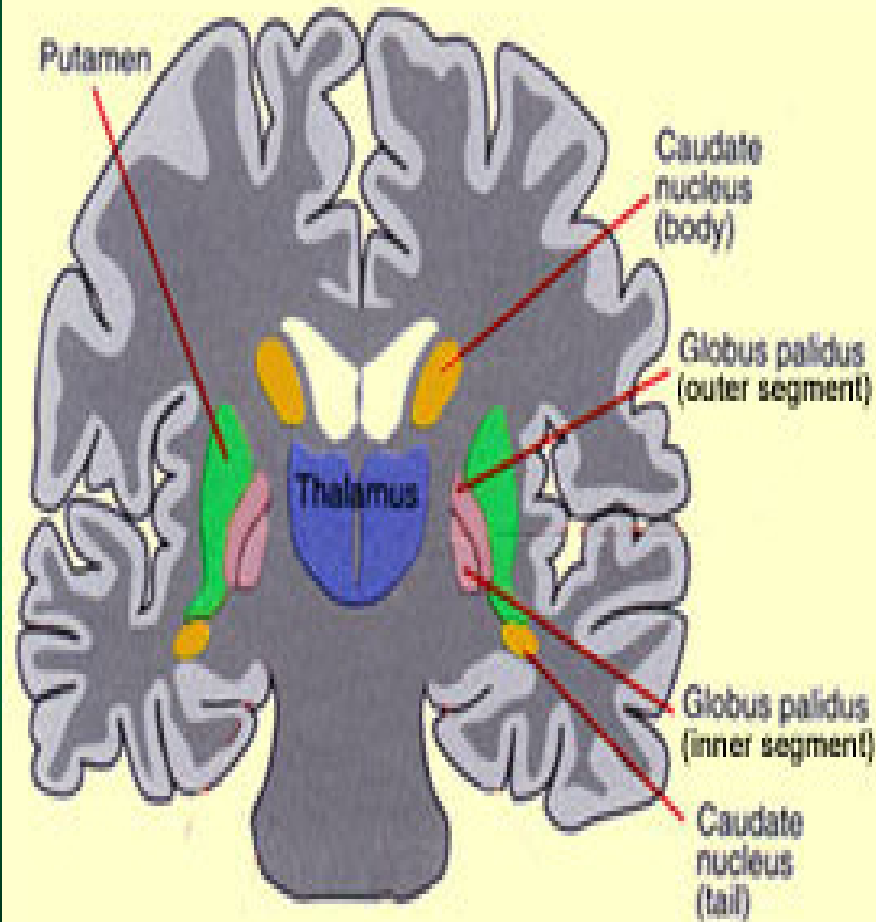
Sagittal section



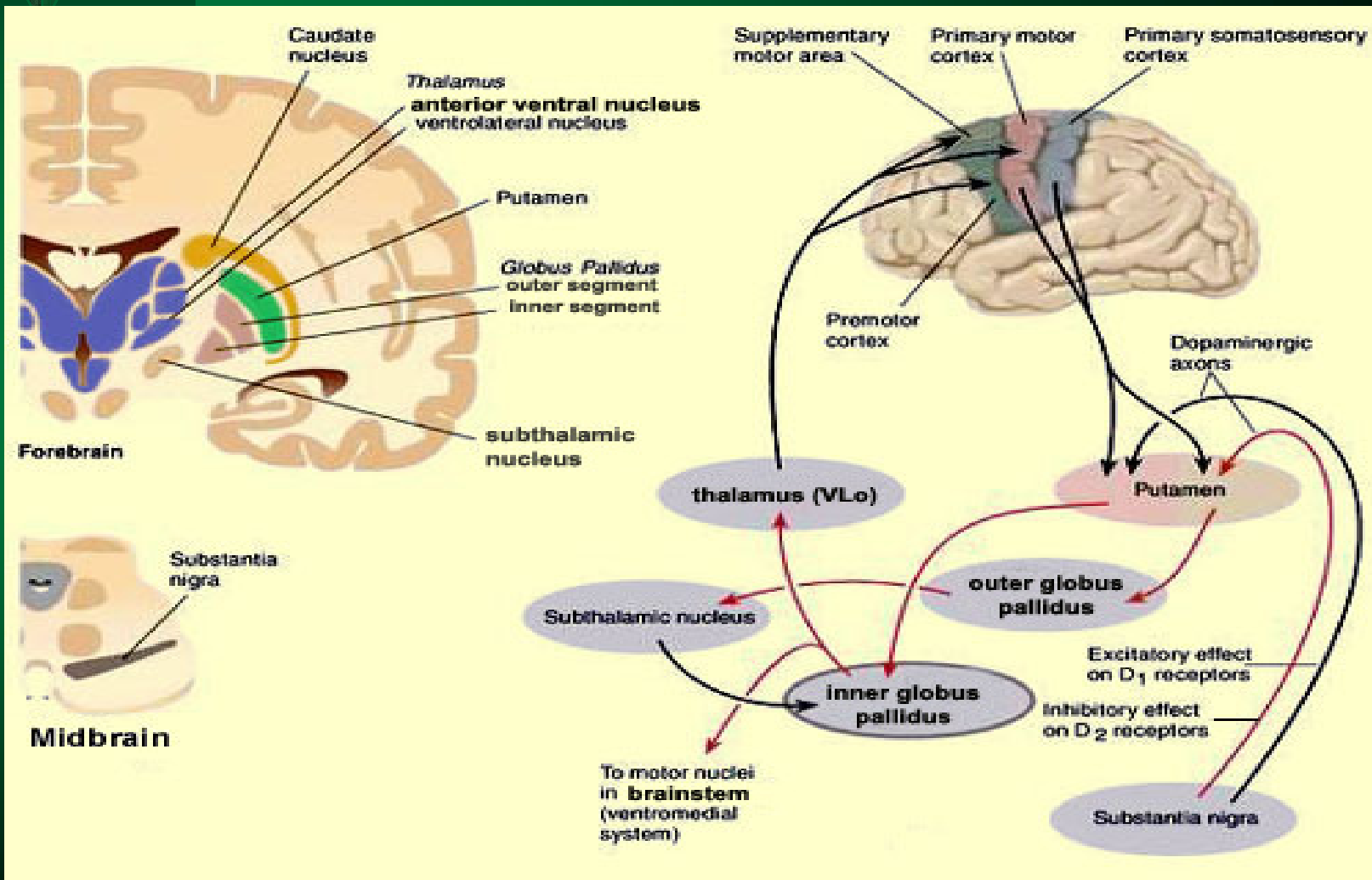
Ganglia Basalis

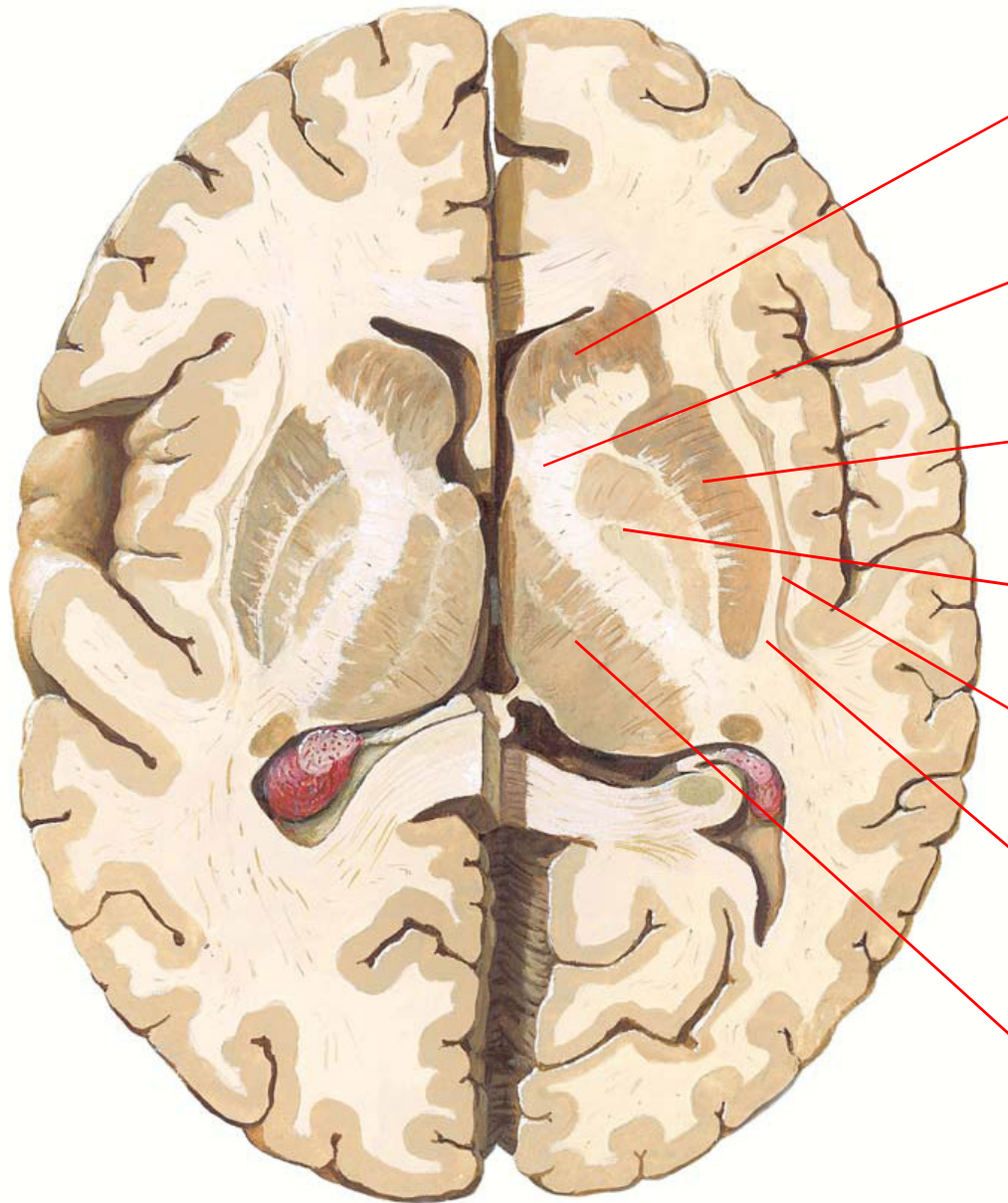
- ✔ Terdiri dr kumpulan badan sel saraf, terletak di bagian dalam masing-masing belahan otak.
- ✔ Bagian yg penting: nukleus caudatus, putamen, & globus palidus.
- ✔ Fungsi: mengontrol aktivitas otot, memperkuat aktivitas motorik ml sirkuit-sirkuit yg memberi umpan balik pd korteks motorik.

GANGLIA BASALIS



Ganglia Basalis





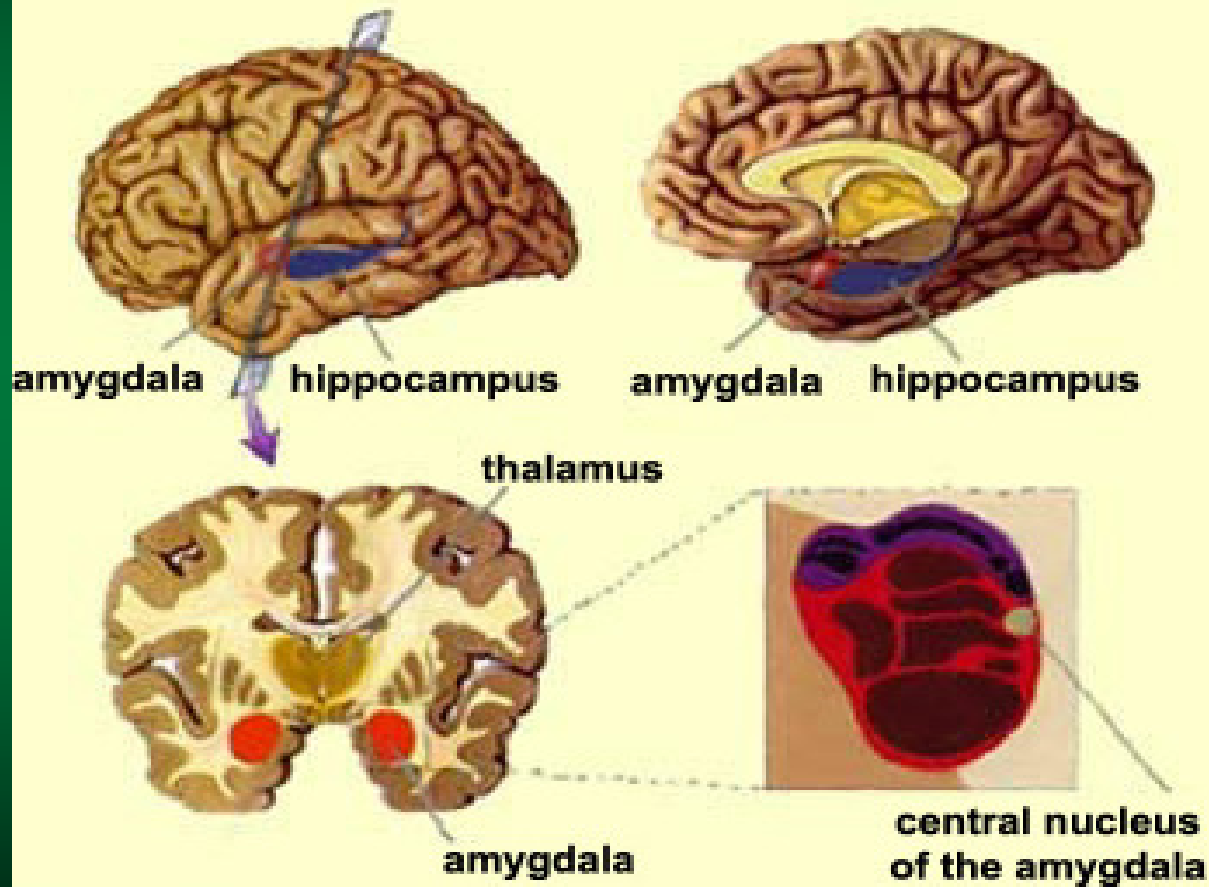
1. Nucleus caudatus
2. Capsula interna
3. Putamen
4. Globus palidus
5. Claustrum
6. Capsula externa
7. Thalamus



Sistem Limbik

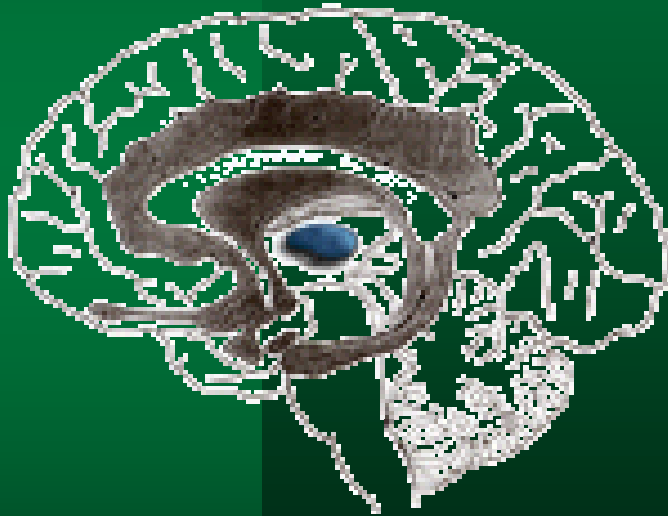
- ✓ Membatasi cerebrum & diencephalon, terutama mengelilingi hipotalamus
- ✓ Fungsi: mengontrol emosi & perilaku
- ✓ Amigdala: pusat ingatan 'emosi'
- ✓ Hipokampus: pusat ingatan rasional → menyimpan memori rasional, terutama ingatan jangka pendek.

AMIGDALA & HIPOKAMPUS



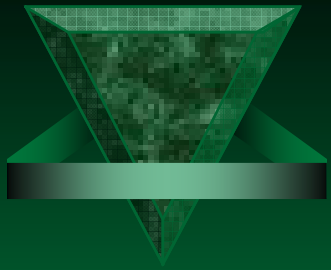


THALAMUS



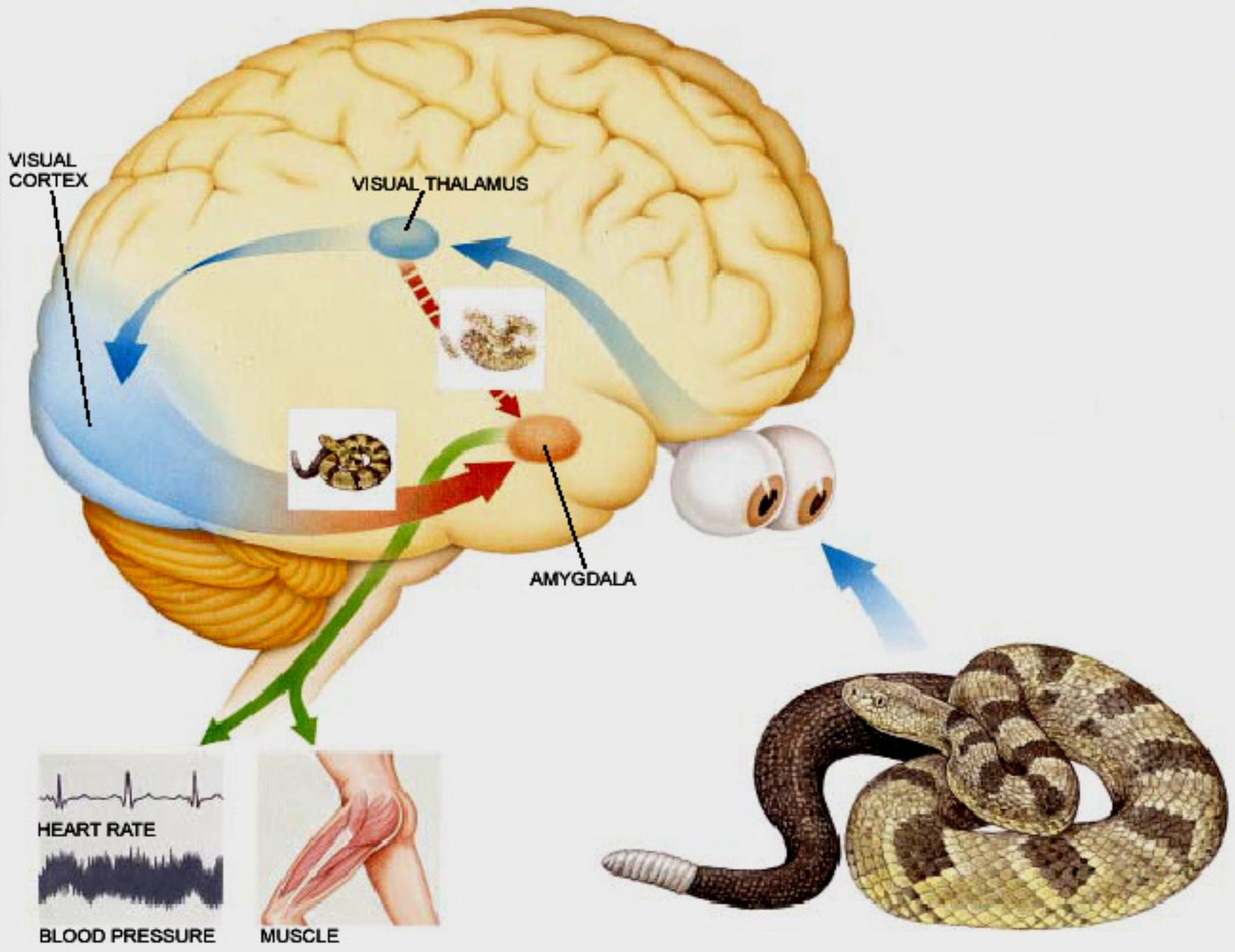
HIPOTHALAMUS



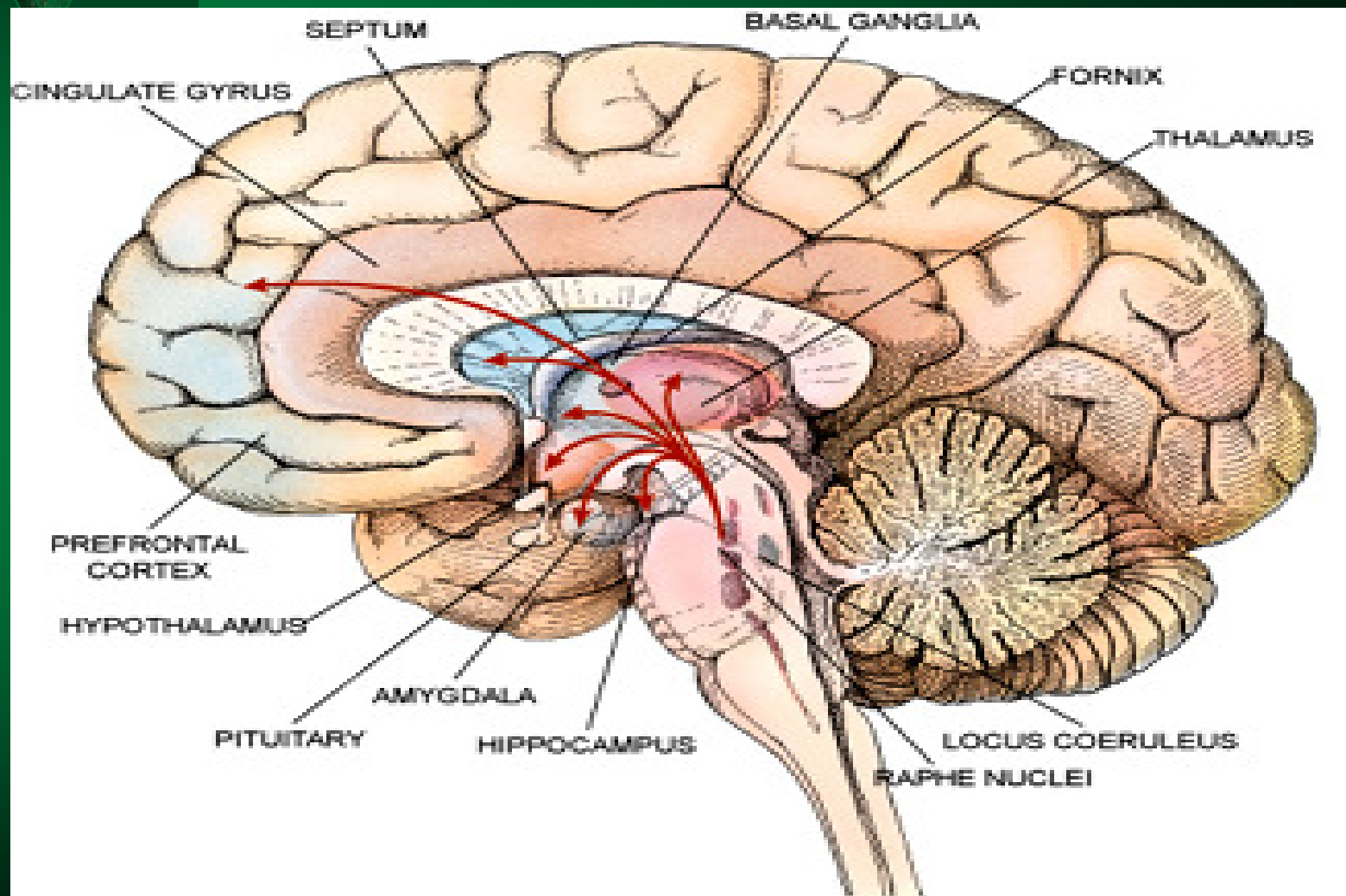


Diencephalon

- ✓ **Thalamus**: menyalurkan informasi yg masuk otak ke bagian-bagian lain di otak. Fungsinya analisis sensoris (tempat persimpangan saraf-saraf sensoris yg menuju otak).
- ✓ **Hipotalamus**: pusat rasa lapar, kenyang, perilaku seksual. Mengatur keseimbangan tubuh: suhu, tekanan darah, denyut jantung.

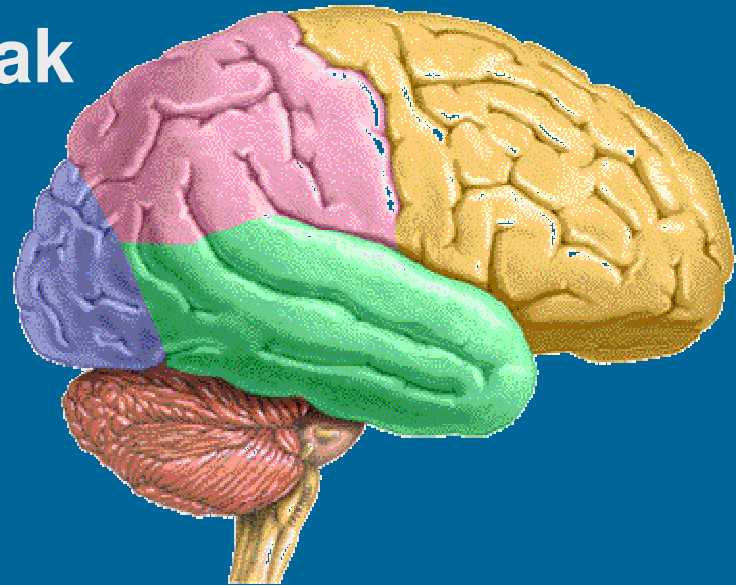


MIRROR NEURONS



Peran Olahraga untuk Optimalisasi Otak

- ✓ Menyeimbangkan otak kanan-kiri
- ✓ Mendukung pengendalian emosi
- ✓ Memperbaiki daya ingat dan sirkulasi darah

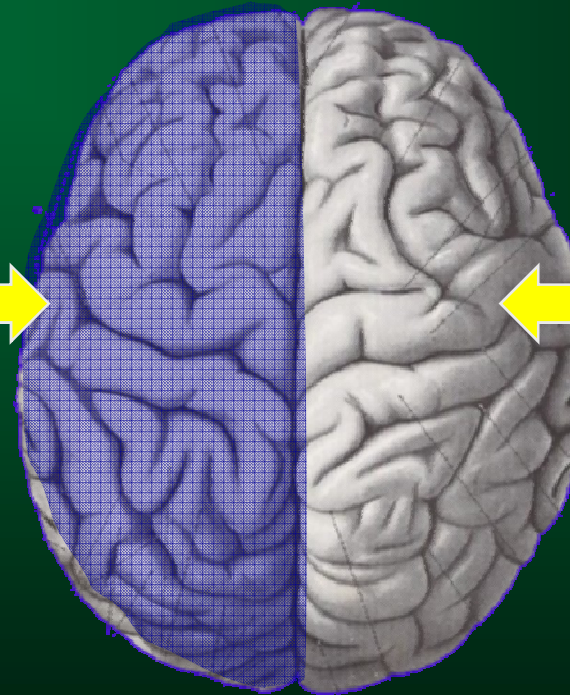




KESEIMBANGAN OTAK KANAN-KIRI

Otak Kiri

- **Logika**
- **Kata/bahasa**
- **Matematika**
- **Urutan**



Otak Kanan

- **Musik**
- **Gambar**
- **Warna**
- **Imajinasi**
- **Kreativitas**





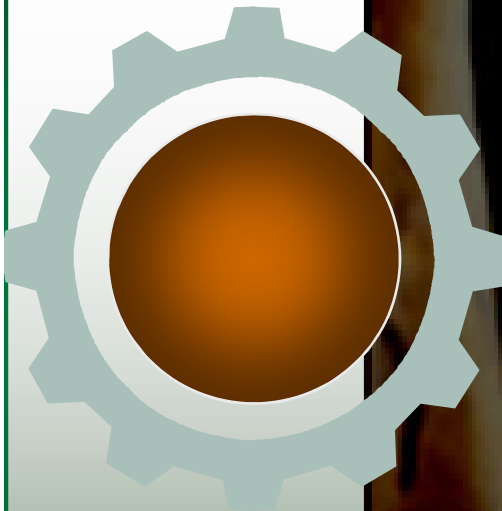
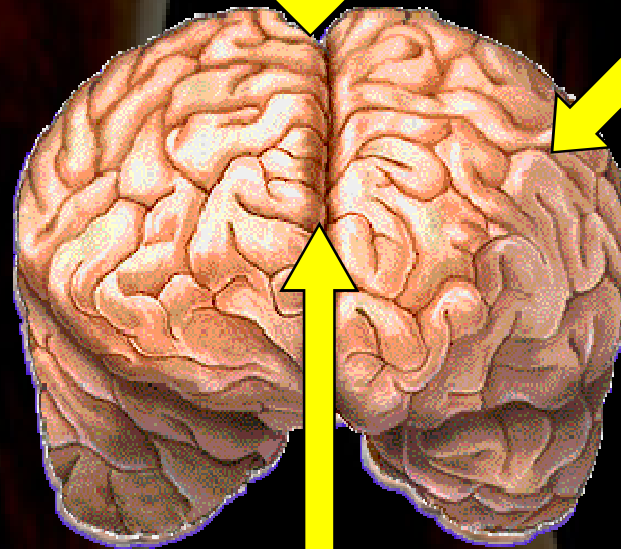
Potongan Otak Vertikal

Fissura Longitudinalis

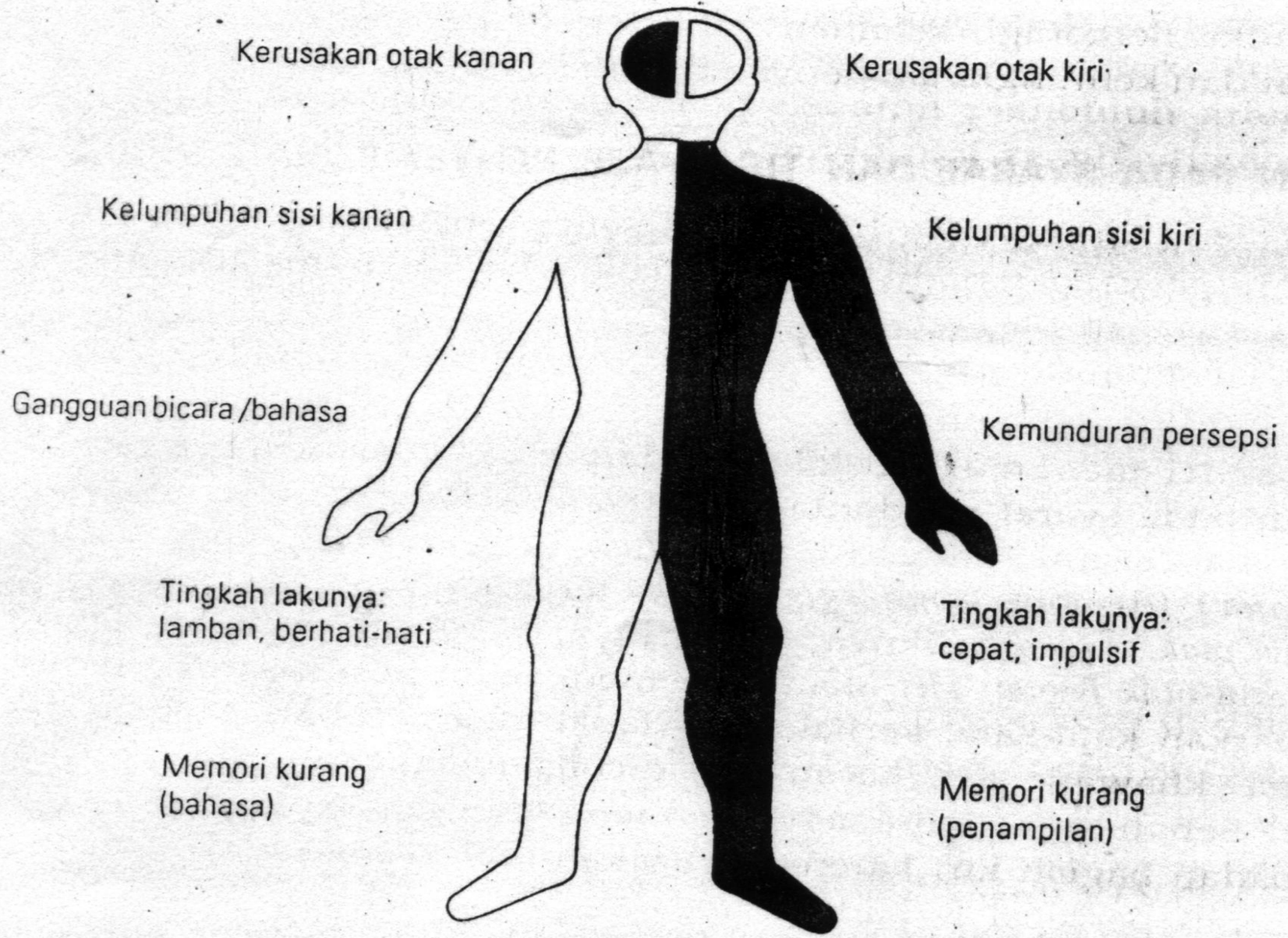
cortex cerebri

- Sensorik
- Asosiasi
- Motorik

corpus callosum



STROKE ?

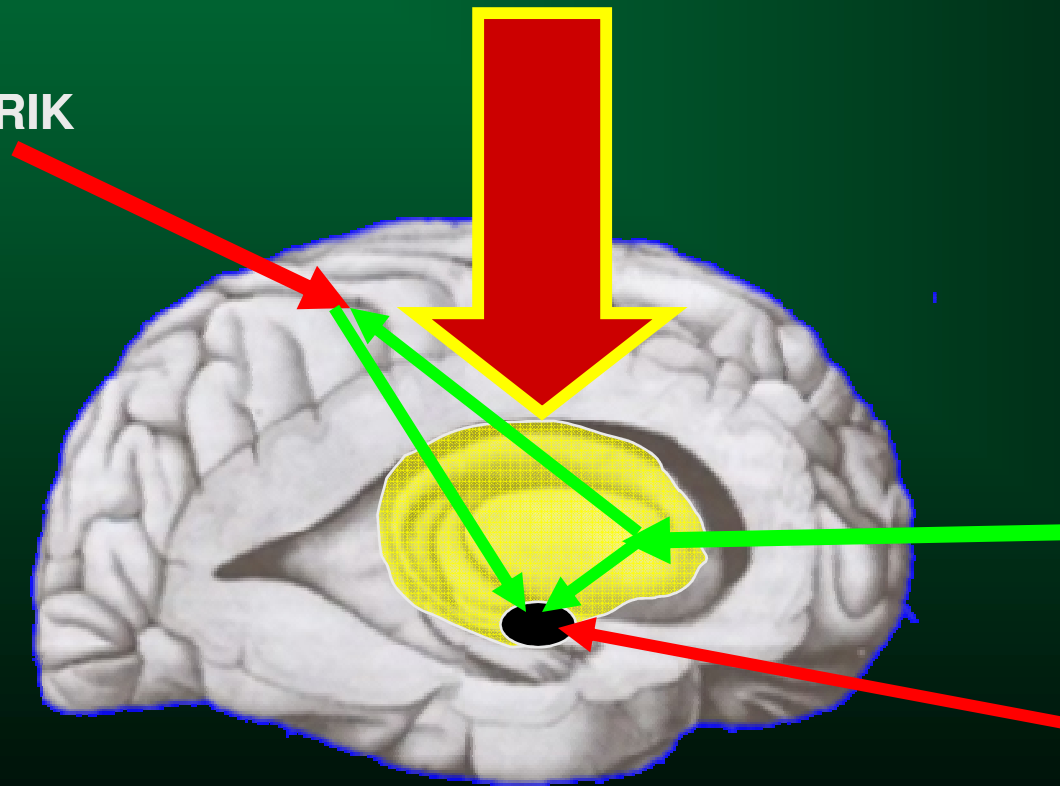




PENGENDALIAN EMOSI

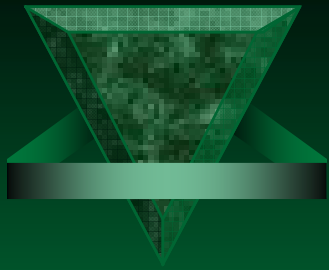
Sistem Limbik Sebagai Pusat Emosi

AREA MOTORIK



THALAMUS

AMYGDALA



GELOMBANG OTAK



13 – 35 Hz BETA



7 – 13 Hz ALFA



3,5 – 7 Hz TETA

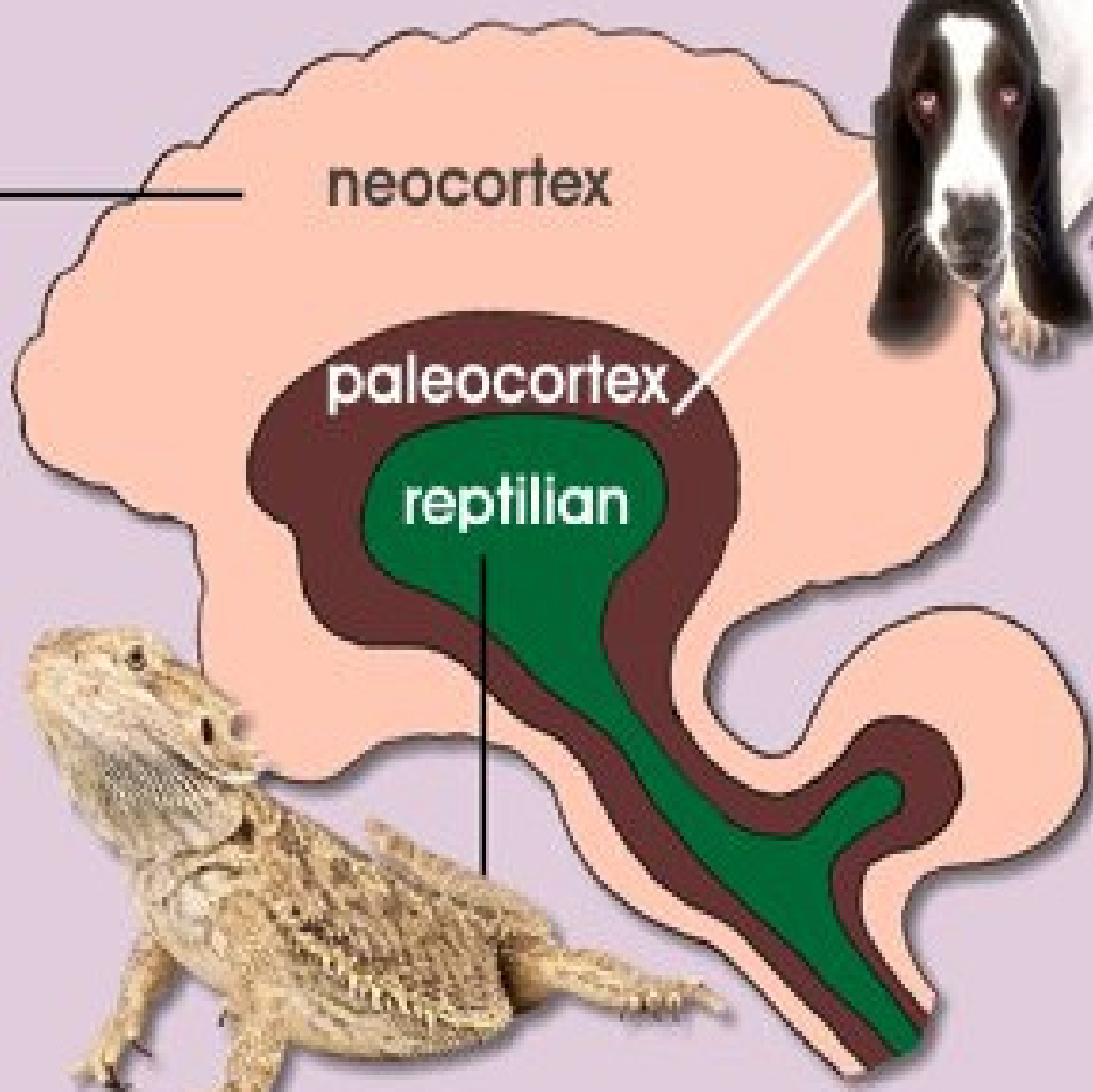


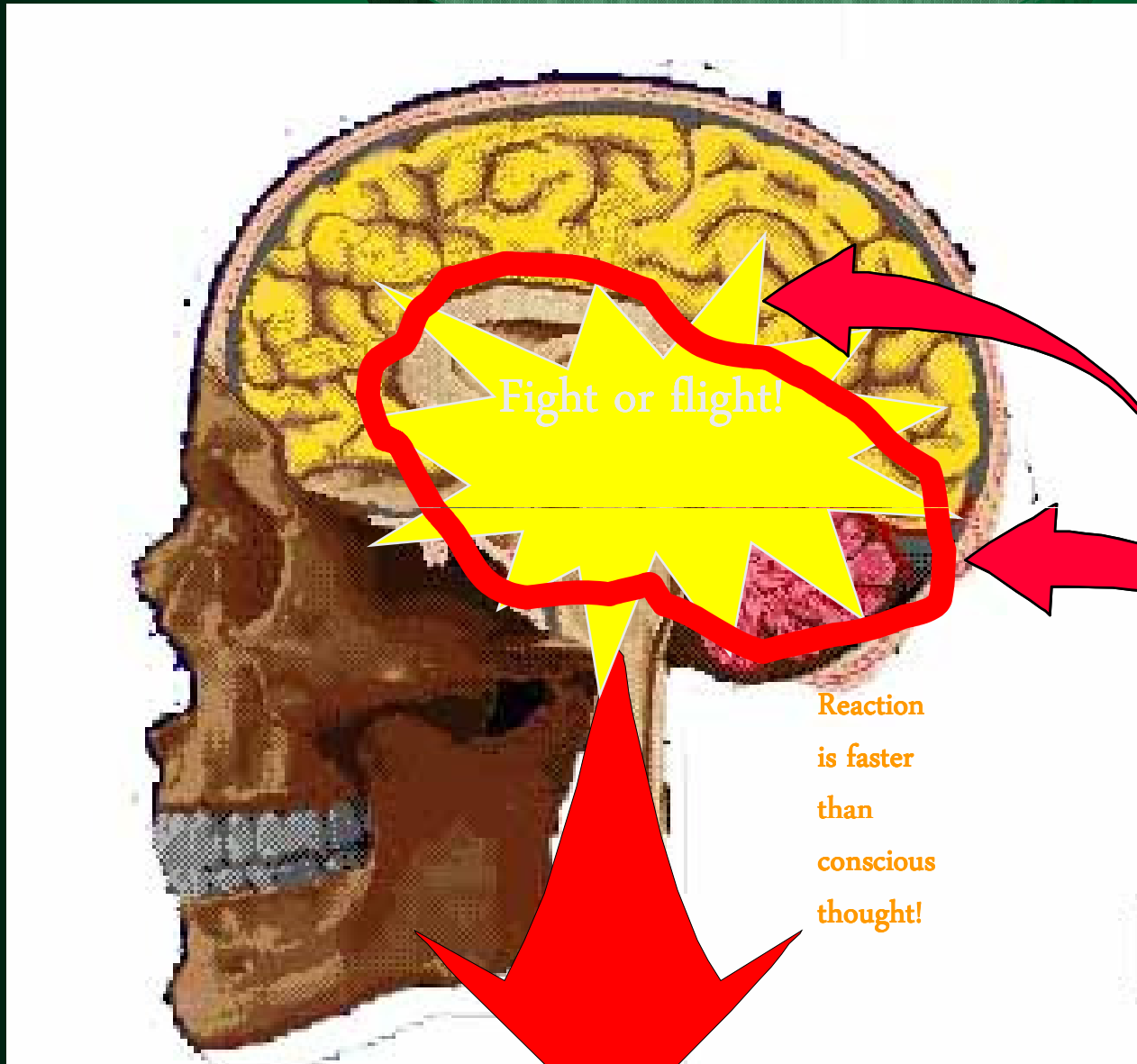
0,5 – 3,5 Hz DELTA

neocortex

paleocortex

reptilian





Human brain
Cortex

Mammal Brain
Limbic system

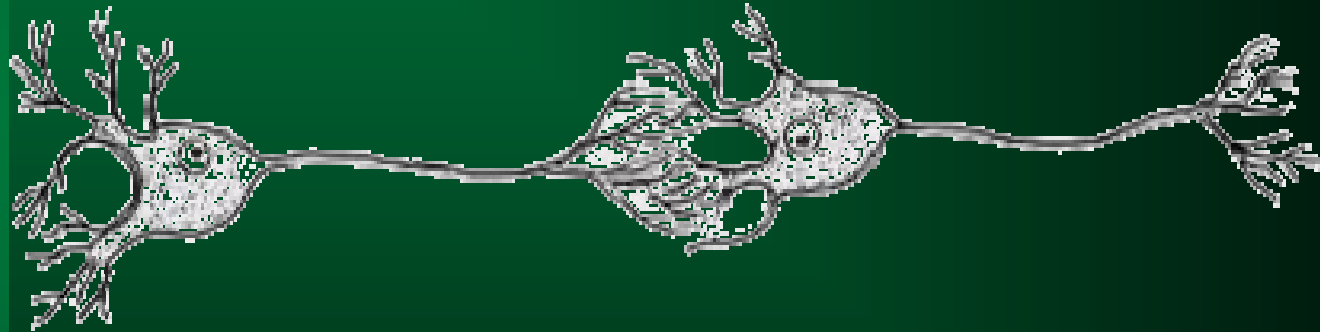
Reptile Brain

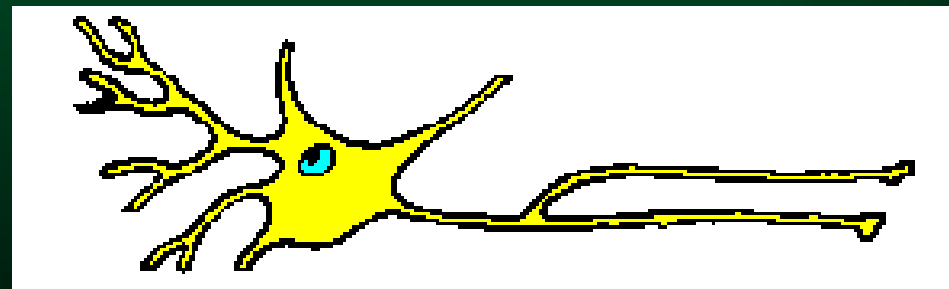
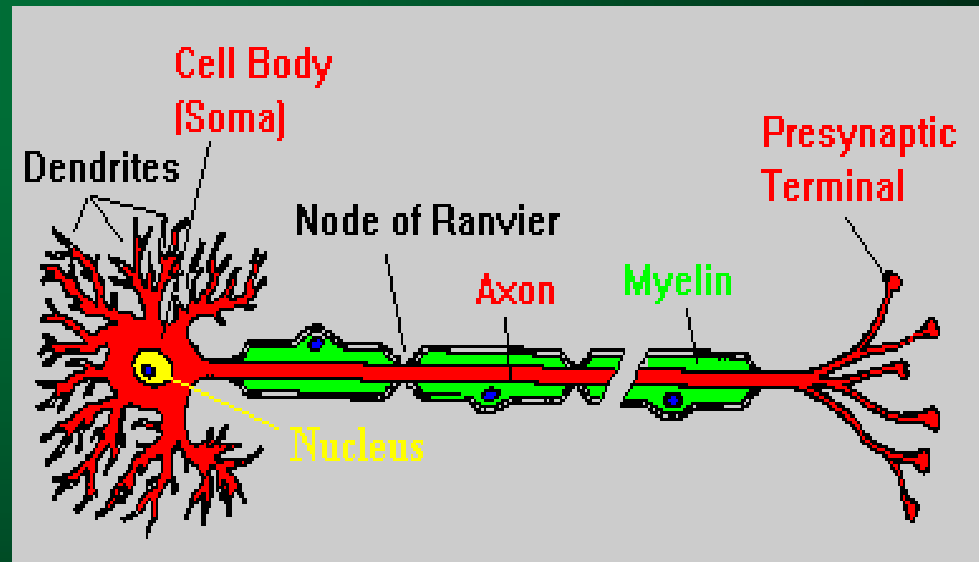
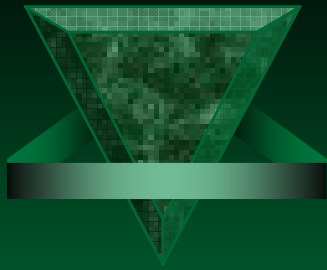
Fight or flight!

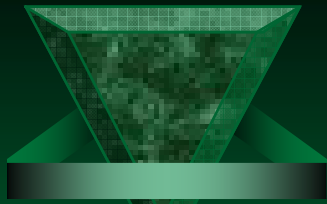
Reaction
is faster
than
conscious
thought!

SEL SARAF

SINAPS

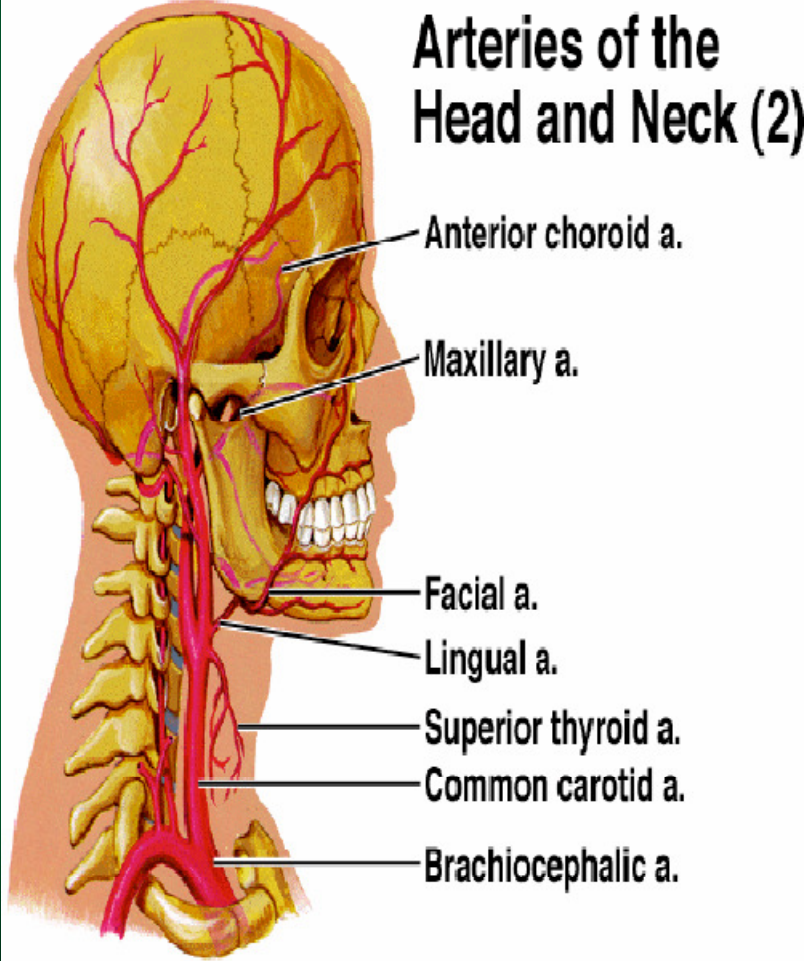






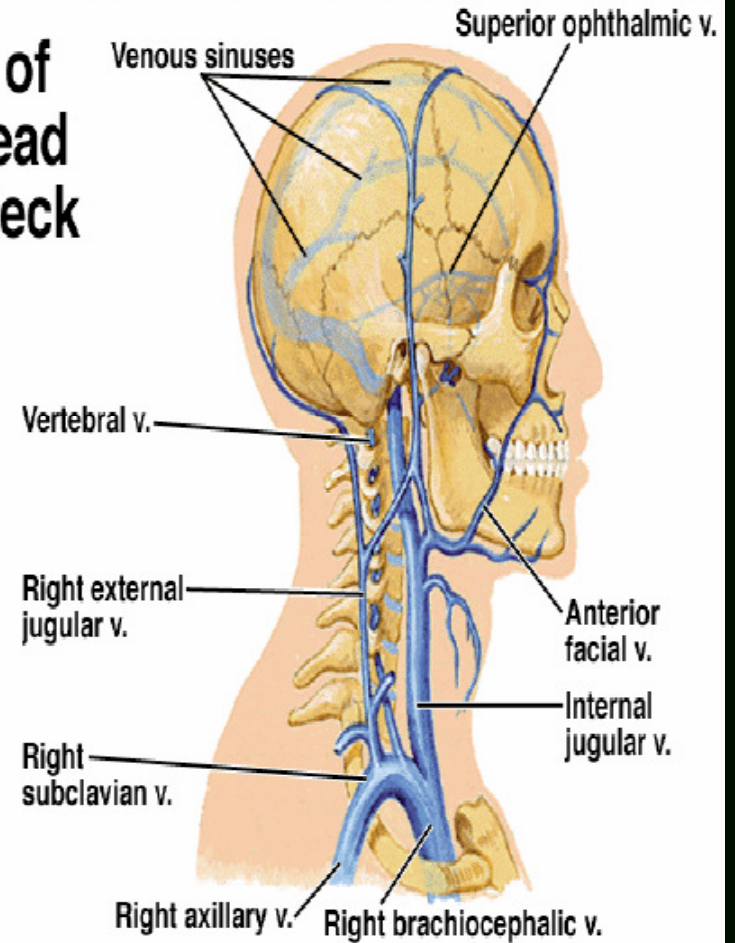
Shier/Euter/Lewis, *Hole's Human Anatomy and Physiology*, 8th edition, Copyright © 1998, The McGraw-Hill Companies, Inc. All rights reserved.

Arteries of the Head and Neck (2)



Shier/Euter/Lewis, *Hole's Human Anatomy and Physiology*, 8th edition, Copyright © 1998, The McGraw-Hill Companies, Inc. All rights reserved.

Veins of the Head and Neck

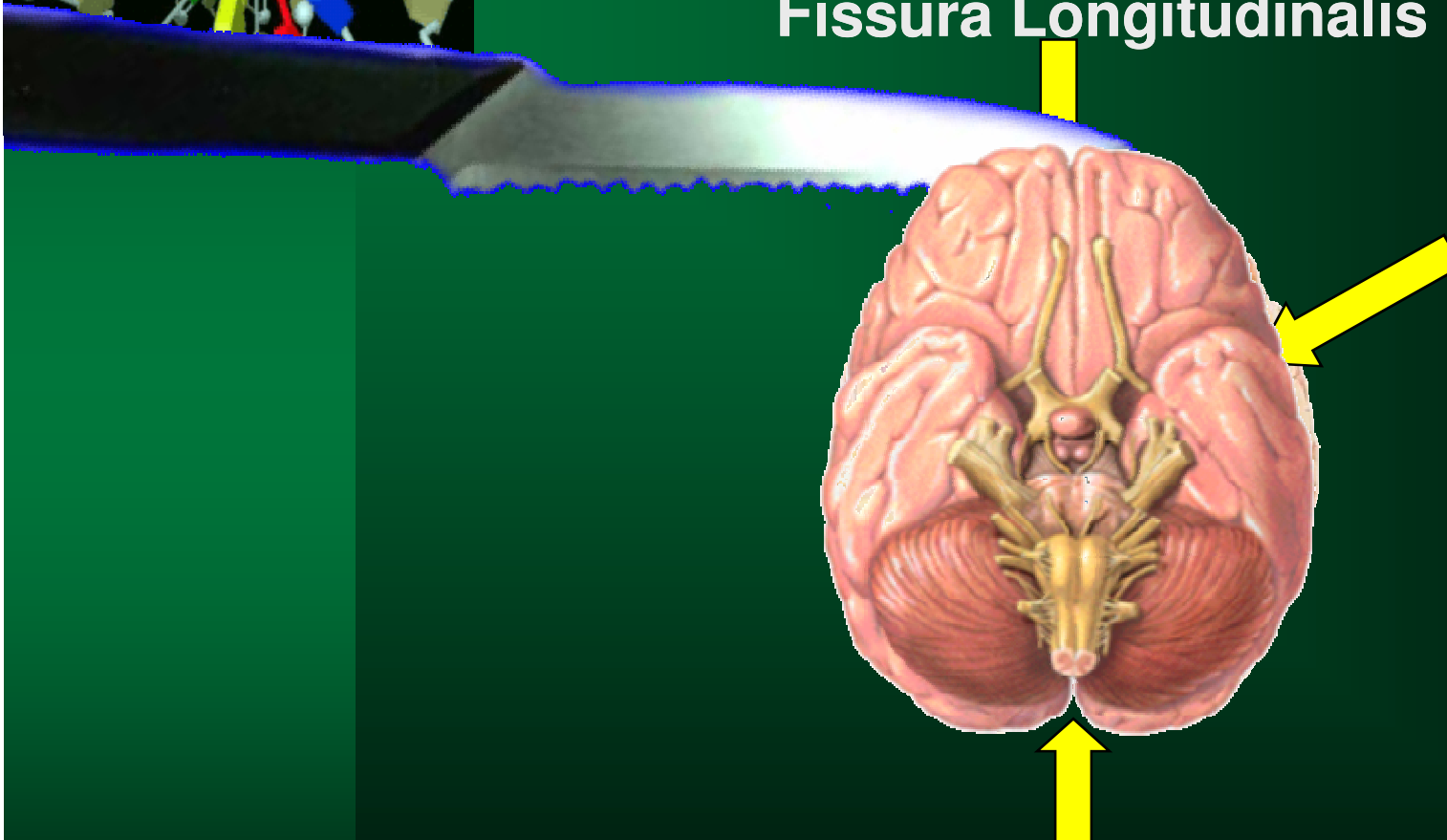
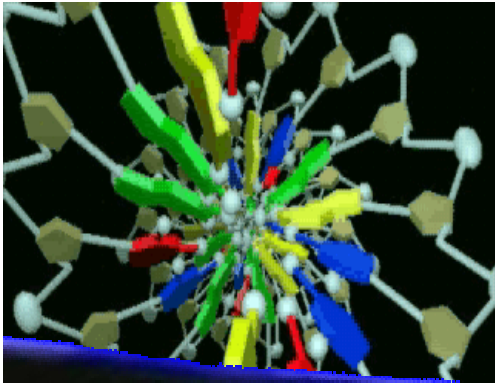


Potongan Otak Horizontal

Fissura Longitudinalis

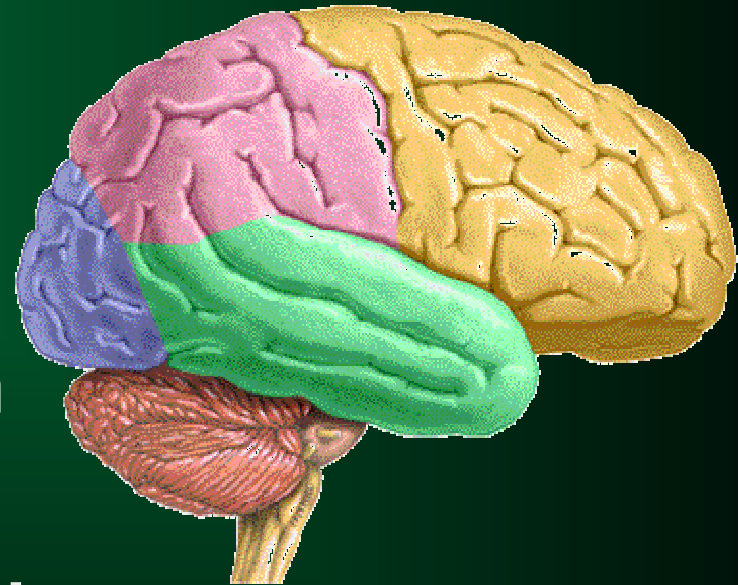
XXXXXX

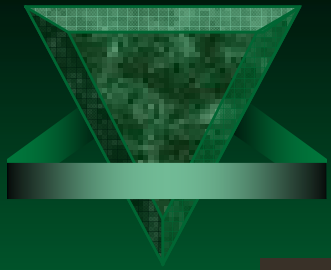
XXXXXX



Prinsip Olahraga untuk Optimalisasi Otak

- ✓ Hubungan Otak-Tubuh
- ✓ Pelibatan Emosi
- ✓ Integrasi Sensoris
- ✓ Menyilang garis tengah tubuh
- ✓ Merayap dan merangkak
- ✓ Mengikuti jejak penglihatan





TERIMAKASIH

