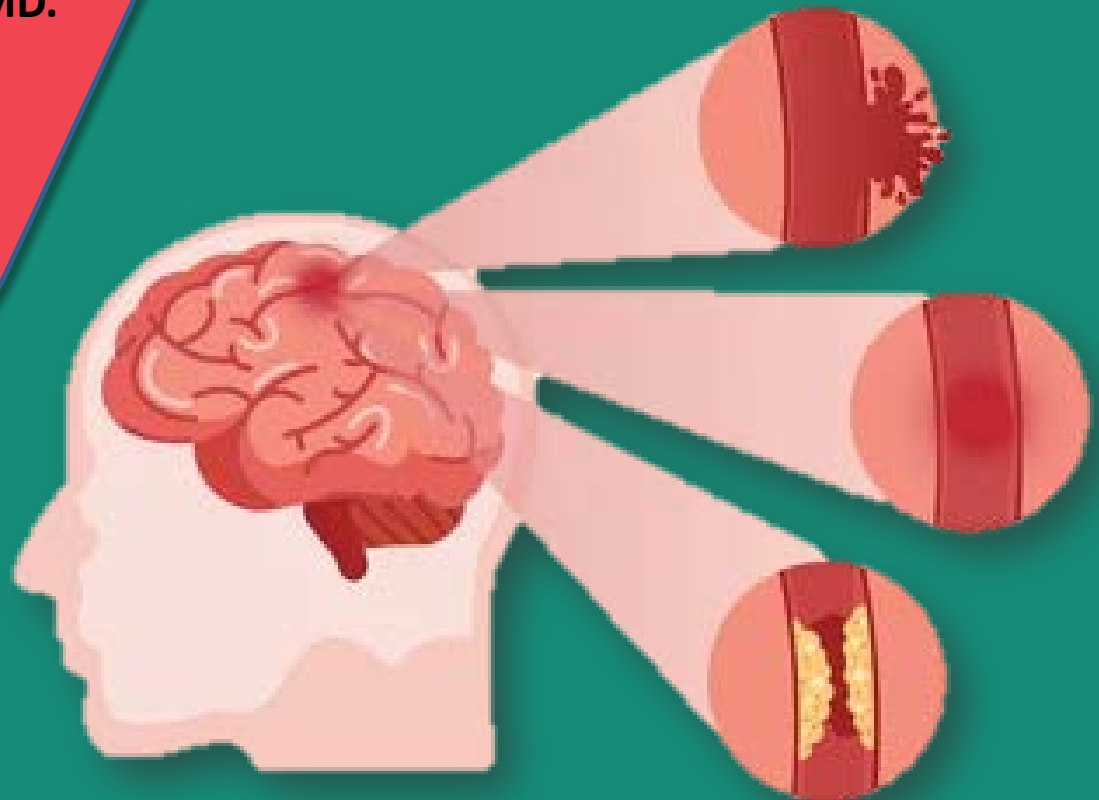


UPDATE STROKE MANAGEMENT

Lapassanan Chatsiriphuwatch, MD.



Handout Stroke



Stroke situation



Circulation

Heart Disease & Stroke Statistics 2021 Update



On average,
someone in the US dies of CVD every
36 seconds

About 2380 US deaths from CVD each day
(based on 2018 data)



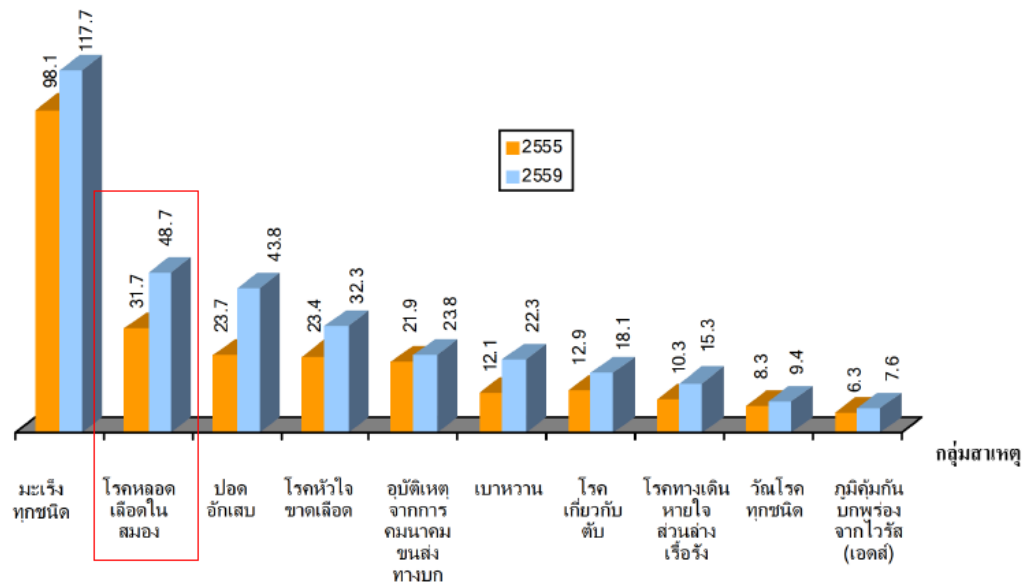
someone in the US dies of stroke every
3 minutes

About 405 US deaths from stroke each day
(based on 2018 data)

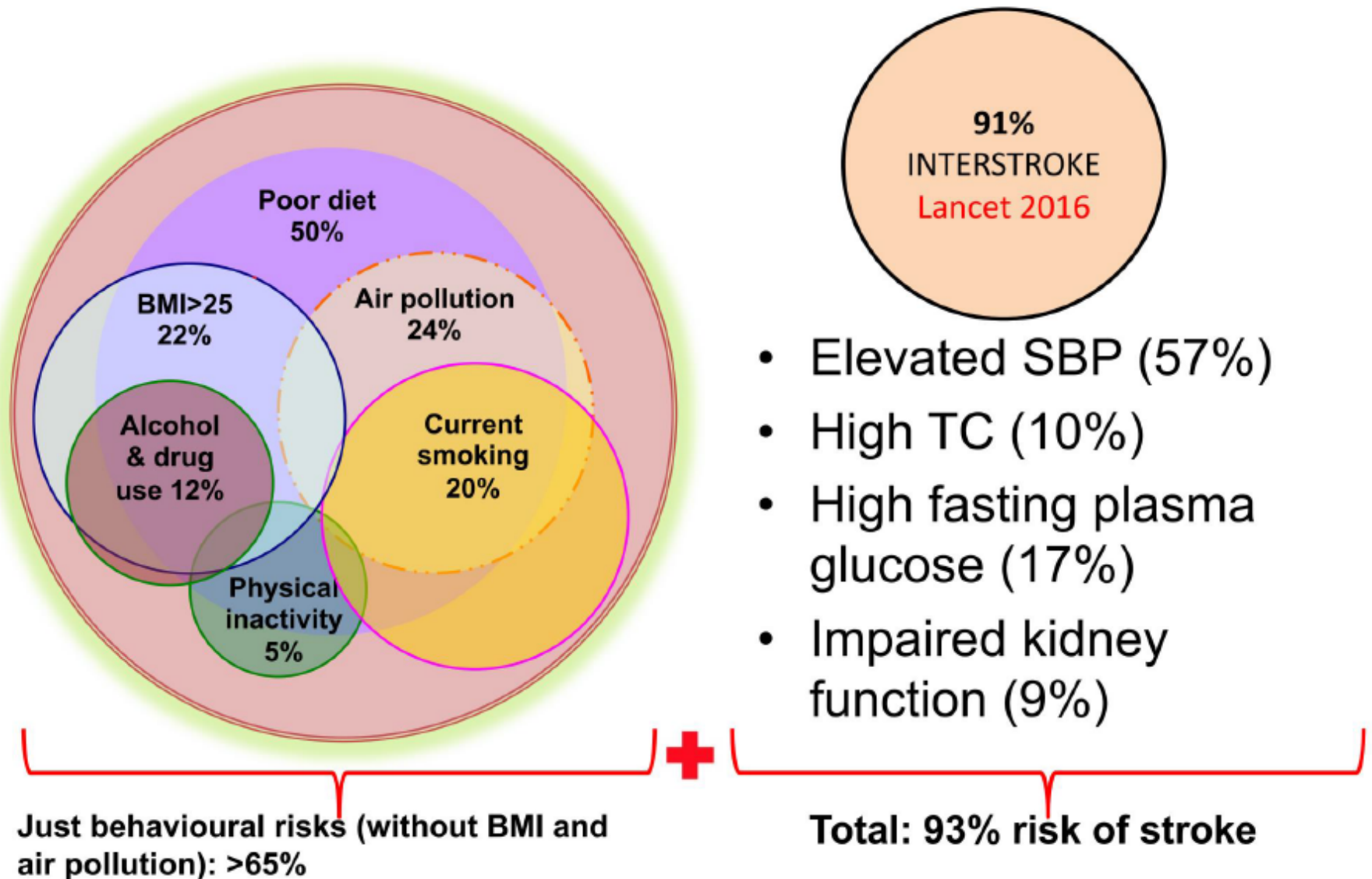
Virani et al. Heart disease and stroke statistics—2021 update: a report from the American Heart Association [published online ahead of print January 12, 2021].

ภาพ 2.3 ก : อัตราตาย จำแนกตามสาเหตุที่สำคัญ ต่อประชากร 100,000 คน ประเทศไทย พ.ศ. 2555 และ 2559

Figure 2.3 A : Mortality Rates by Leading Cause of Death per 100,000 Population Thailand, 2012 and 2016



Age-adjusted stroke-related DALYs attributable risk factors and risk clusters: GBD 2016



Time is brain



Estimated pace of neural circuitry loss in typical large vessel, supratentorial acute ischemic stroke

	Neurons Lost	Synapses Lost	Myelinated Fibers Lost	Accelerated Aging
Per Stroke	1.2 billion	8.3 trillion	7140 km/4470 miles	36 y
Per Hour	120 million	830 billion	714 km/447 miles	3.6 y
Per Minute	1.9 million	14 billion	12 km/7.5 miles	3.1 wk
Per Second	32 000	230 million	200 meters/218 yards	8.7 h



10 minutes

Some brain regions (red) already are irreversibly lost.



1 hour

More time elapses, more brain tissue dies. Urgent treatment could still limit the disability.



3 hours

The window is closing. Treatment at this time may result in moderate disability.



6 hours

Without treatment, all at-risk tissue has died; the unfortunate result may be severe disability.

Time is brain



Estimated pace of neural circuitry loss in typical large vessel, supratentorial acute ischemic stroke

	Neurons Lost	Synapses Lost	Myelinated Fibers Lost	Accelerated Aging
Per Stroke	1.2 billion	8.3 trillion	7140 km/4470 miles	36 y
Per Hour	120 million	830 billion	714 km/447 miles	3.6 y
Per Minute	1.9 million	14 billion	12 km/7.5 miles	3.1 wk
Per Second	32 000	230 million	200 meters/218 yards	8.7 h

Time loss is Brain loss

10 minutes
Some brain regions (red) already are irreversibly lost.

1 hour
More time is lost. Urgent treatment could still limit the disability.

2 hours
The window is closing. Treatment at this time may result in moderate disability.

4 hours
Without treatment, all at-risk tissue has died; the unfortunate result may be severe disability.

Time is brain



Door to treatment in ≤ 60 min



0 min

Suspected stroke patient arrives at ED



≤ 10 min

Initiate MD evaluation, including patient history and time last known well/symptom onset
Initiate labwork
Examine using NIHSS



≤ 15 min

Notify stroke team (including neurologic expertise)



≤ 25 min

Initiate CT scan



≤ 45 min

Interpret CT scan using ASPECTS
Review labs if available
Review patient eligibility for tPA



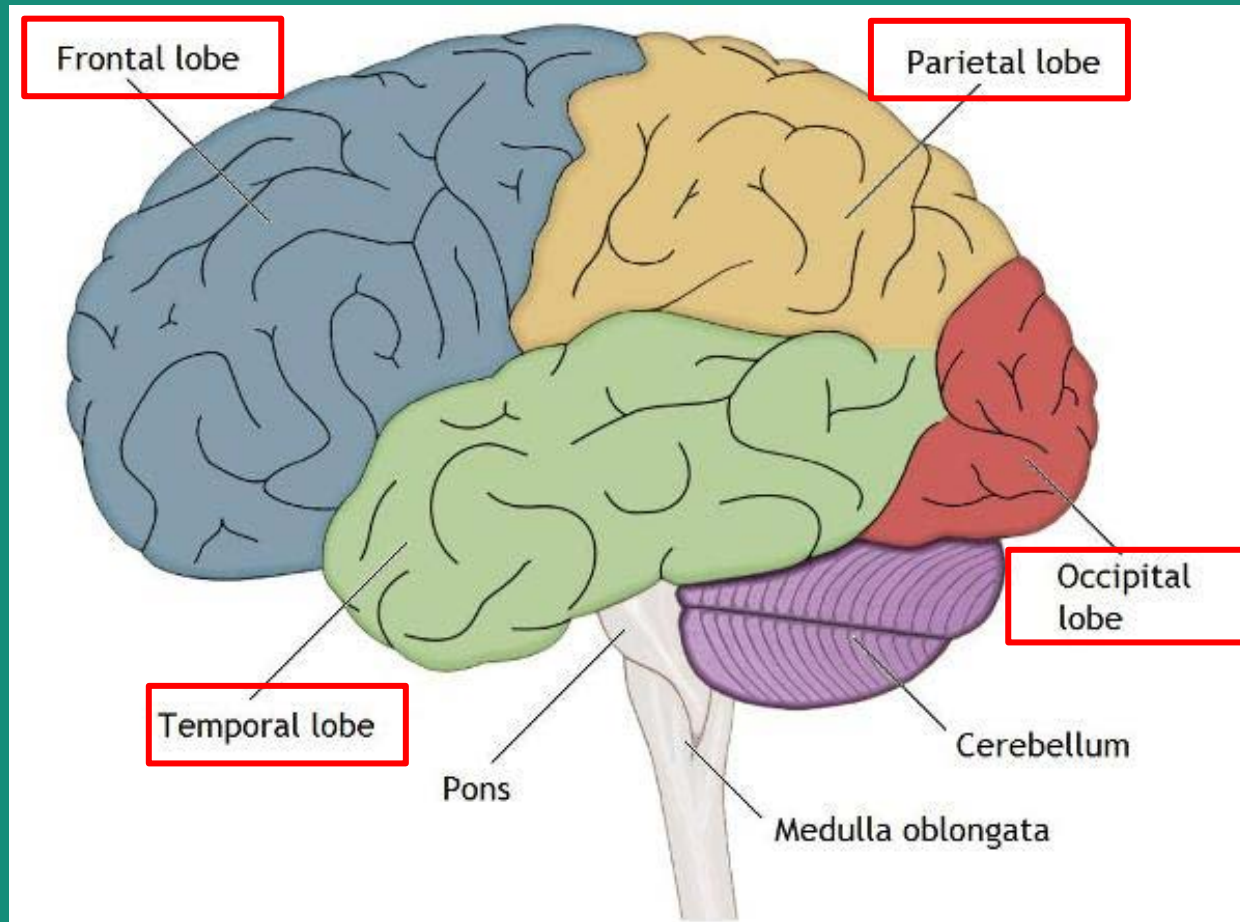
≤ 60 min

Give tPA bolus and initiate infusion in eligible patients

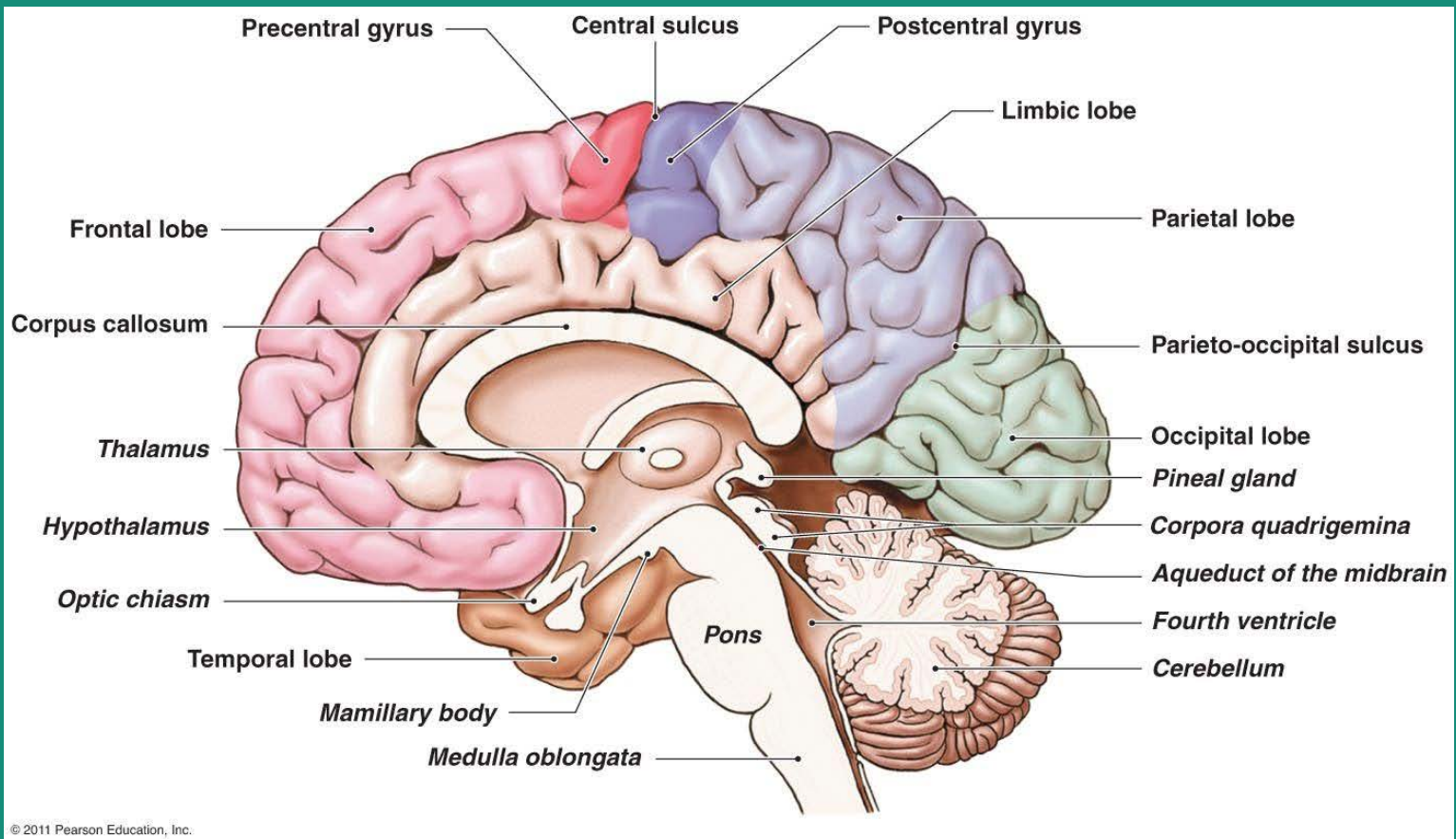
Anatomy of brain



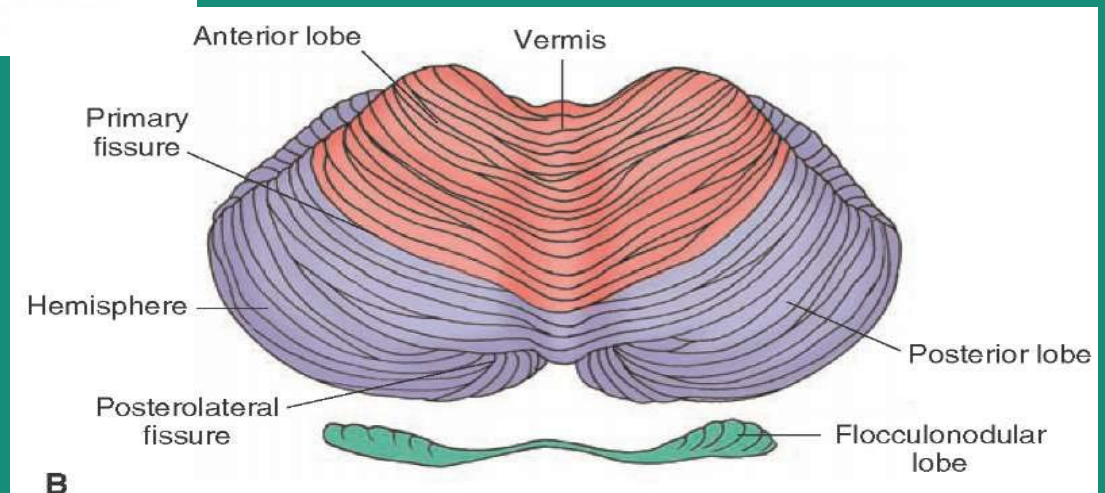
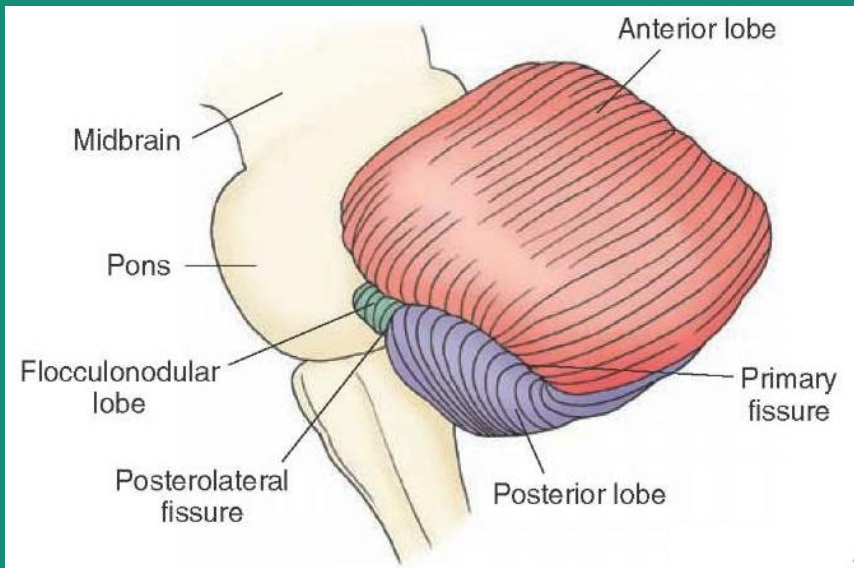
Lobe of cerebral cortex



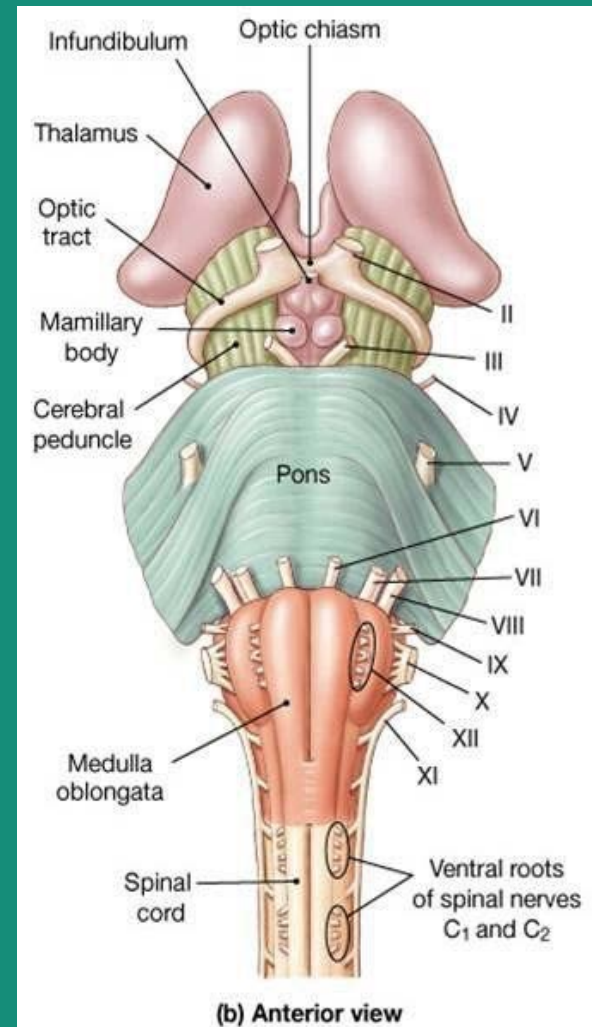
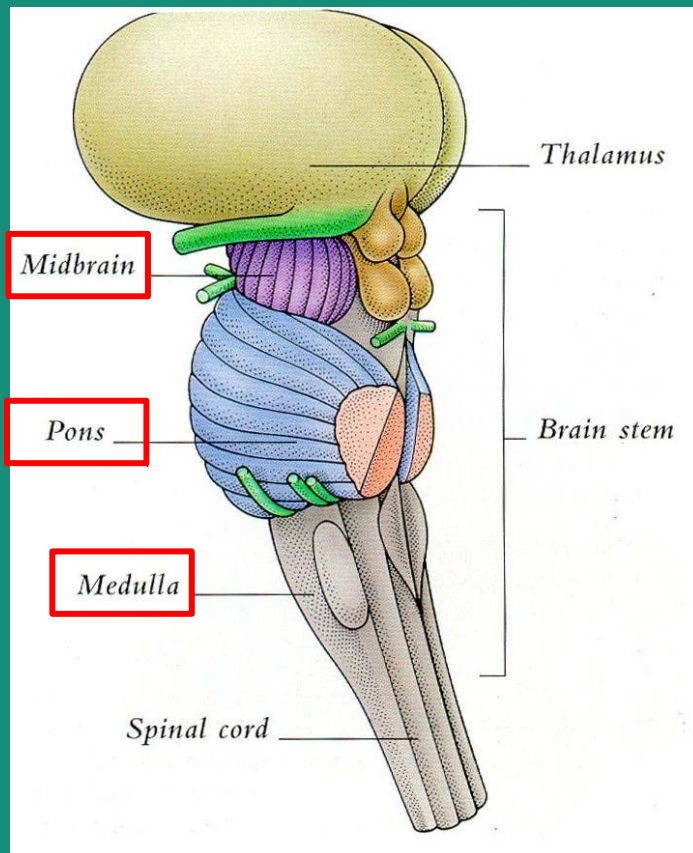
Lobe of cerebral cortex



Cerebellum



Brain stem



Function

Frontal Lobe

- Motor control (premotor cortex)
- Problem solving (prefrontal area)
- Speech production (Broca's area)

Parietal Lobe

- Touch perception (somatosensory cortex)
- Body orientation and sensory discrimination

Temporal Lobe

- Auditory processing (hearing)
- Language comprehension (Wernicke's area)
- Memory / information retrieval

Occipital Lobe

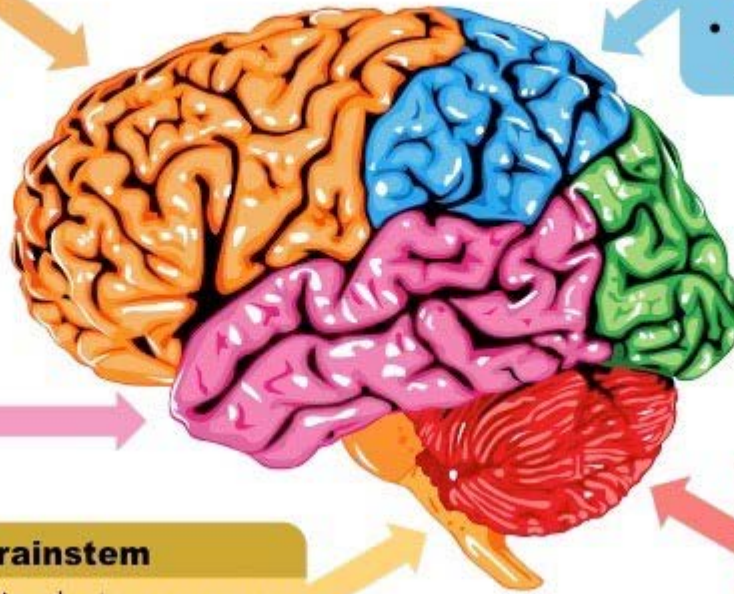
- Sight (visual cortex)
- Visual reception and visual interpretation

Brainstem

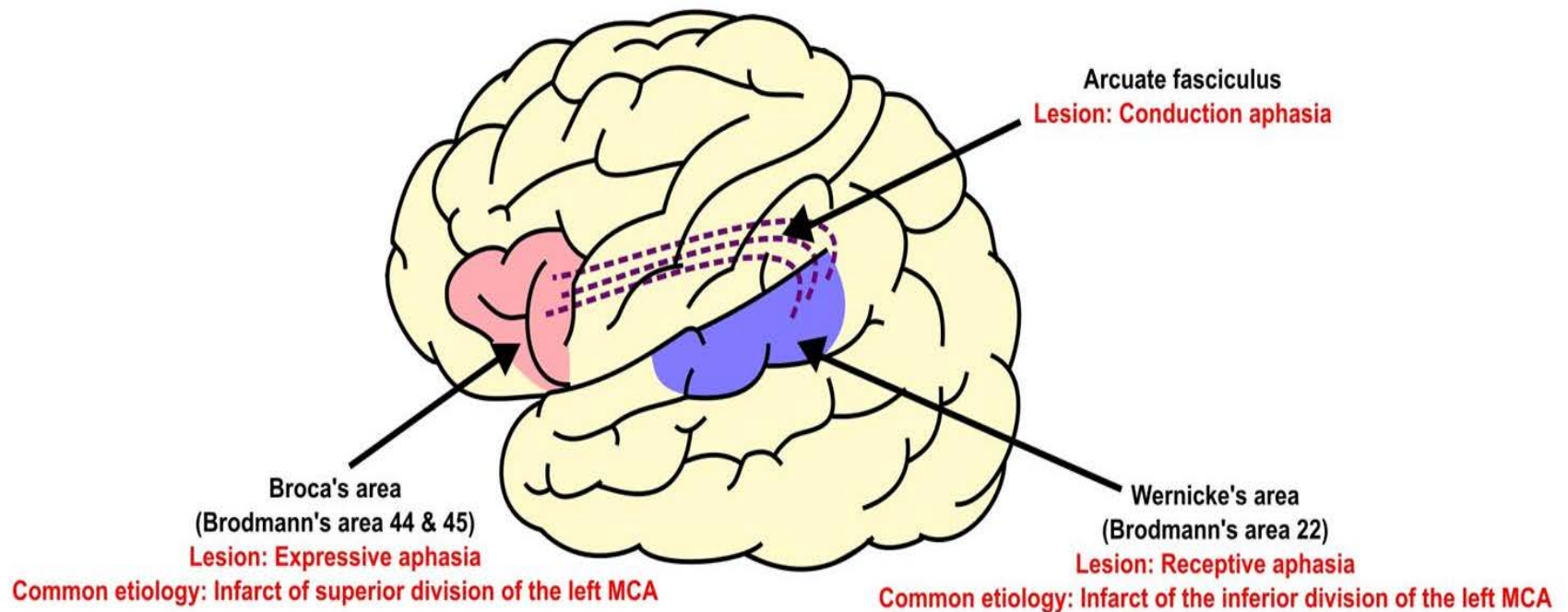
- Involuntary responses

Cerebellum

- Balance and coordination



Dominance hemisphere - Language

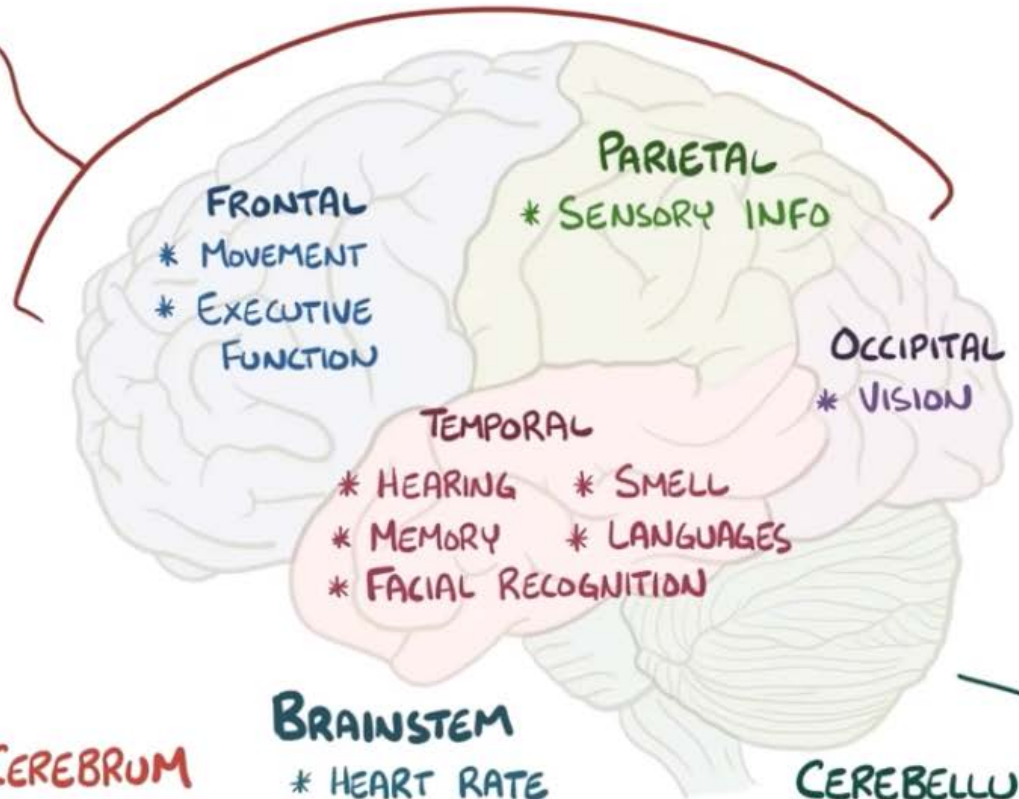


CEREBRUM

- * HAS 2 HEMISPHERES
- * EACH HAS a CORTEX
- * EACH CORTEX HAS 4 LOBES



the
RIGHT CEREBRUM
CONTROLS MUSCLES
on the LEFT
& VICE VERSA



FRONTAL
* MOVEMENT
* EXECUTIVE
FUNCTION

PARIETAL
* SENSORY INFO

OCCIPITAL
* VISION

TEMPORAL
* HEARING * SMELL
* MEMORY * LANGUAGES
* FACIAL RECOGNITION

BRAINSTEM

- * HEART RATE
- * BLOOD PRESSURE
- * BREATHING
- * GI FUNCTION
- * CONSCIOUSNESS

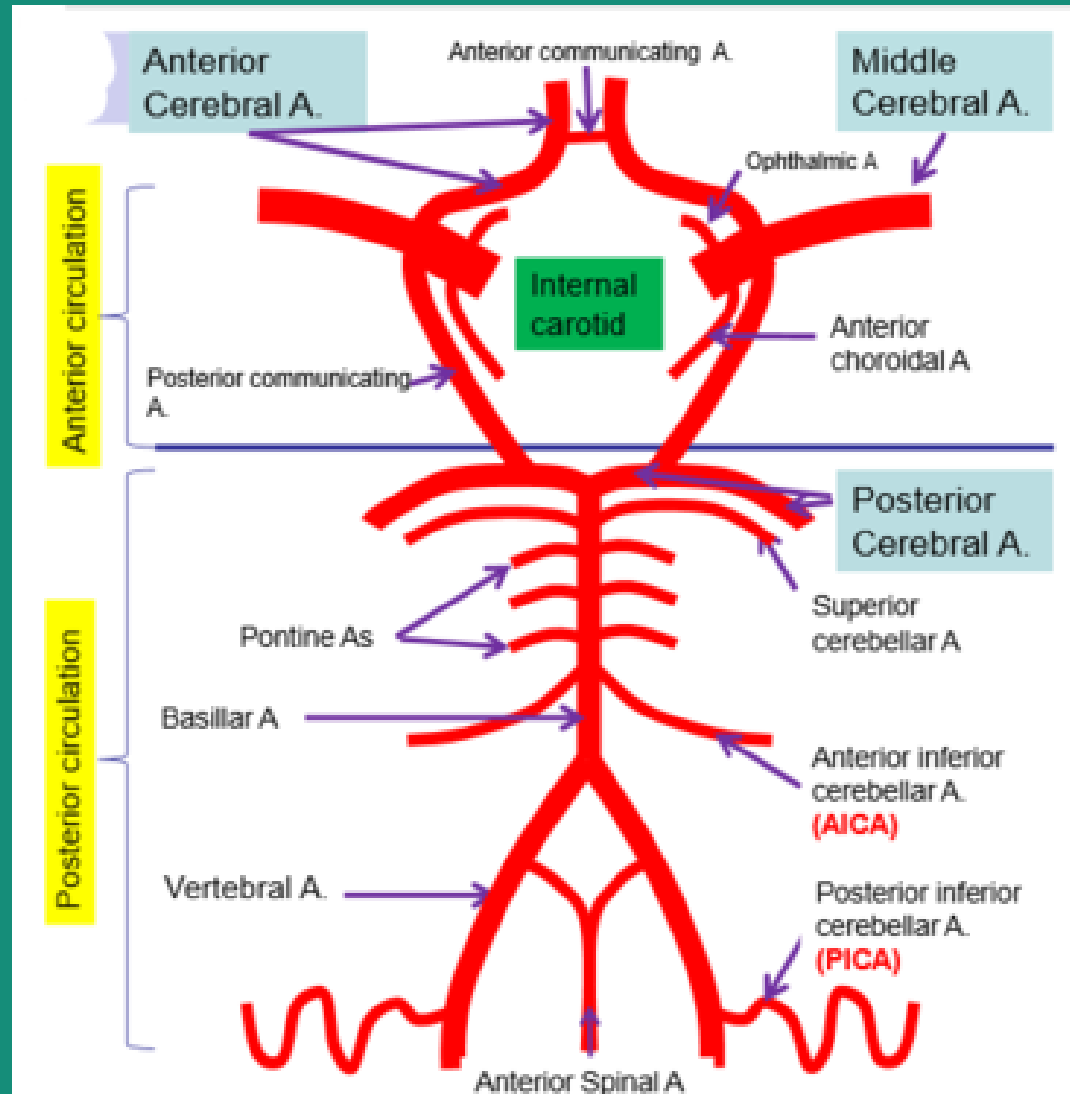
CEREBELLUM

- * MUSCLE COORDINATION
- * BALANCE

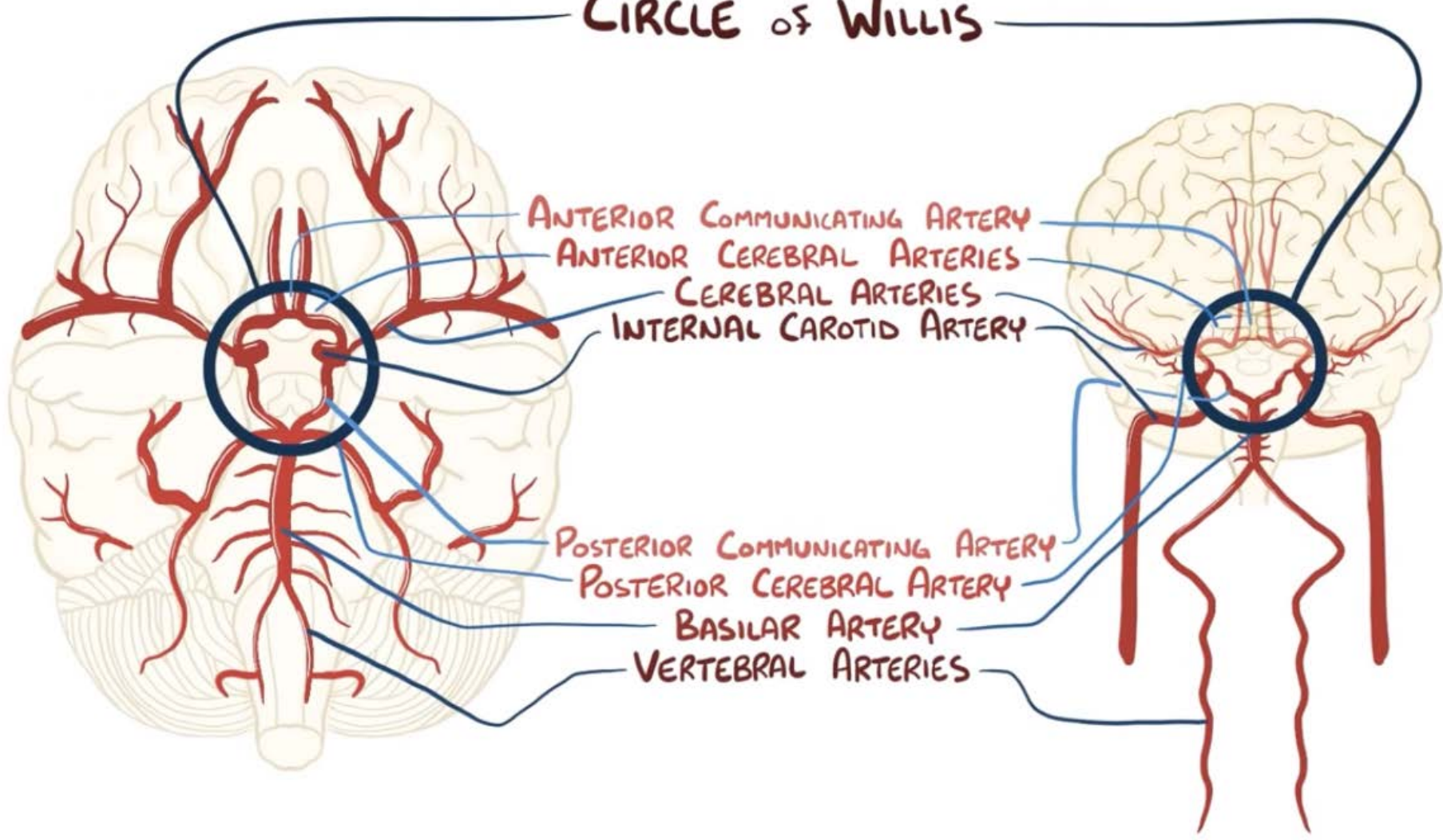
Blood supply of CNS

Anterior circulation ;
ICA , ACA , MCA

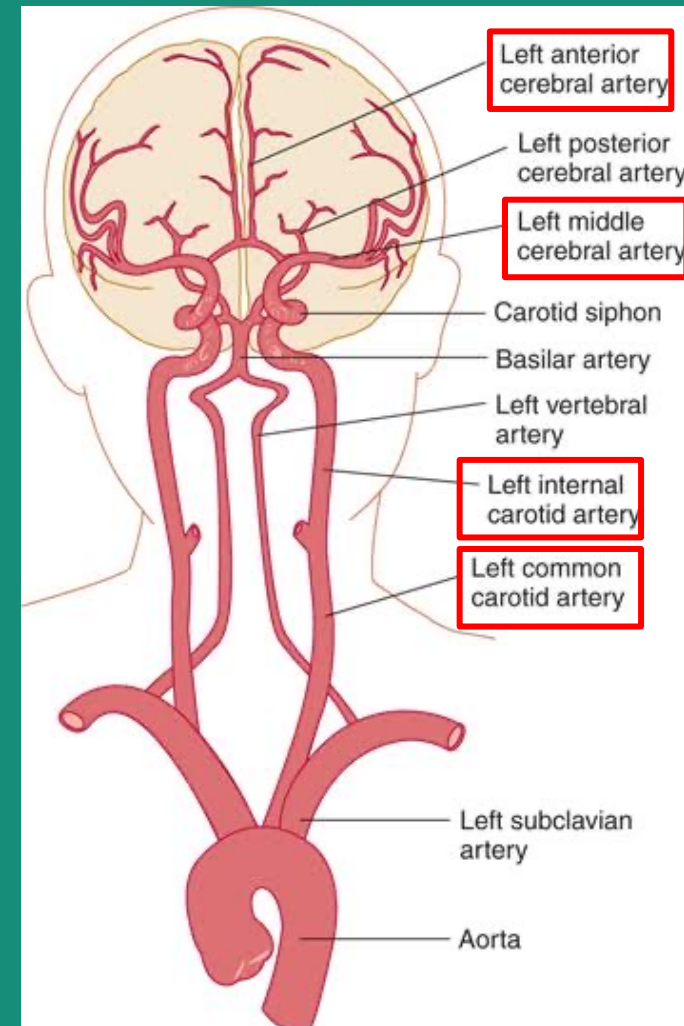
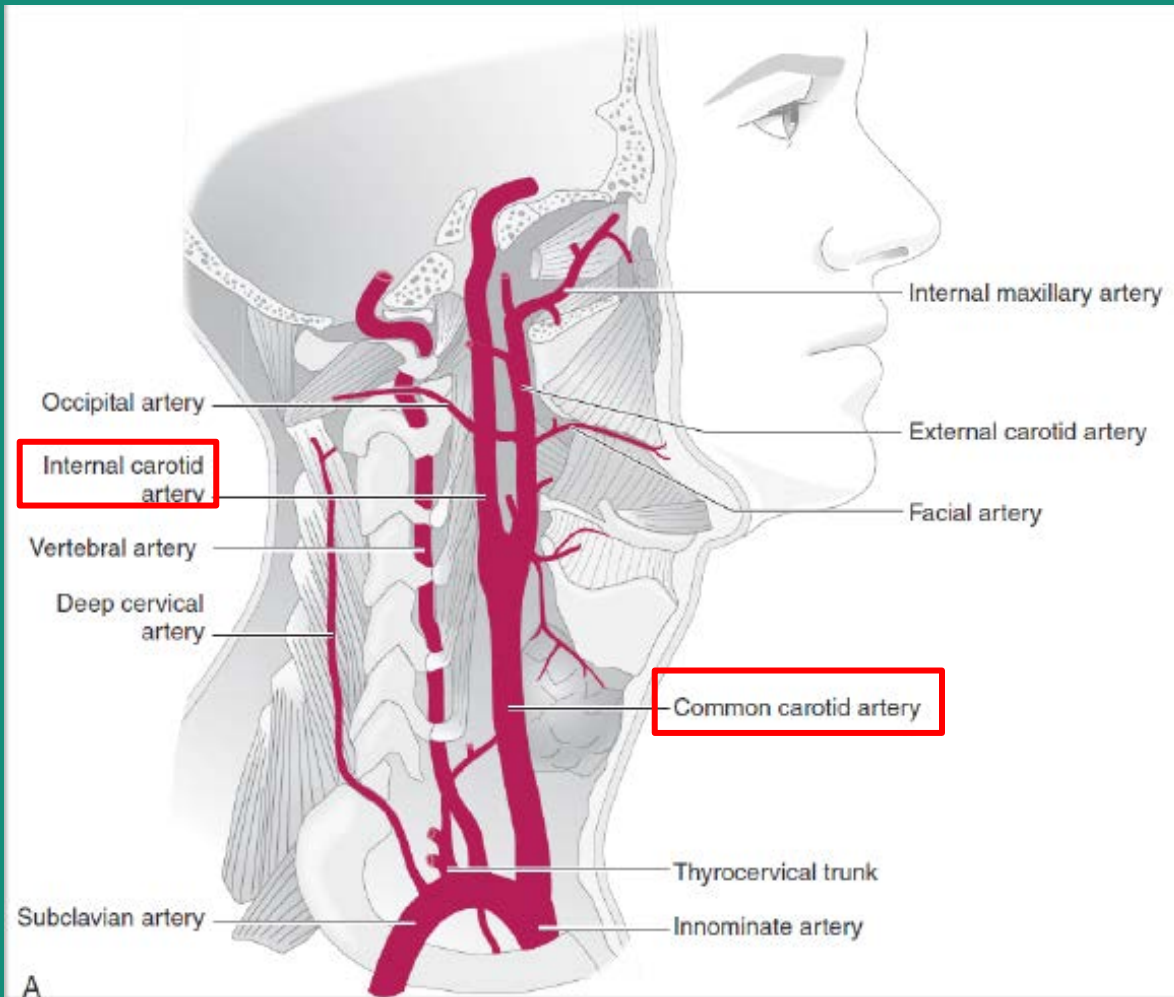
Posterior circulation;
Vertebral a. , Basilar a. ,
PCA



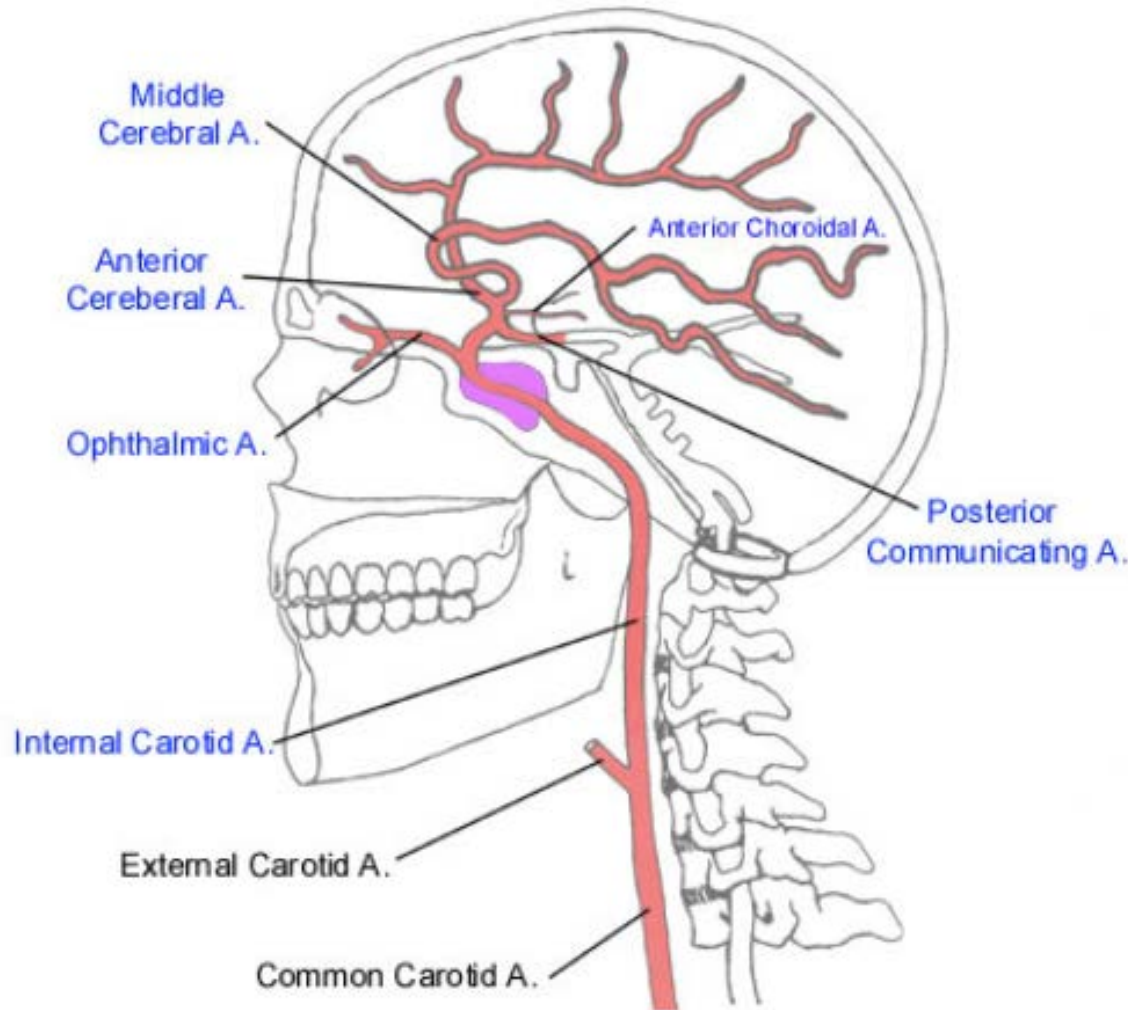
CIRCLE OF WILLIS



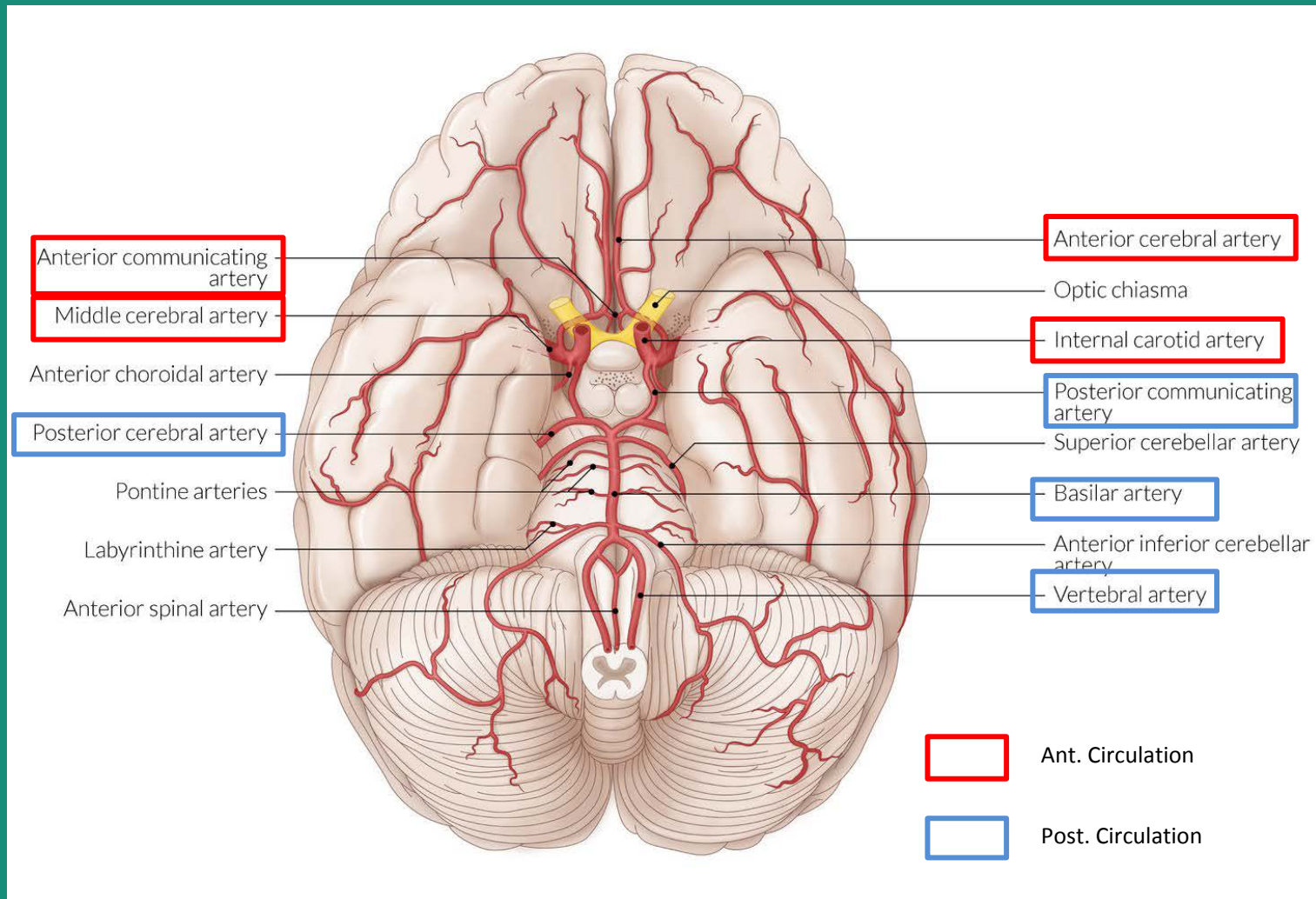
Anterior circulation



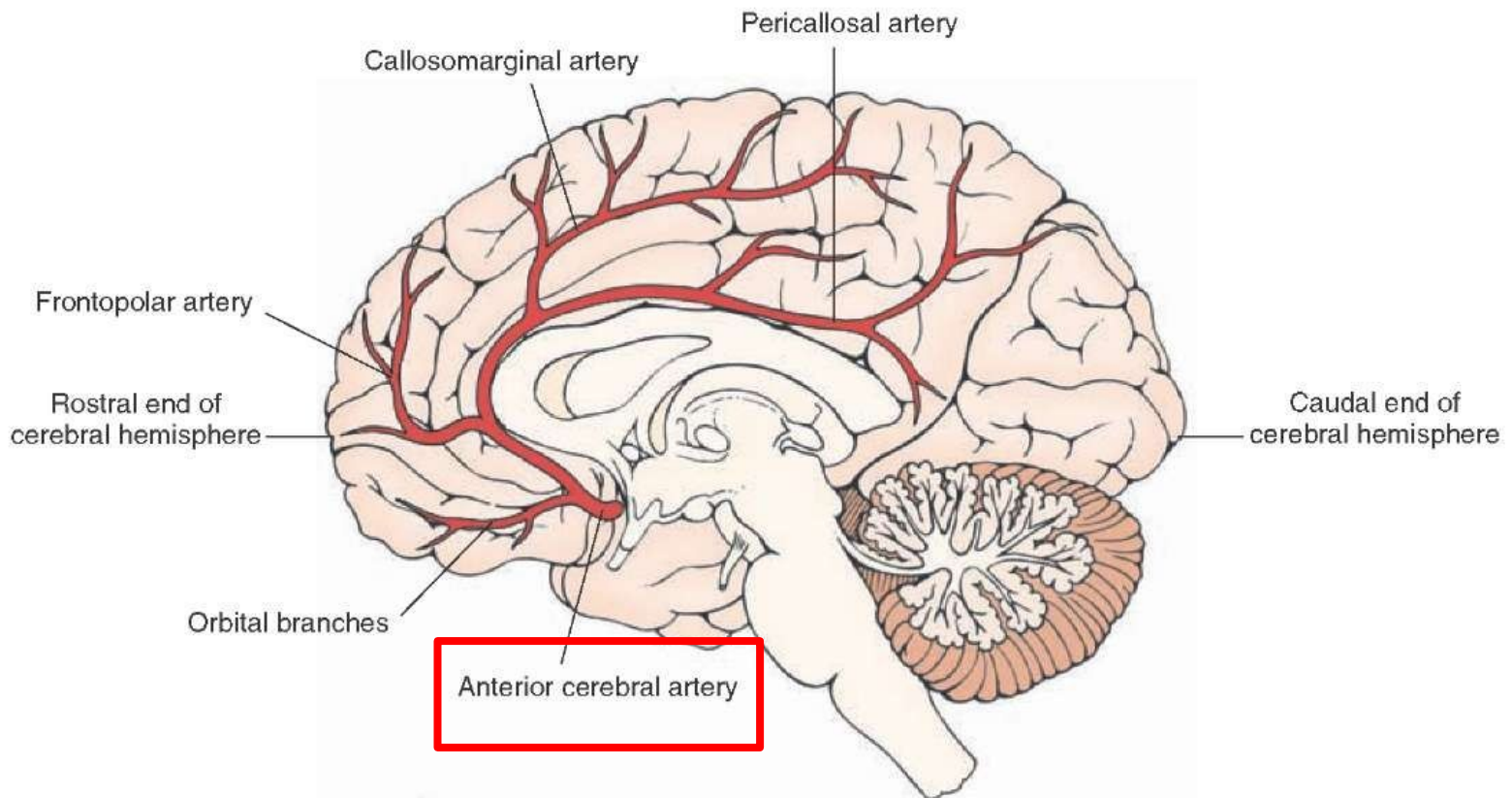
Anterior circulation



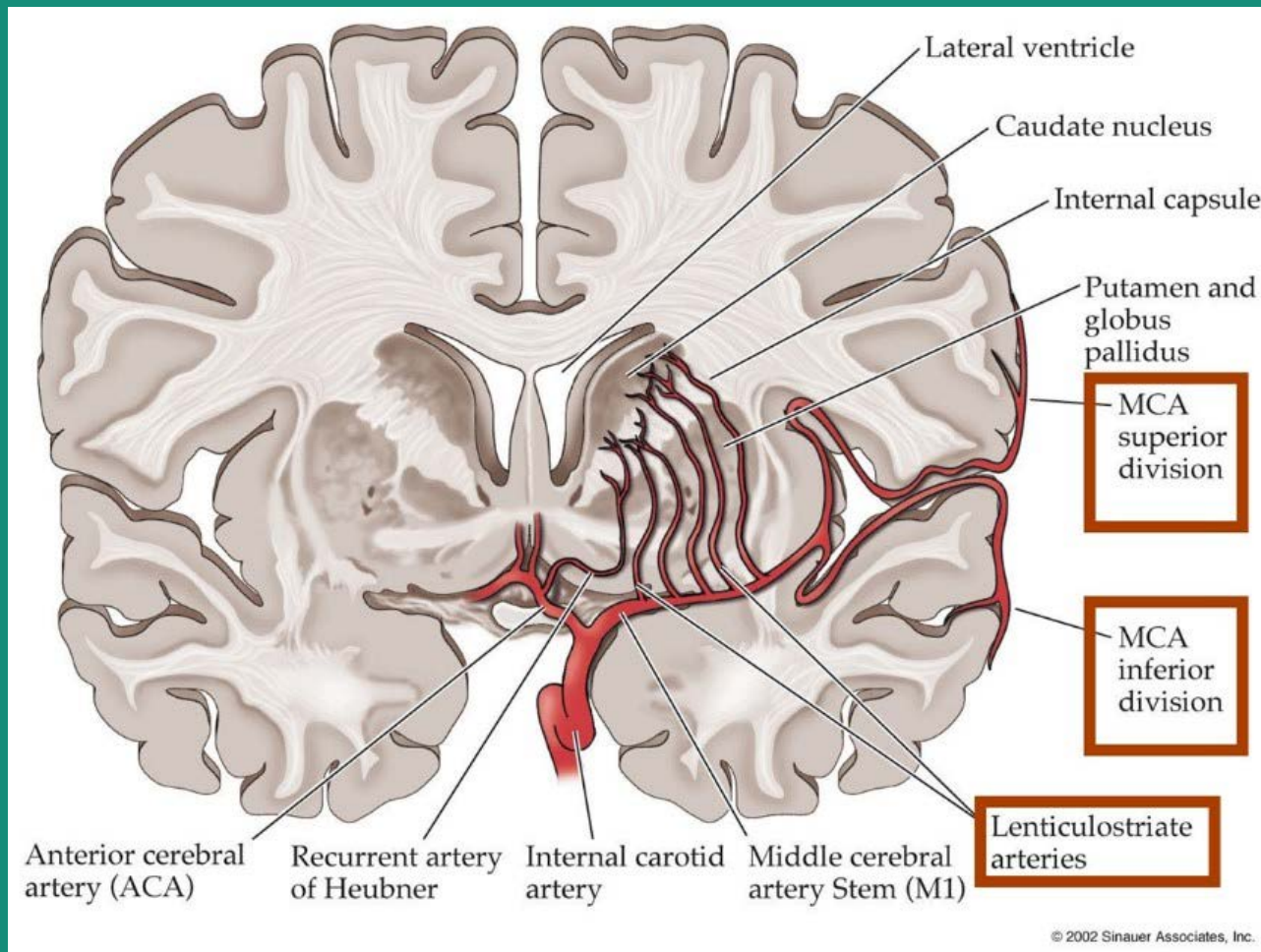
Anterior circulation



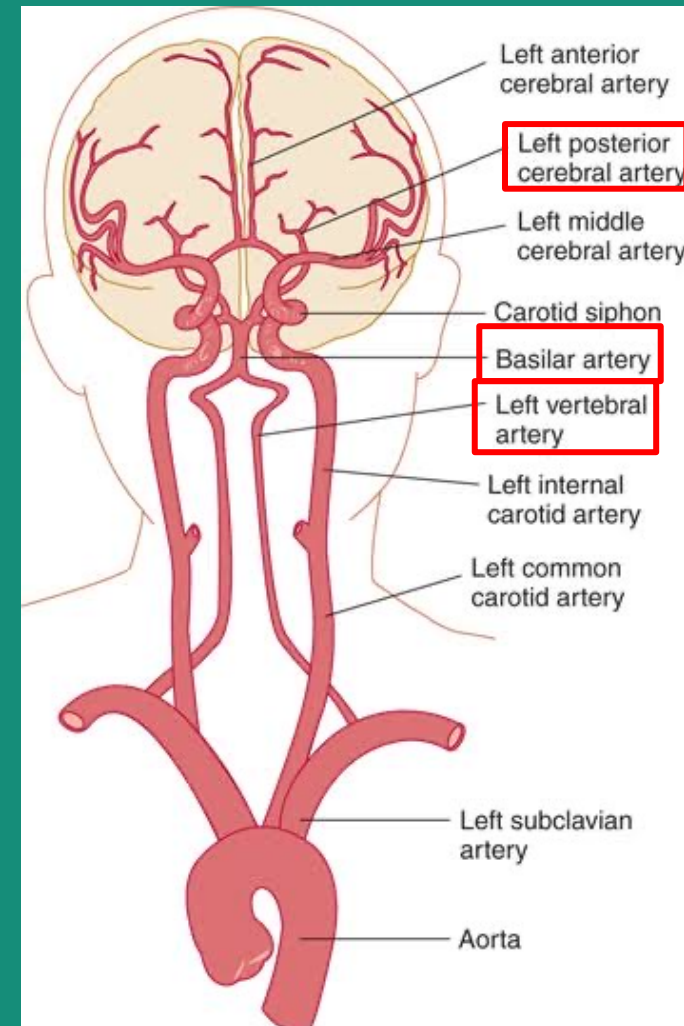
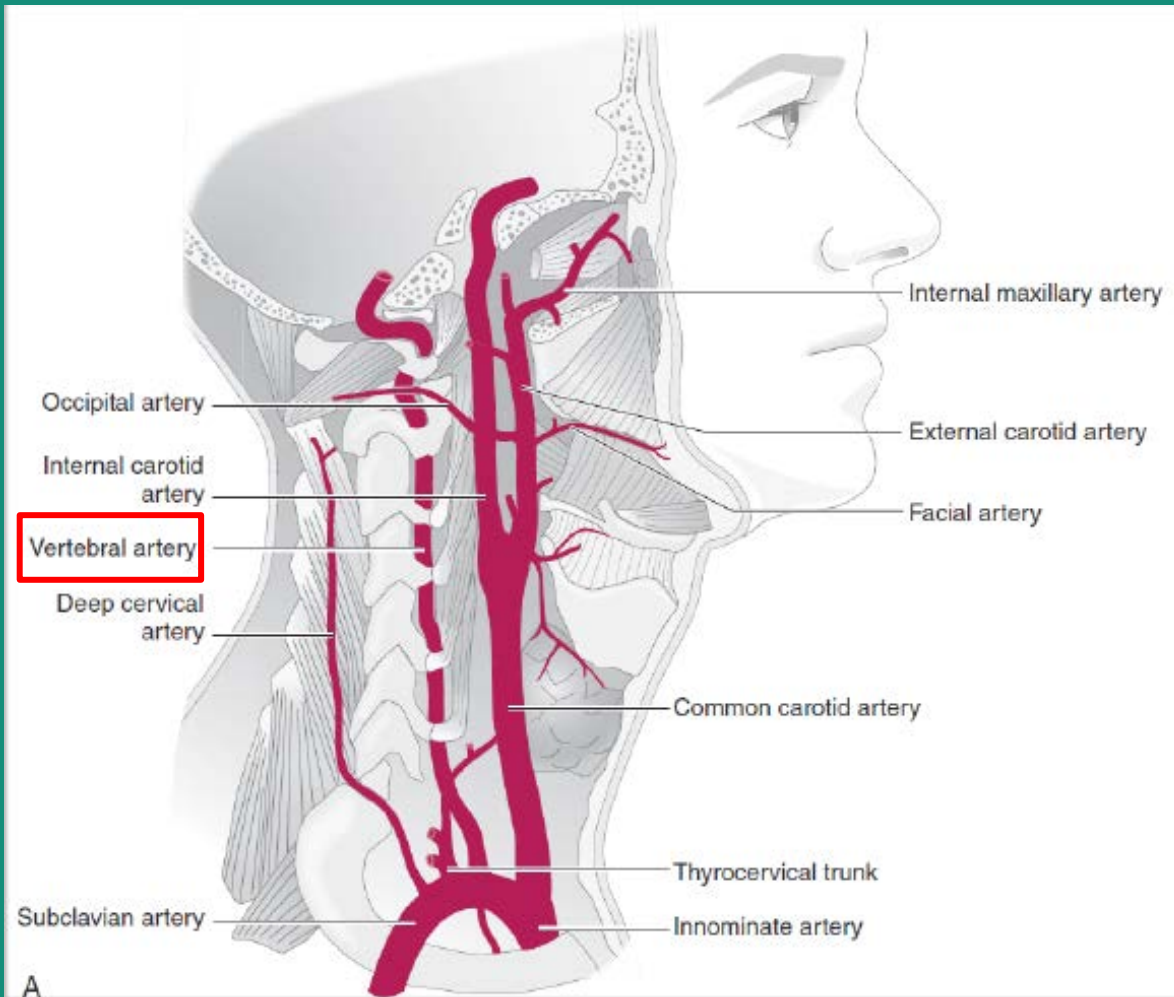
Anterior circulation



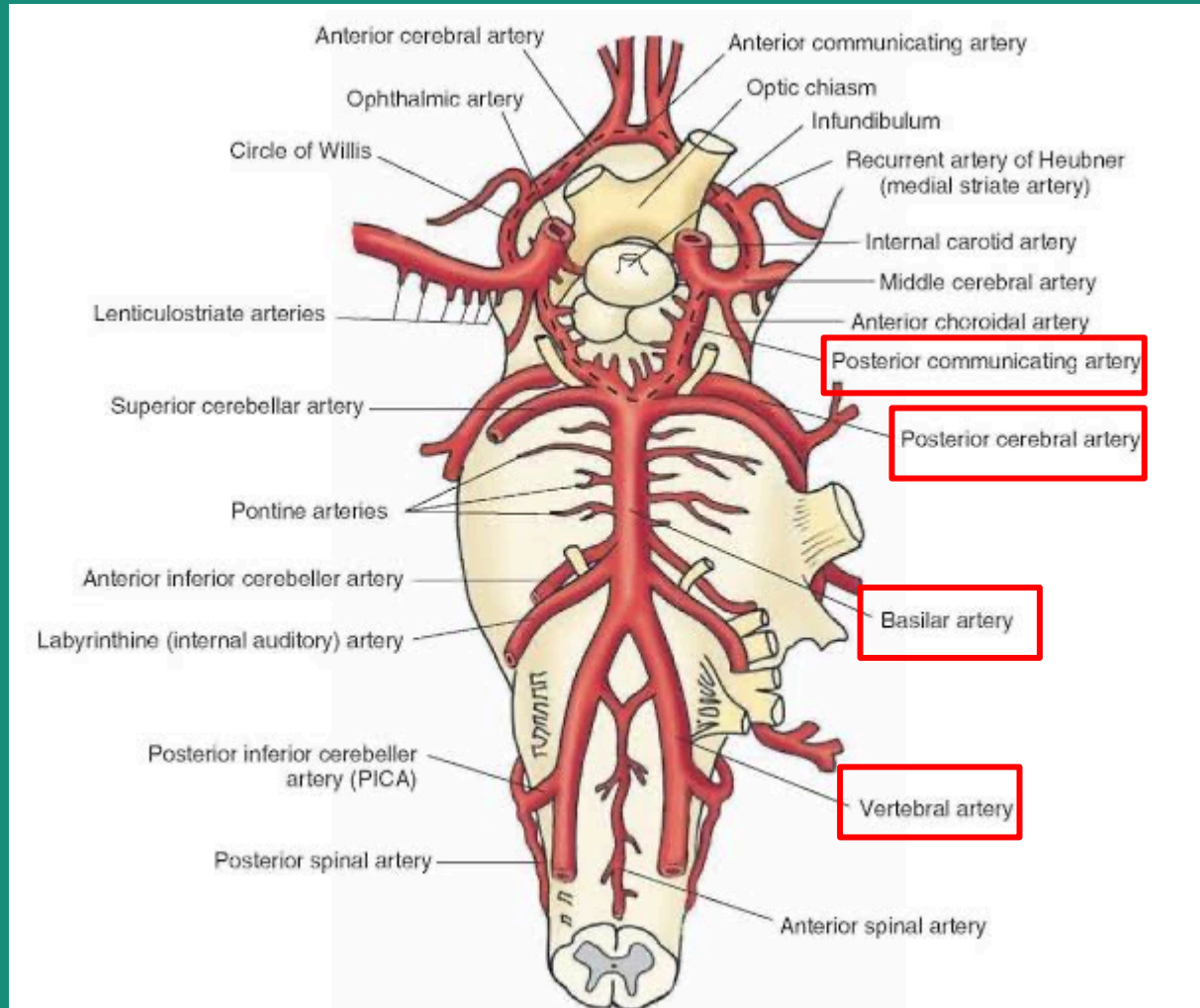
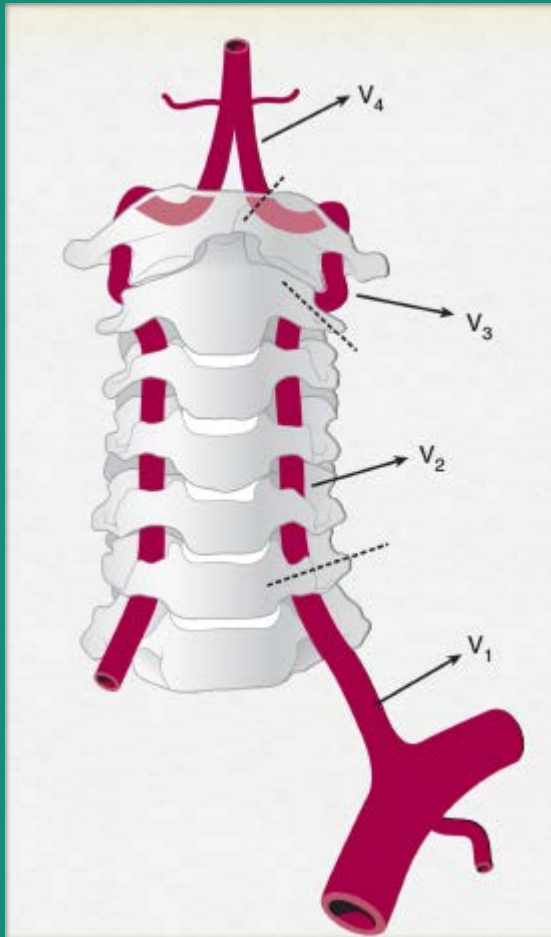
Anterior circulation



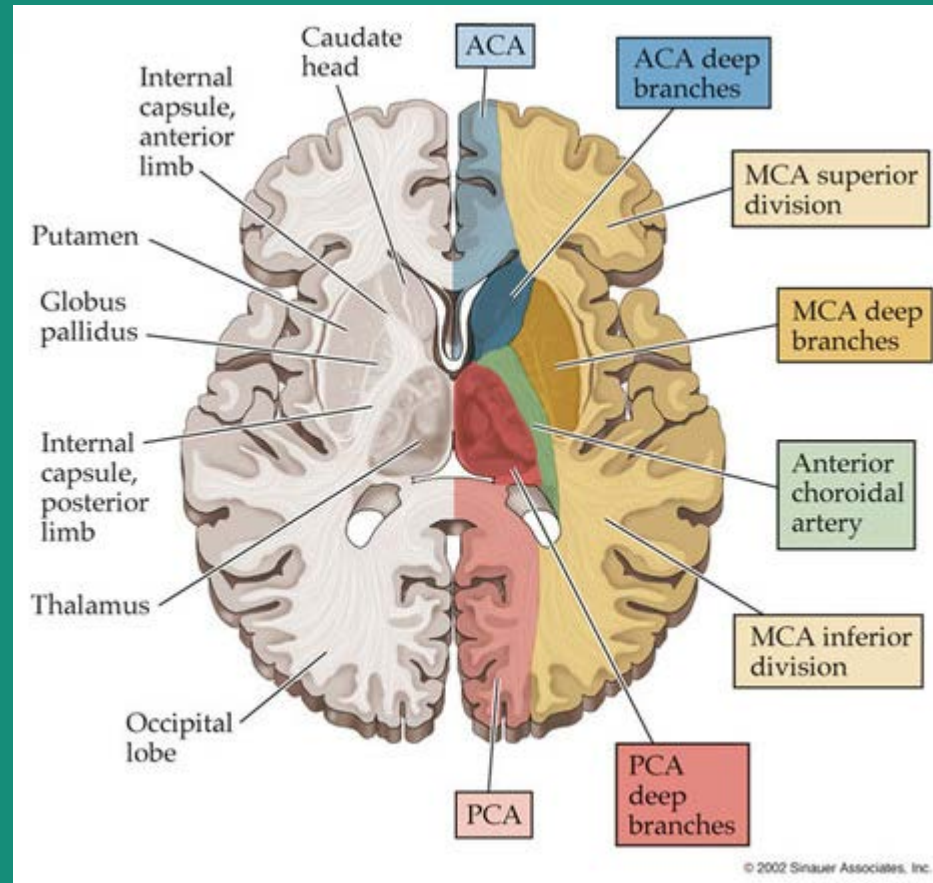
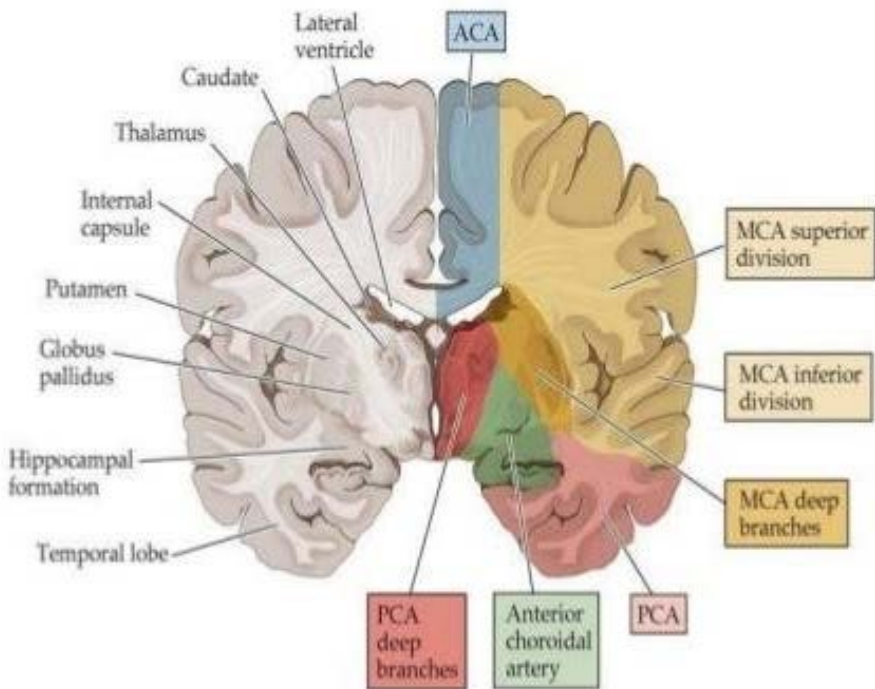
Posterior circulation



Posterior circulation

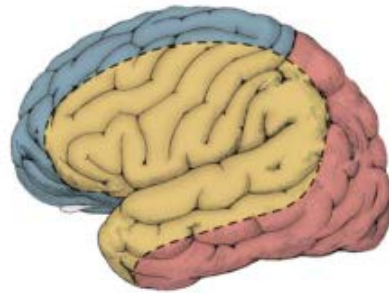
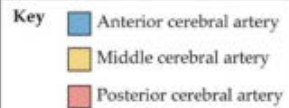


Vascular territory



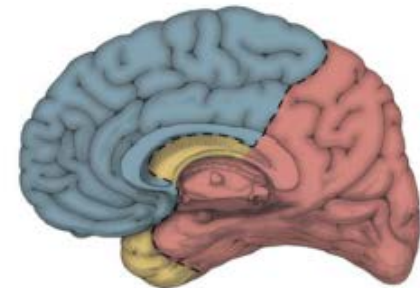
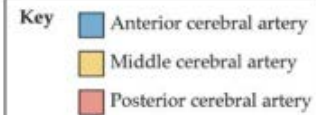
Vascular territory

(A)



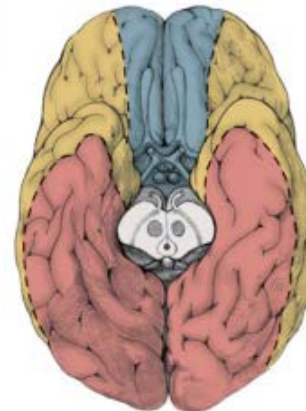
© 2002 Elsevier Associates, Inc.

(B)

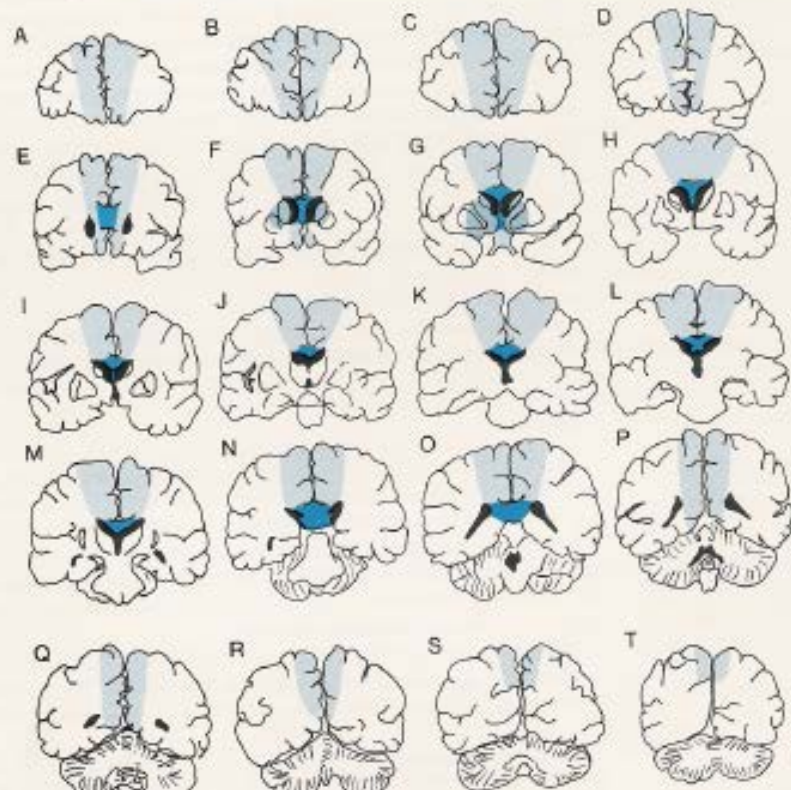
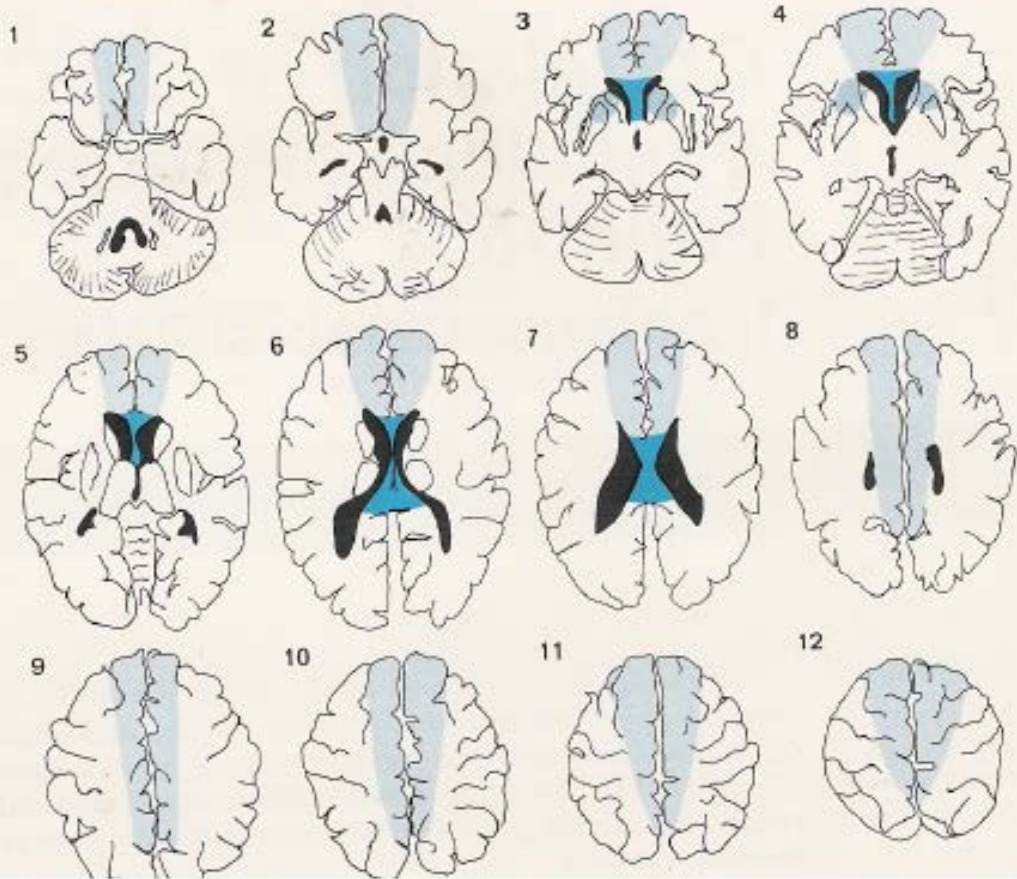


© 2002 Elsevier Associates, Inc.

(C)



© 2002 Elsevier Associates, Inc.

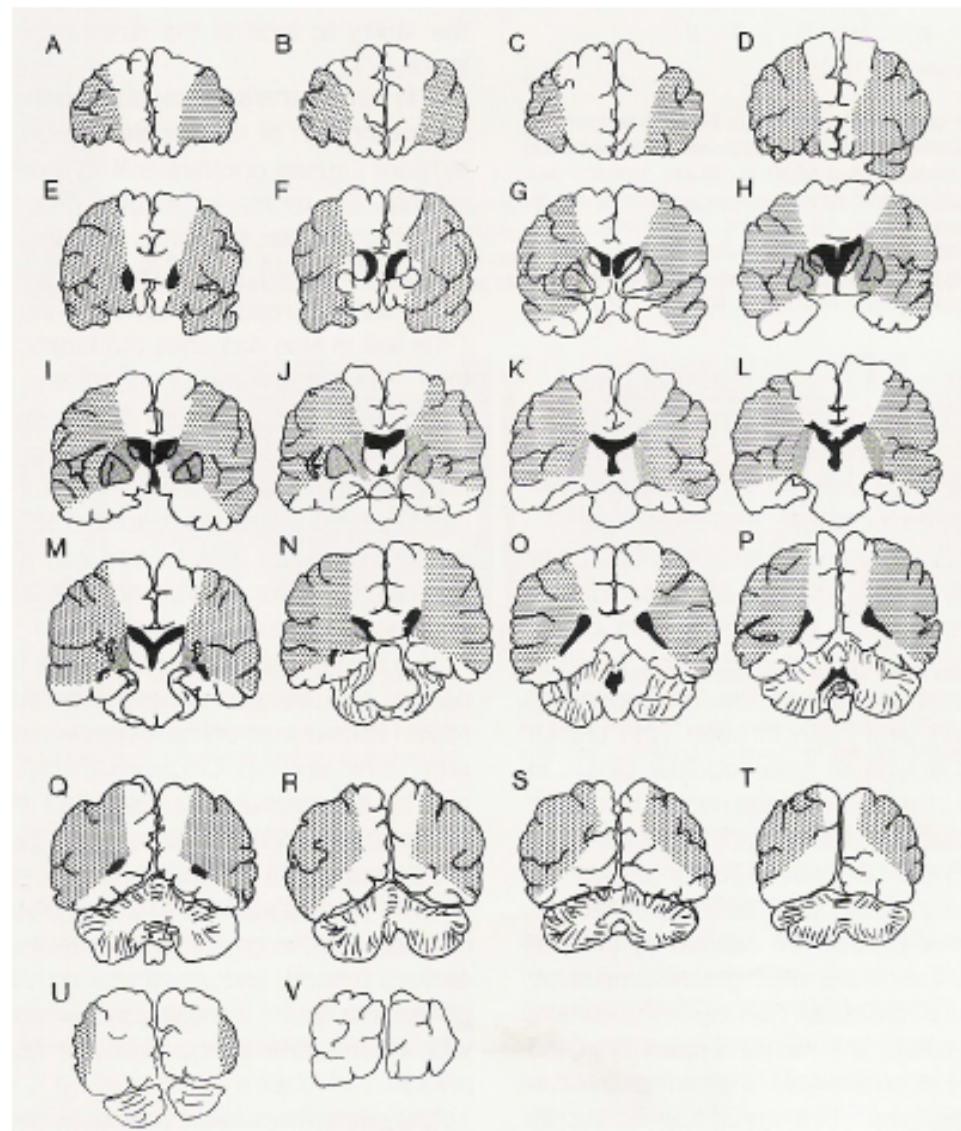
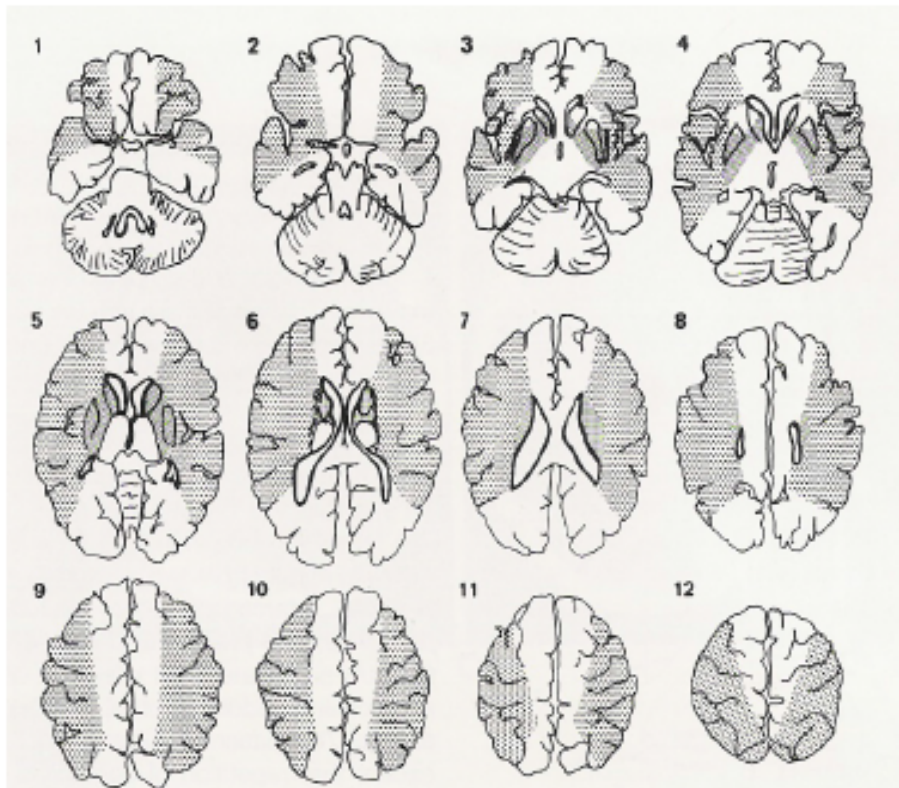


ACA territory

Light blue

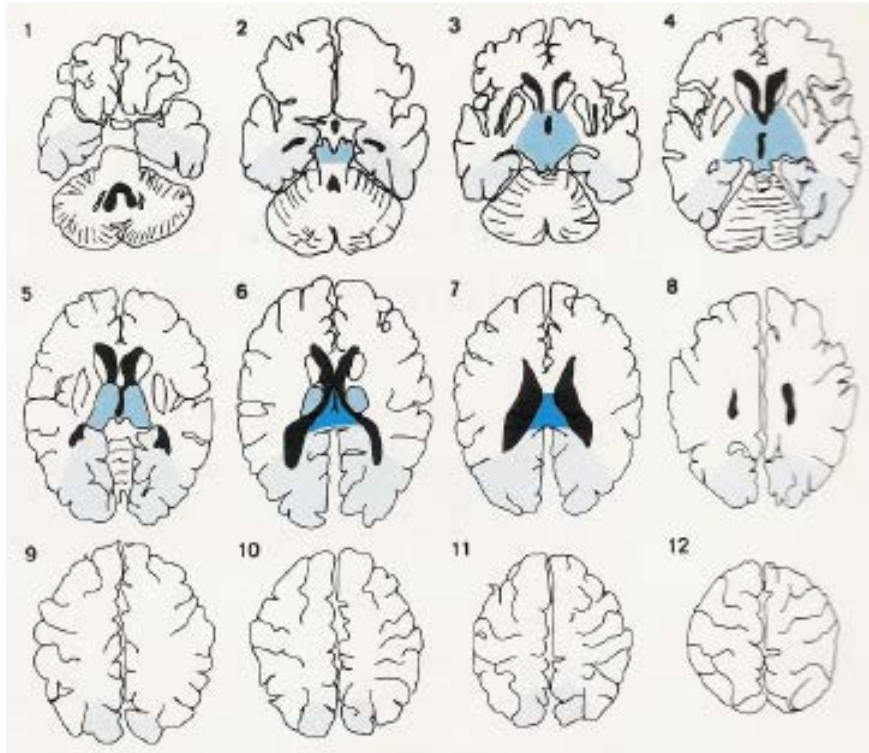
Medium blue

Dark blue



MCA territory

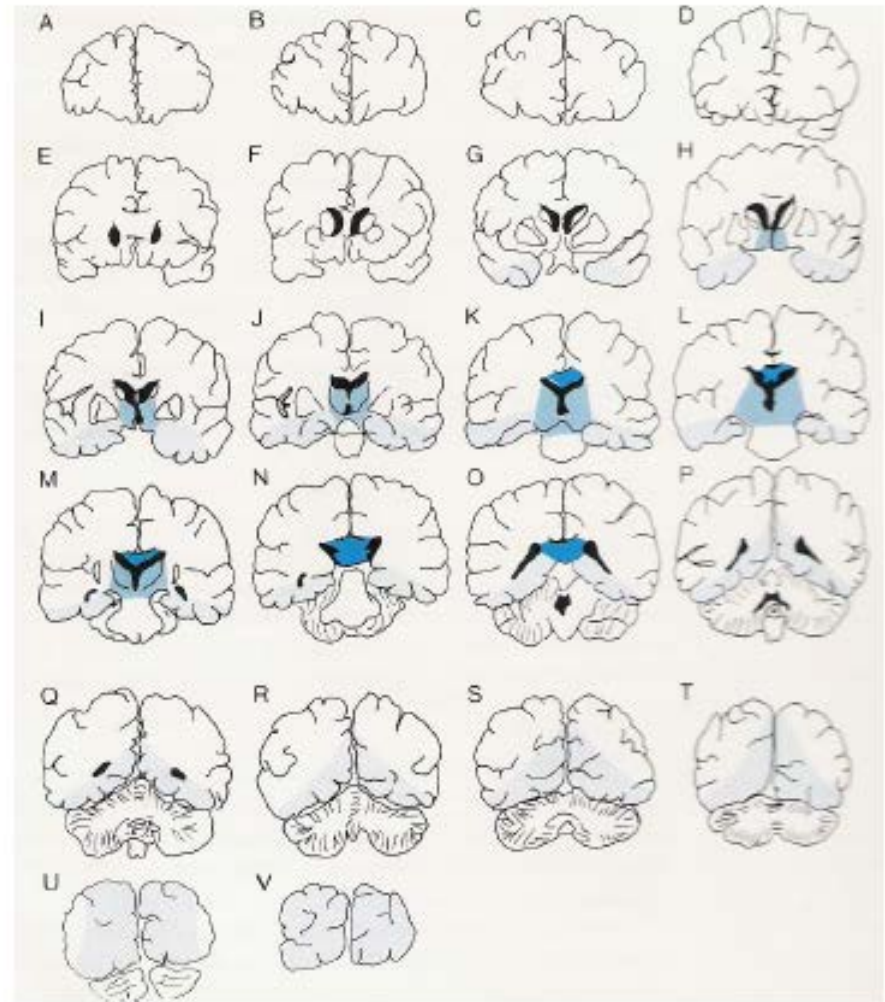
PCA territory



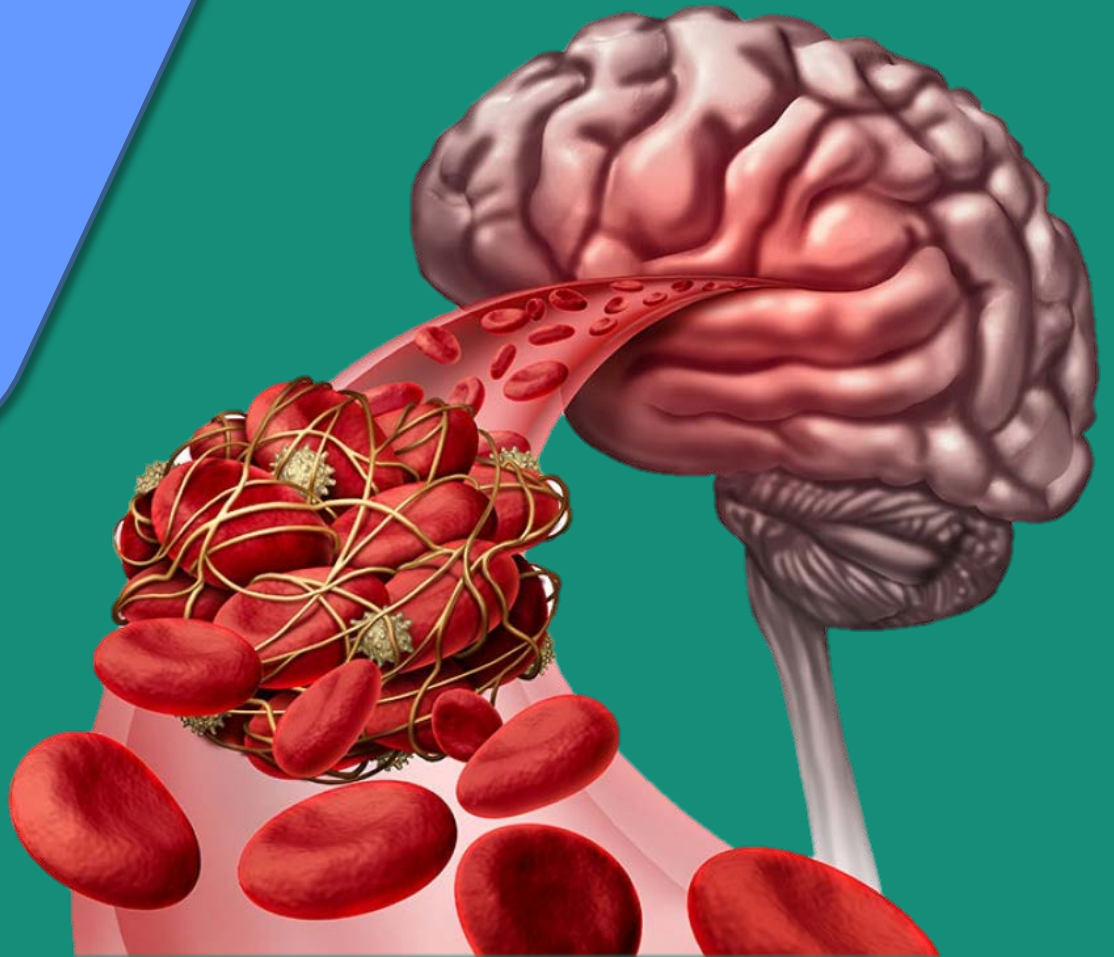
Light blue

Medium blue

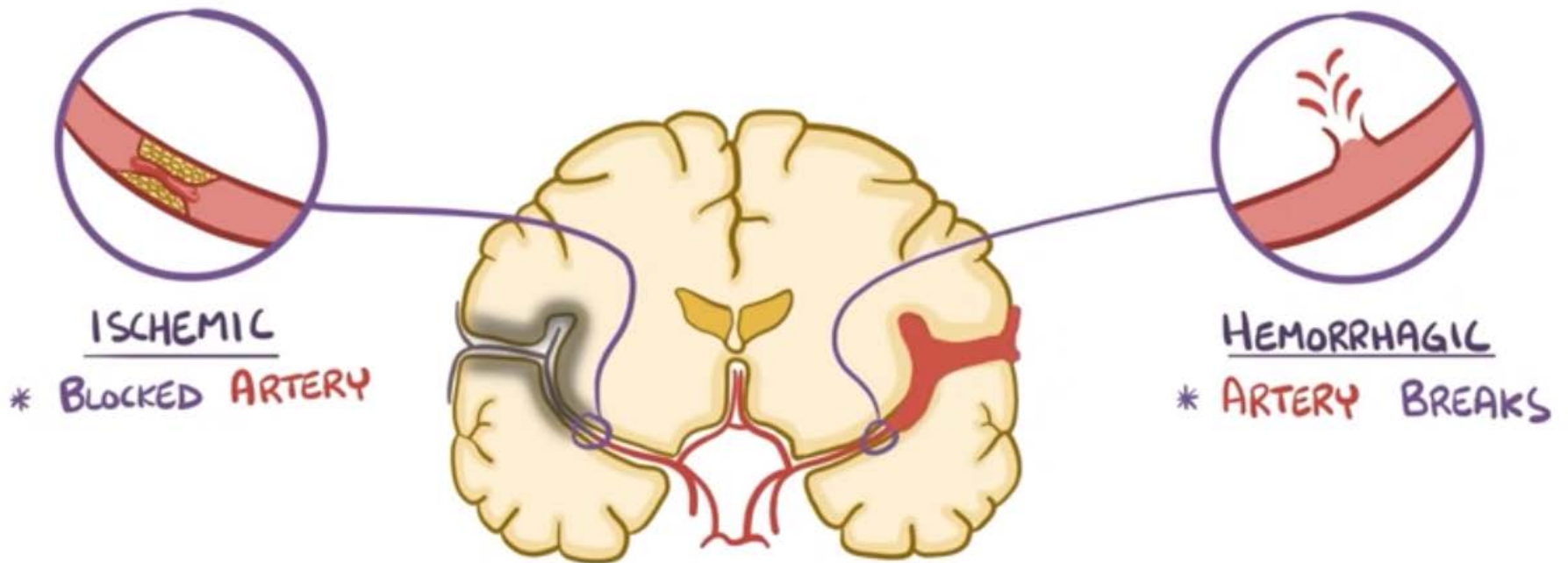
Dark blue

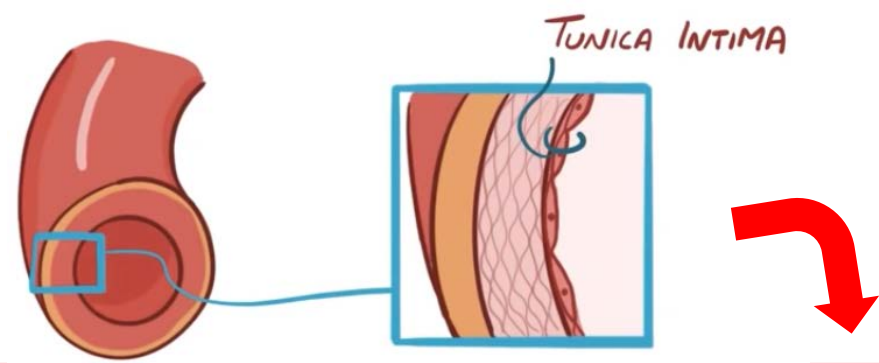


Pathophysiology



Stroke



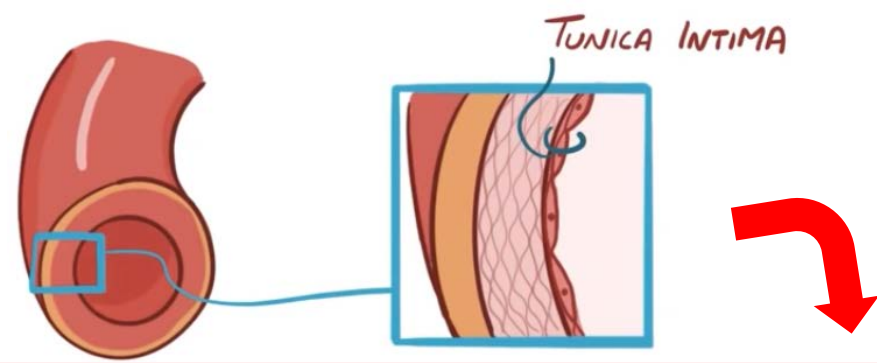


1

ENDOTHELIAL CELL DYSFUNCTION

* IRRITANTS DAMAGE the ENDOTHELIUM

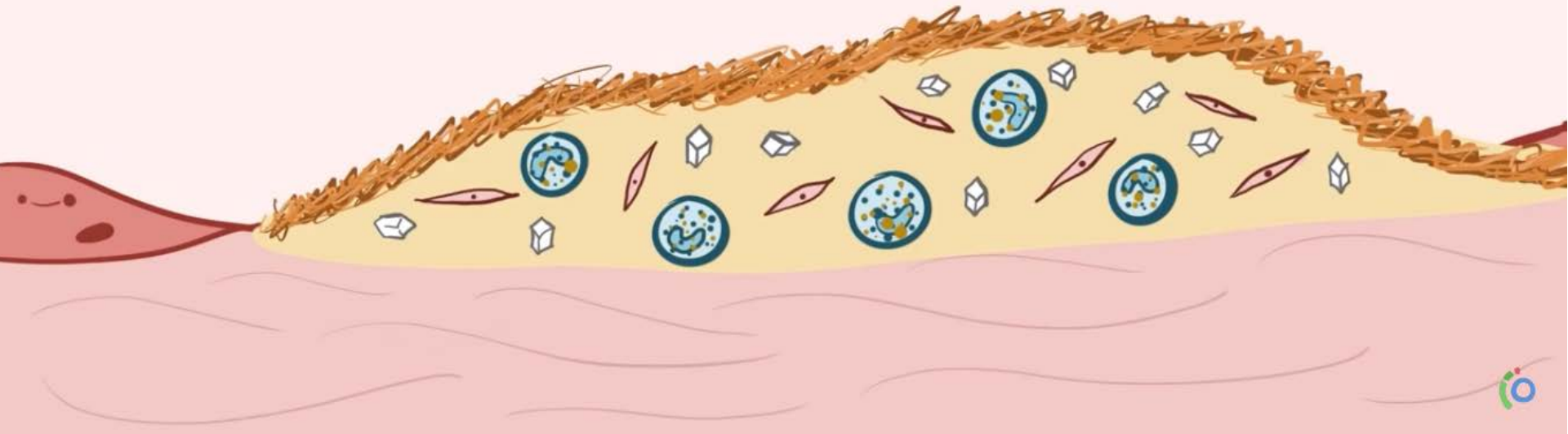


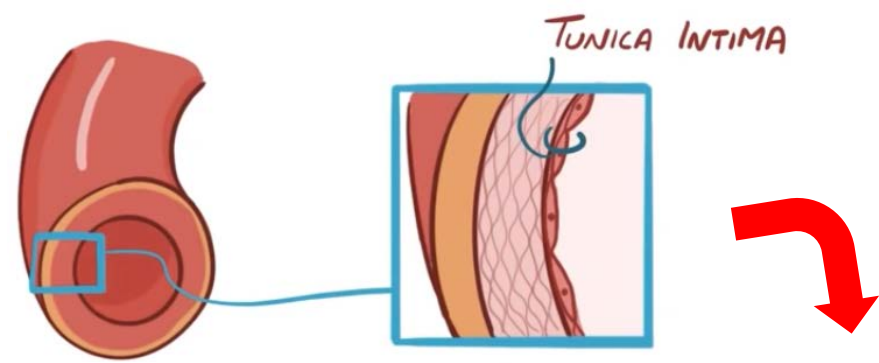


ENDOTHELIAL CELL DYSFUNCTION

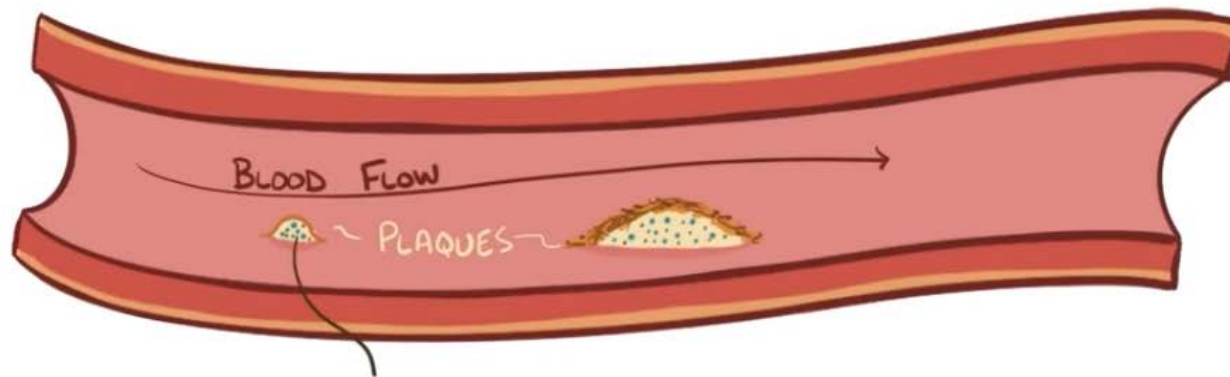
- * IRRITANTS DAMAGE the ENDOTHELIUM
- * DAMAGE BECOMES SITE FOR **ATHEROSCLEROSIS**
 - ↳ a **PLAQUE** FORMS → OBSTRUCTS BLOOD FLOW

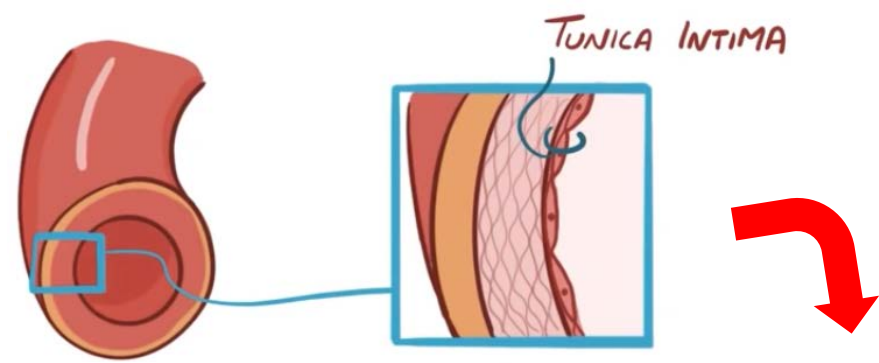
A BUILDUP OF **FATS, CHOLESTEROL, PROTEINS,**
CALCIUM, AND IMMUNE CELLS



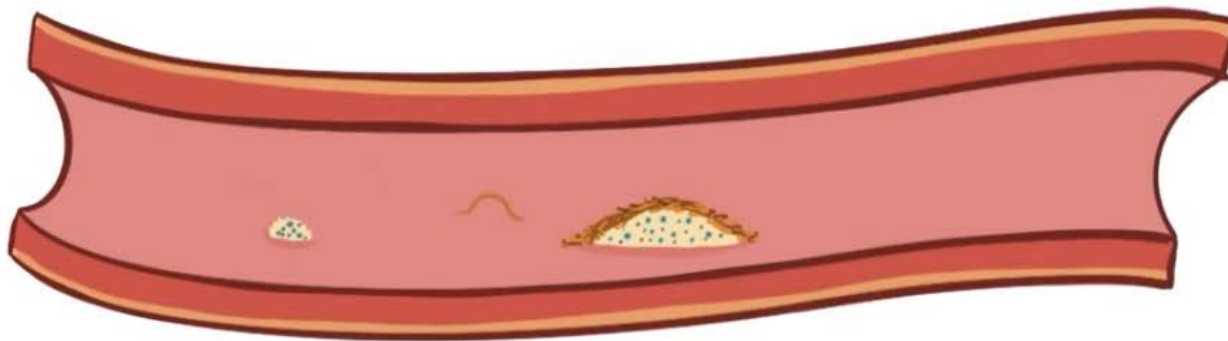


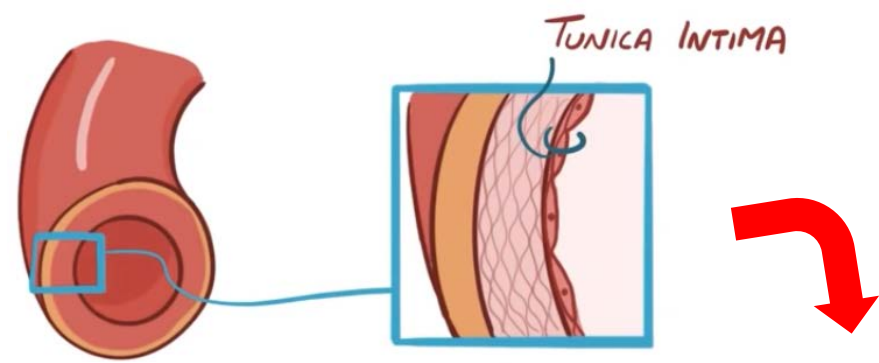
ENDOTHELIAL CELL DYSFUNCTION
STROKE \rightsquigarrow SUDDEN & COMPLETE BLOCKAGE





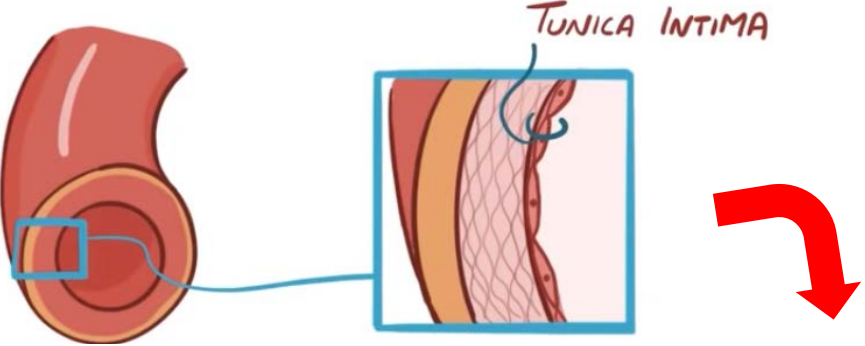
ENDOTHELIAL CELL DYSFUNCTION
STROKE \rightsquigarrow SUDDEN & COMPLETE BLOCKAGE





ENDOTHELIAL CELL DYSFUNCTION
STROKE → SUDDEN & COMPLETE BLOCKAGE

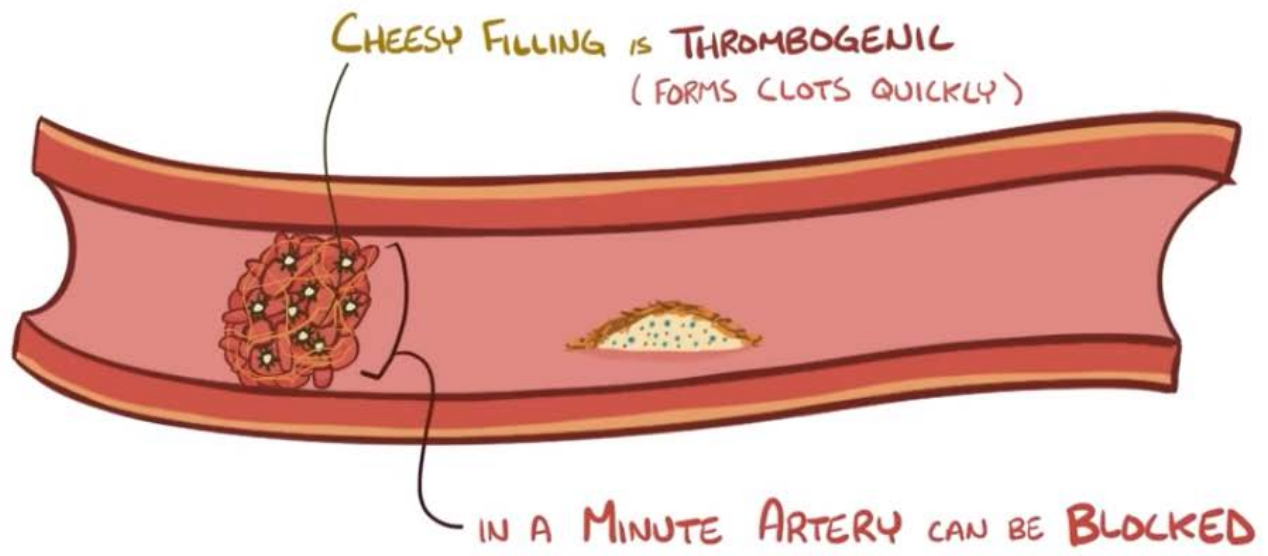




TUNICA INTIMA

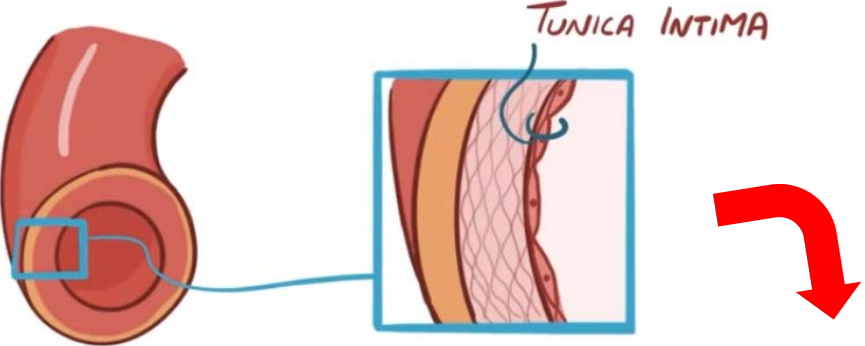
ENDOTHELIAL CELL DYSFUNCTION

STROKE → SUDDEN & COMPLETE BLOCKAGE



CHEESY FILLING IS THROMBOGENIC
(FORMS CLOTS QUICKLY)

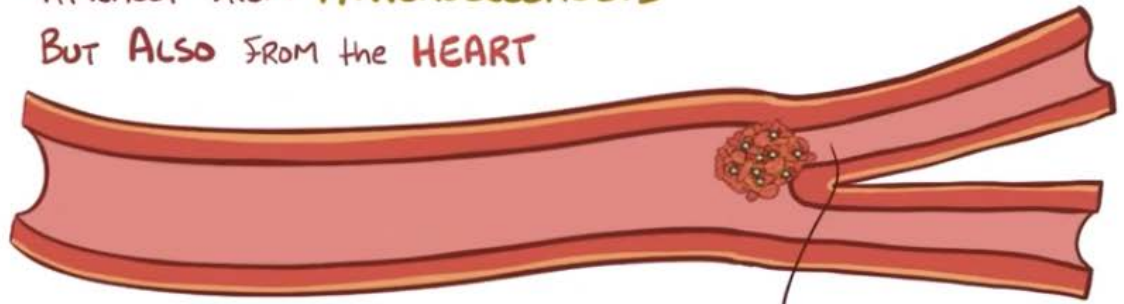
IN A MINUTE ARTERY CAN BE BLOCKED



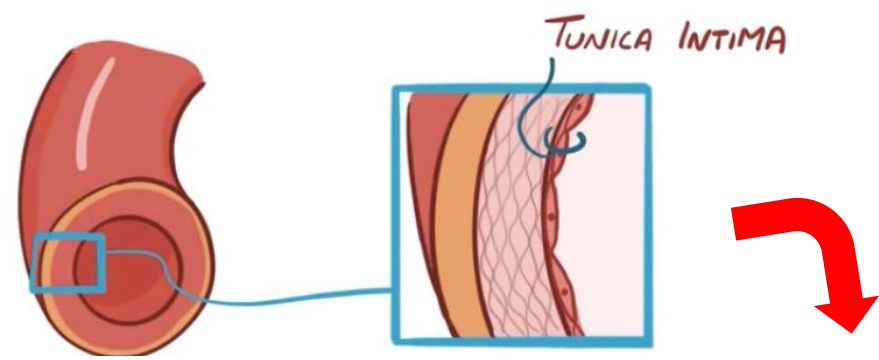
EMBOLISM

BLOOD CLOT BREAKS OFF FROM ONE LOCATION & GETS LODGED IN ANOTHER

TYPICALLY FROM **ATHEROSCLEROSIS**
BUT ALSO FROM THE HEART



TYPICALLY a VESSEL WITH a SMALLER DIAMETER



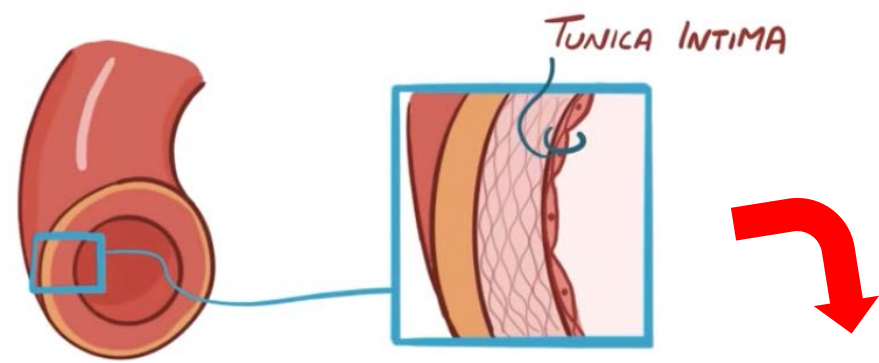
EMBOLISM

BLOOD CLOT BREAKS OFF FROM ONE LOCATION
& GETS LODGED IN ANOTHER



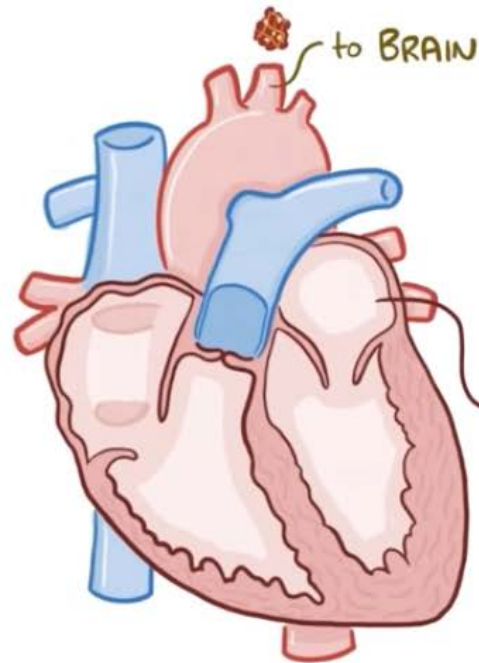
STAGNANT BLOOD
CAN CLOT
BLOOD CAN STAGNATE
↳ ATRIAL FIBRILLATION
↳ HEART ATTACK

IF FORMS IN LEFT ATRIUM



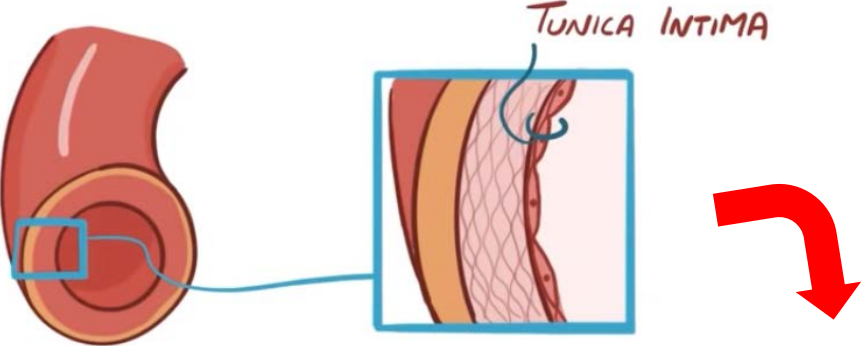
EMBOLISM

BLOOD CLOT BREAKS OFF FROM ONE LOCATION
& GETS LODGED IN ANOTHER

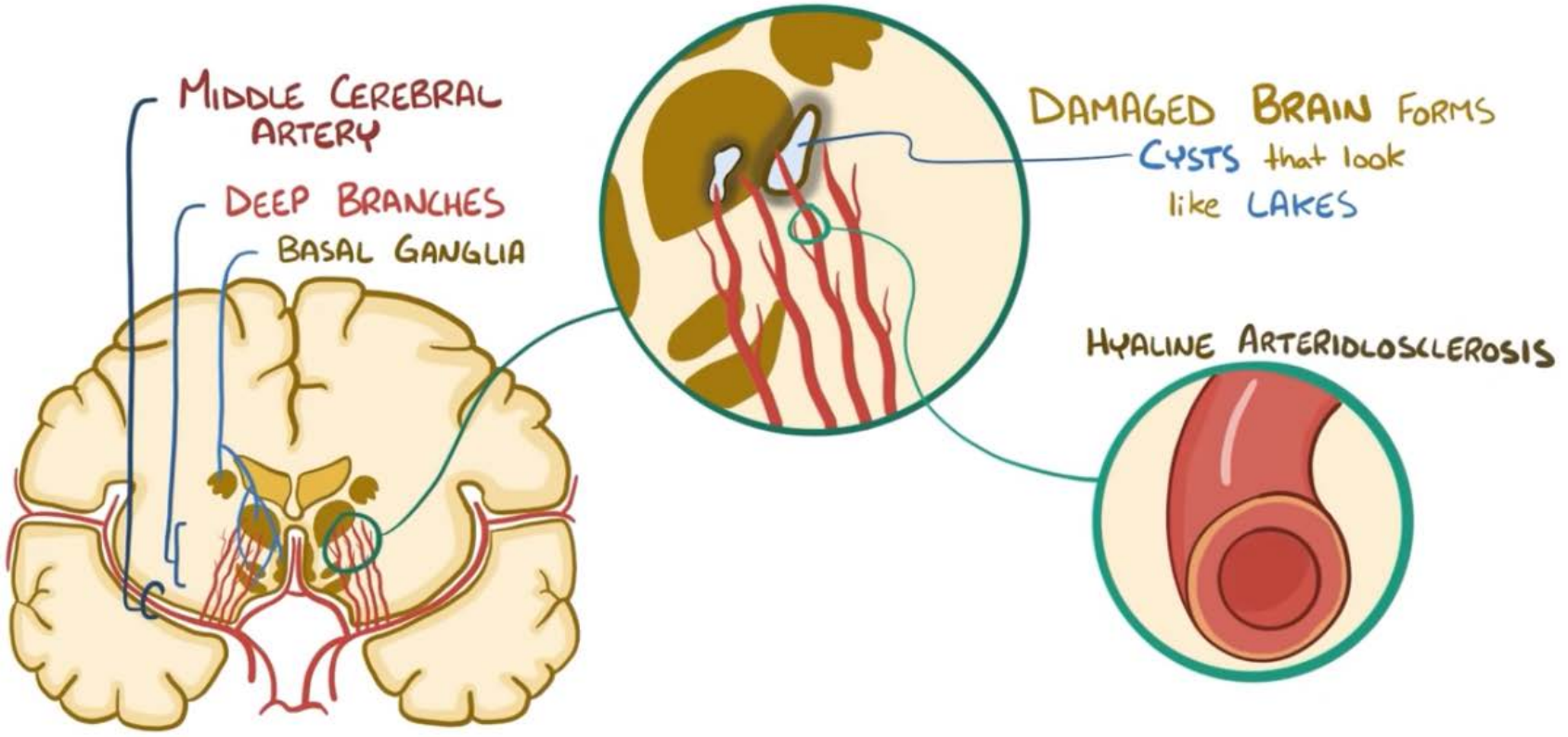


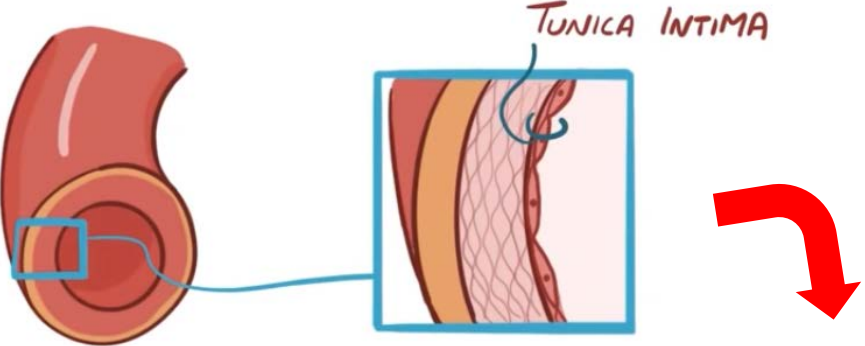
STAGNANT BLOOD
CAN CLOT
BLOOD CAN STAGNATE
↳ ATRIAL FIBRILLATION
↳ HEART ATTACK

IF FORMS IN LEFT ATRIUM
↳ DIRECT ROUTE to BRAIN

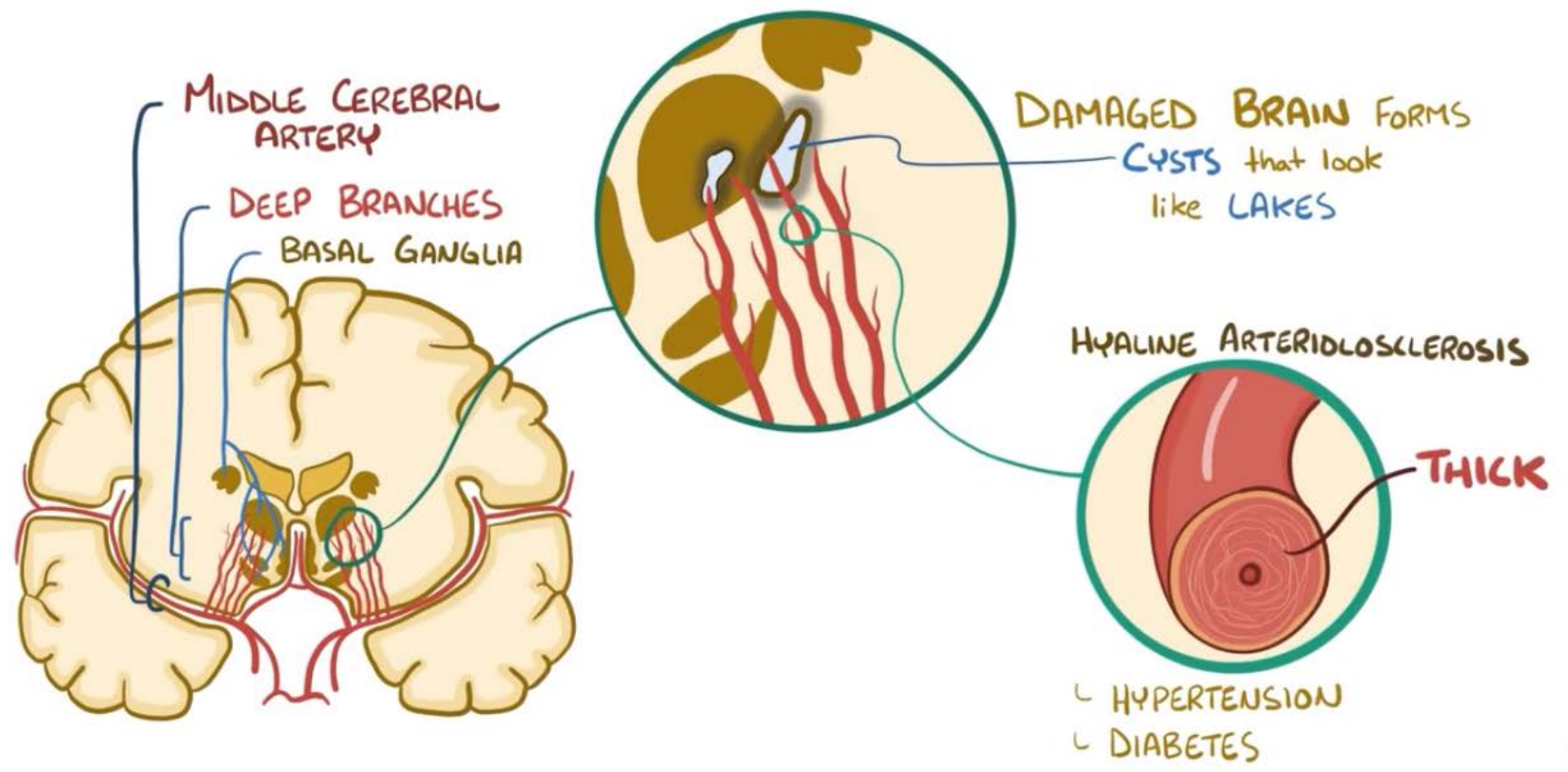


LACUNAR STROKE

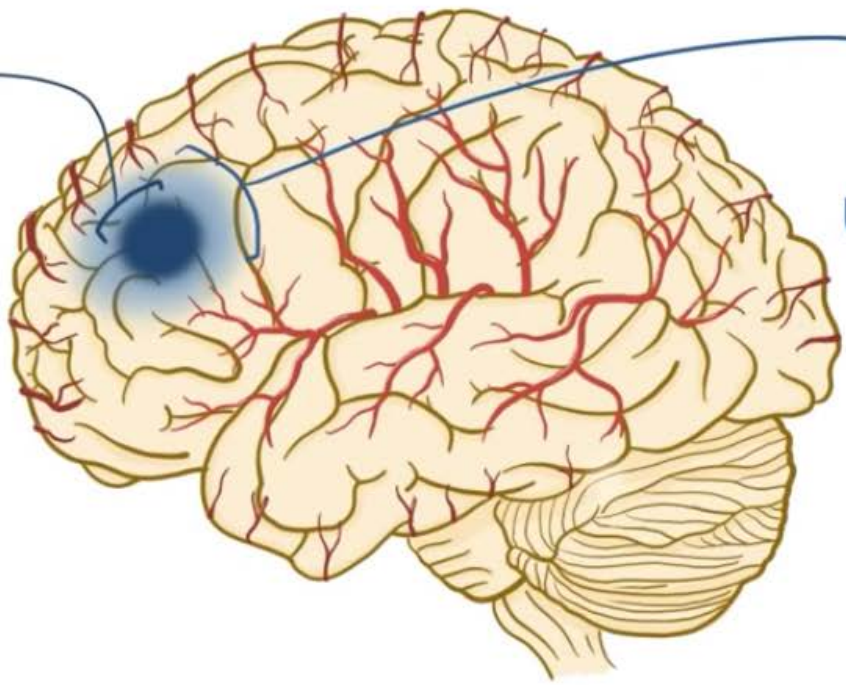




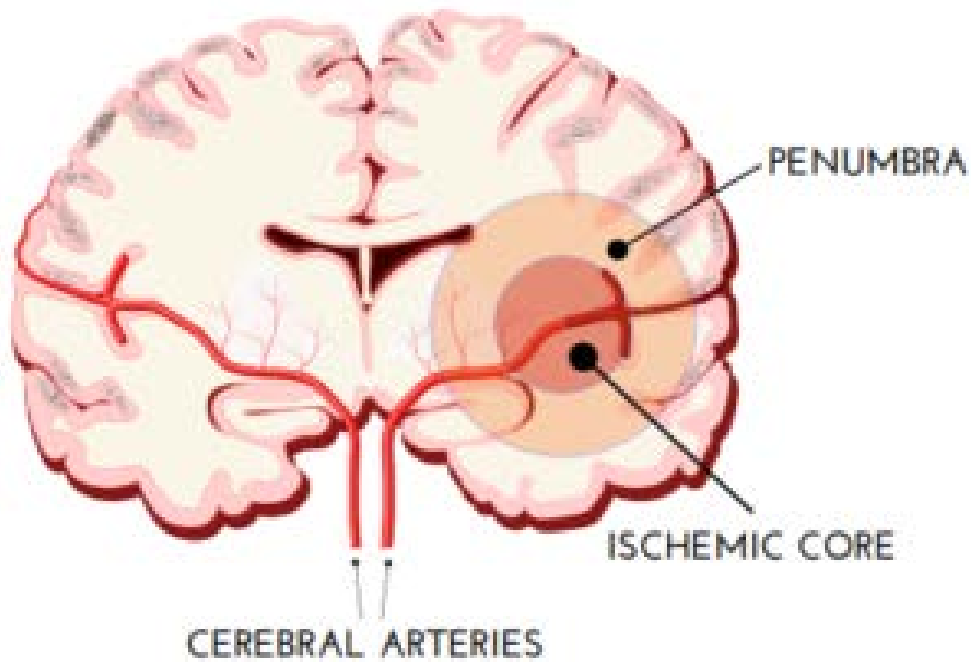
LACUNAR STROKE



ISCHEMIC CORE
TISSUE WILL LIKELY DIE



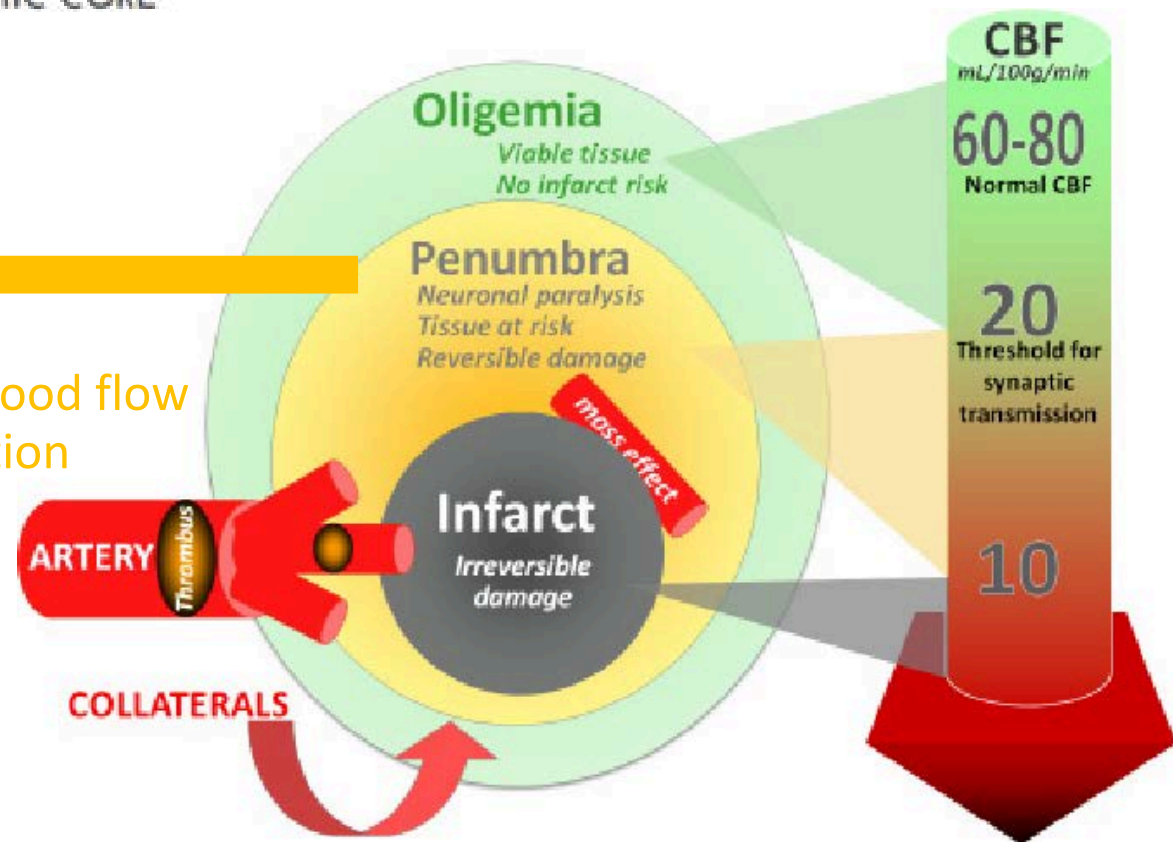
ISCHEMIC PENUMBRA
PRESERVED BY
COLLATERAL CIRCULATION
MAY SURVIVE



Reversible ischemia



Reperfusion
 Restoration blood flow
 Tissue protection



Clinical presentation of stroke



Clinical stroke

Sudden onset of focal neurological deficits

- Hemiparesis / hemianesthesia
- Dysarthria . Aphasia
- Visual loss , hemianopia
- Hemichorea , hemiballism
- Ataxia , imbalance , brainstem / cerebellar sign
- Vertigo with neuro deficit

แยก Anterior circulation stroke VS Posterior circulation stroke

Clinical stroke

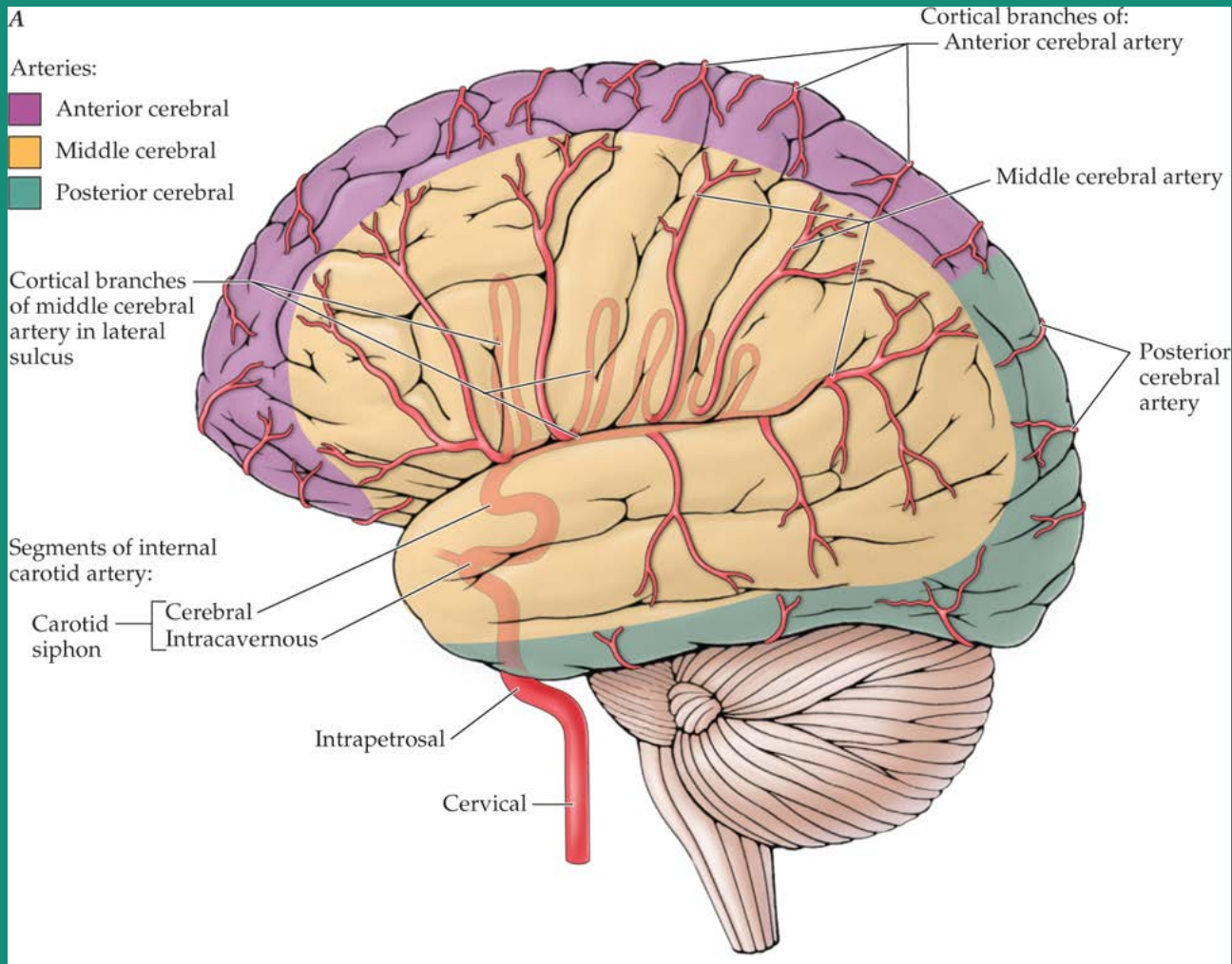
Sudden onset of focal neurological deficits

- Hemiparesis / hemianopia
- Dysarthria . Aphasia
- Visual loss , hemianopia
- Hemichorea , hemiballism
- Ataxia , imbalance , cerebellar sign
- Vertigo with neuro deficit

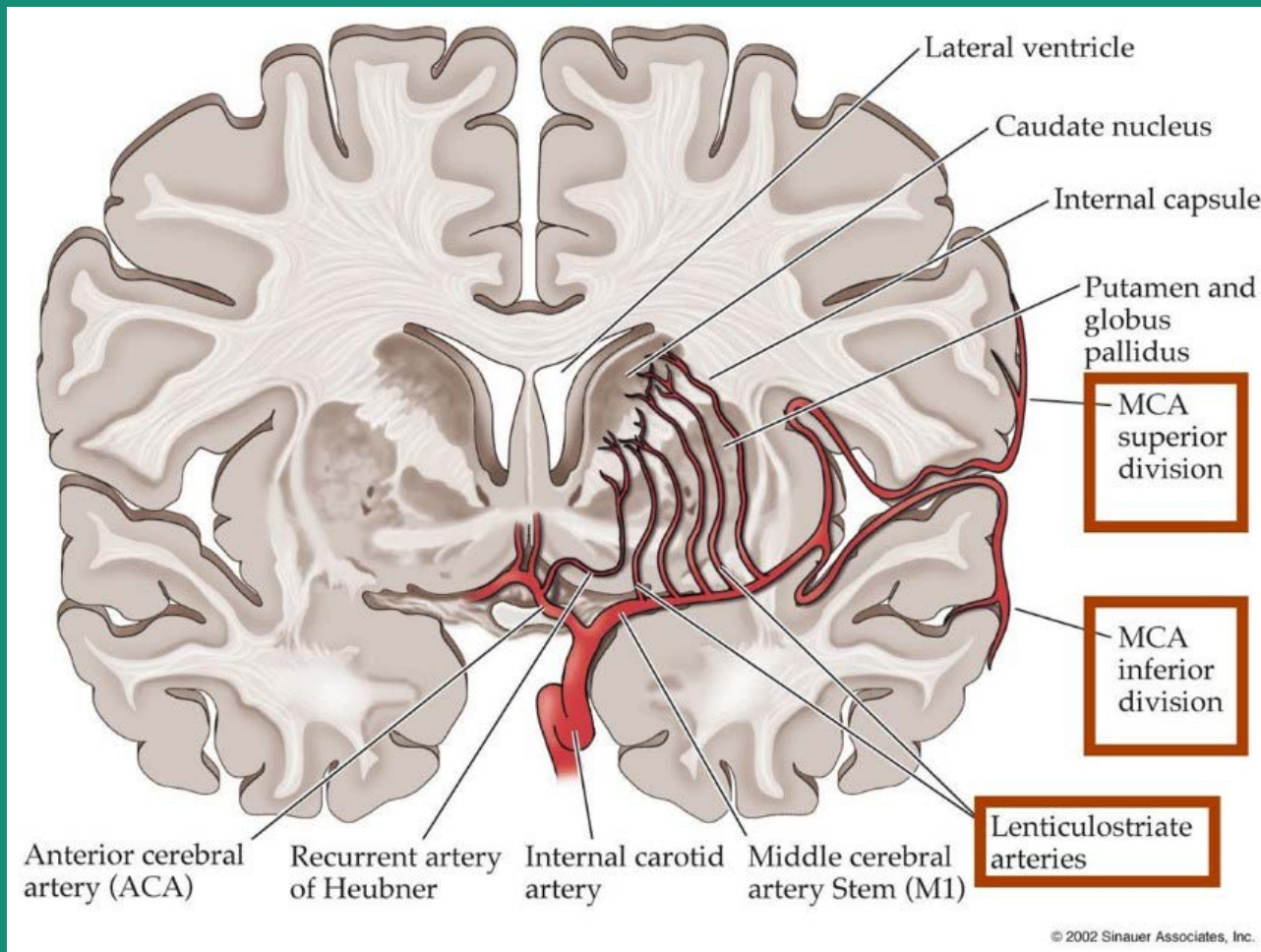


แยก Anterior circulation stroke VS Posterior circulation stroke

Anterior circulation stroke



Anterior circulation stroke



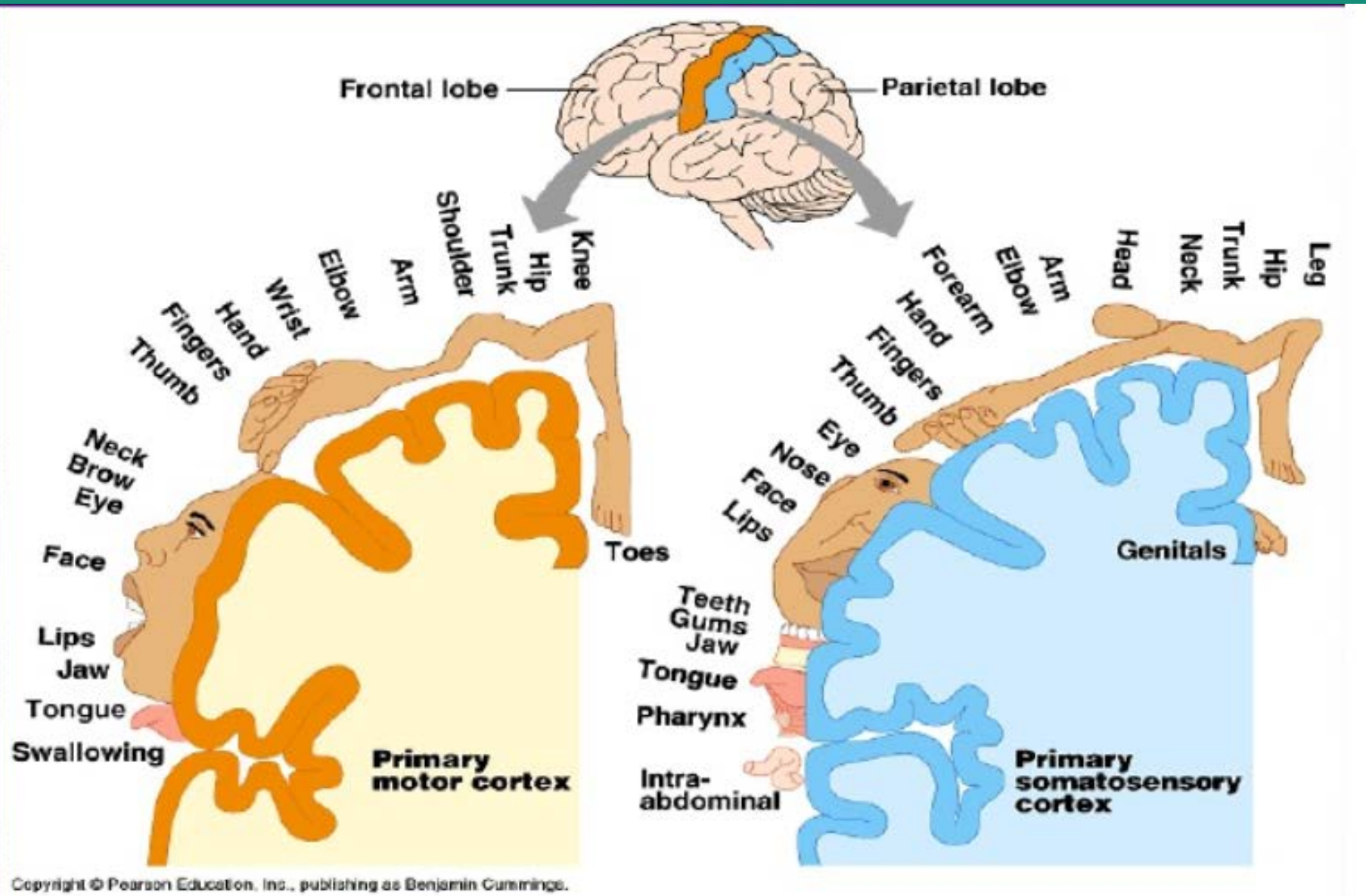
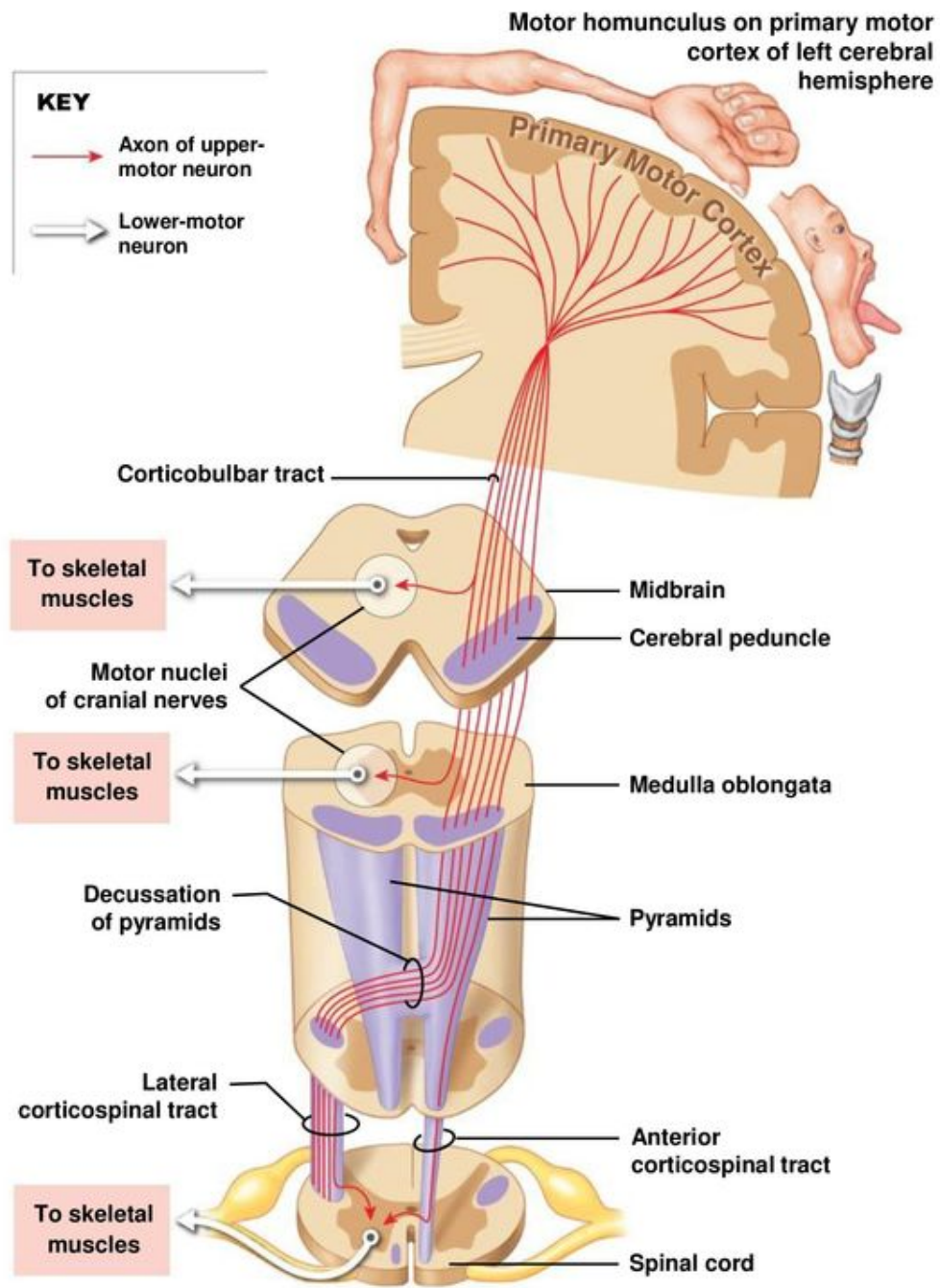
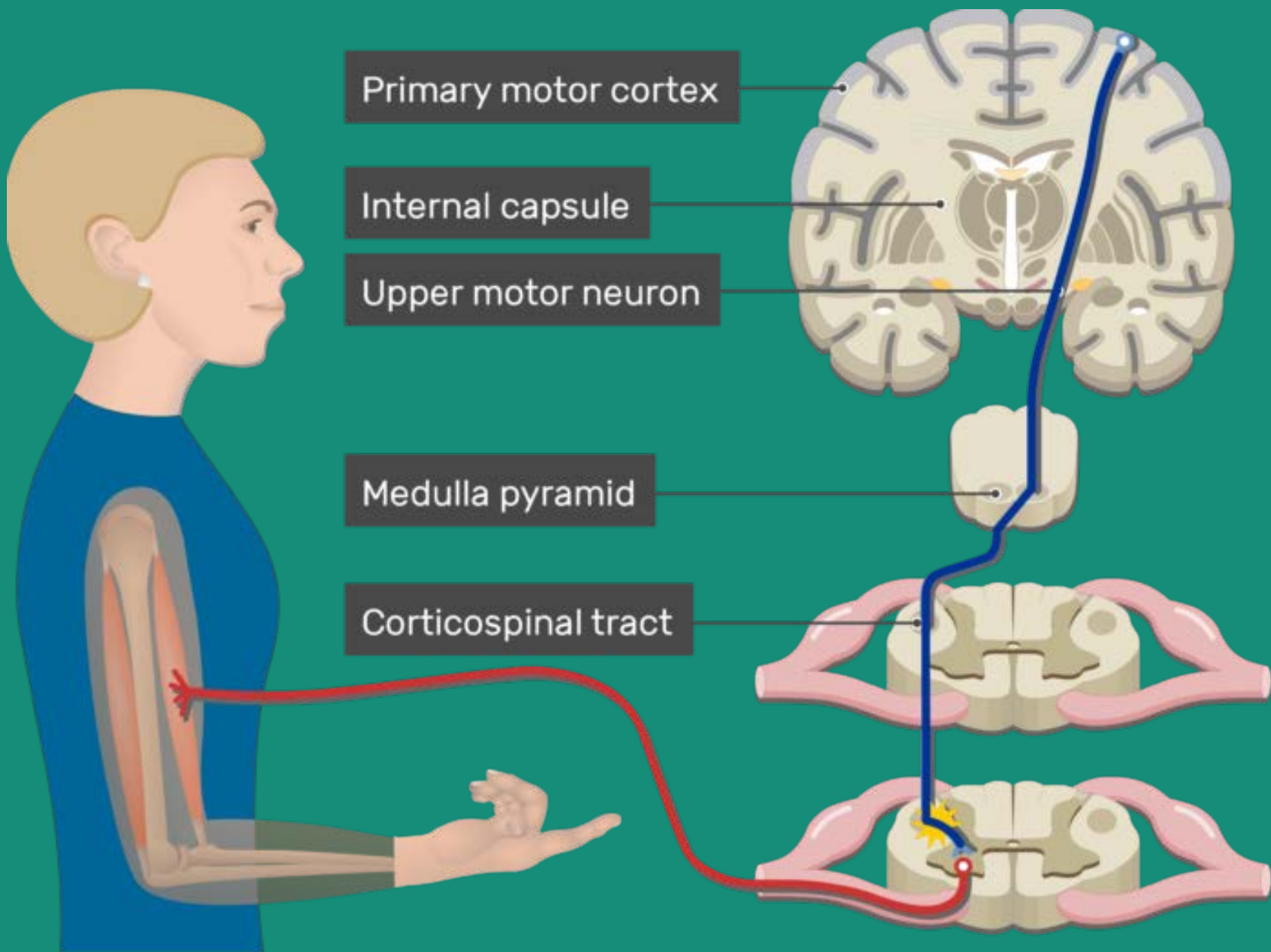


Figure 15-9 The Corticospinal Pathway.





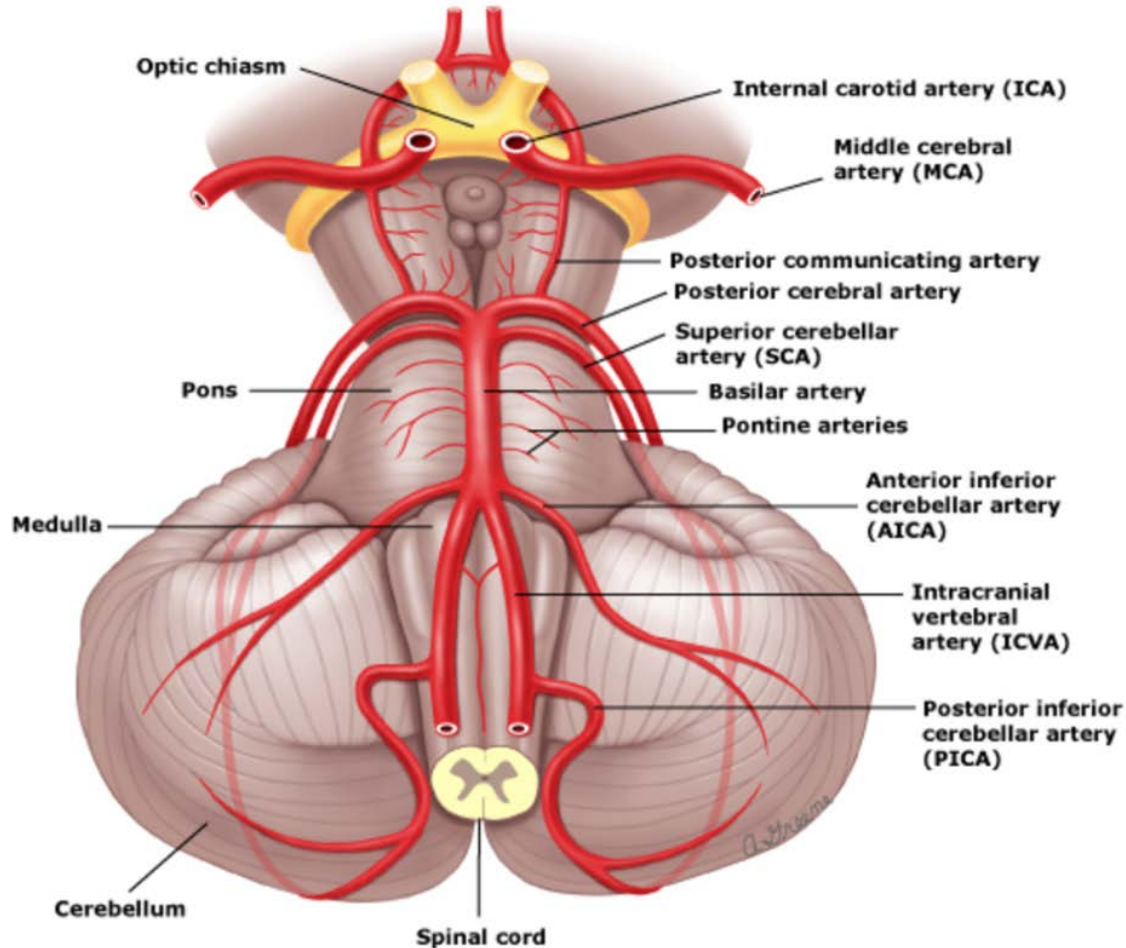
Anterior circulation stroke

**Malignant MCA/ICA infarction or
Large infarction with midline shift**

Clinical

- Hemiplegia with alteration of consciousness
- Forced eye deviation
- Aphasia
- Hemi-inattention
- Unequal pupils

Posterior circulation stroke



Posterior circulation stroke

Brain stem and cerebellar infarction

Clinical

- Ataxia or incoordination
- Vertigo or dizziness
- Double vision
- Nystagmus
- Dysphagia
- Slurred speech
- Impaired consciousness
- Hemiparesis/Quadriparesis

Emergency evaluation and treatment



Sudden onset of focal neurological deficits with suspicious of stroke



- Basic life support (ABC)
- Capillary blood glucose
- Emergency lab (CBC, BUN, Cr, electrolyte, coagulogram, EKG)

- Stroke onset time
- Last seen normal
- Medical history and baseline mental status

Rule out stroke mimic :

- Hypoglycemia
- Seizure
- Syncope
- Migraine
- Brain tumor
- Toxin
- CNS infection

Sudden onset of focal neurological deficits with suspicious of stroke

- Basic life support (ABC)
- Capillary blood glucose
- Emergency lab (CBC, BUN, Cr, electrolyte, coagulogram, EKG)

Onset < 4.5 hr

Onset 4.5 – 12 hr

กรณีสงสัย Large VV occlusion

Onset > 12 hr

Stroke Fast track



**Sudden onset of focal neurological deficits
with suspicious of stroke**

Onset < 4.5 hr

Onset 4.5 – 12 hr

Onset > 12 hr

Stroke Fast track



Sudden onset of focal neurological deficits with suspicious of stroke

Onset < 4.5 hr

Onset 4.5 – 12 hr

Onset > 12 hr

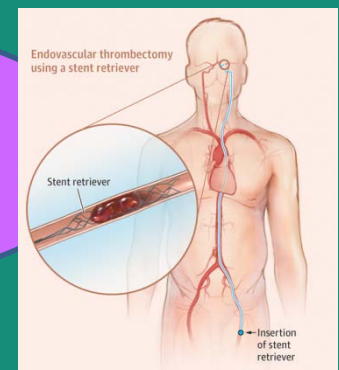
Stroke Fast track



rt-PA



Endovascular
treatment

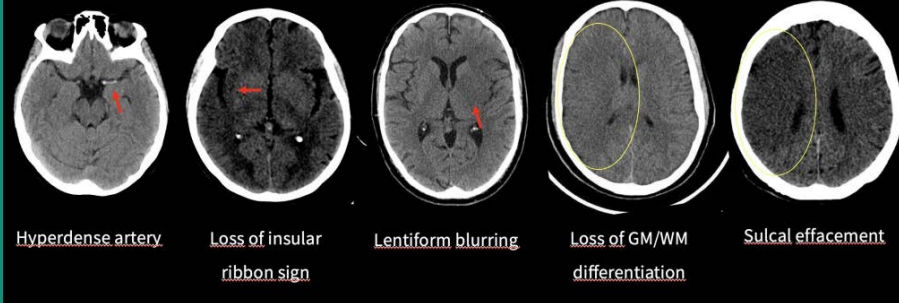


Onset < 4.5 hr

Ability to investigate and start IV rt-PA

Non-contrasted CT scan

Early ischemic stroke signs



Hemorrhage



Appropriate treatment

Normal/early/
ischemic lesion

Consider IV rt-PA

- Hyperdense MCA
- Loss of insular ribbon
- Basal ganglion obscuration
- Loss of gray-white junction
- Effacement of cortical sulci

Consider **endovascular treatment** if suspected with severe stenosis or occlusion of proximal MCA /ICA and BA occlusion

Onset 4.5 – 12 hr

Non-contrasted CT scan + / - CTA



Occlusion or severe stenosis of proximal MCA/ICA with onset <6 hr
BA with onset <12 hr



Consider **endovascular treatment** if suspected with severe stenosis or occlusion of proximal MCA /ICA and BA occlusion

No occlusion or severe stenosis of proximal MCA/ICA/ BA

Treat acute ischemic stroke
General management

Onset > 12 hr

Non-contrasted CT scan

Hemorrhage

Appropriate
treatment

Normal/early/
ischemic lesion

Treat acute ischemic stroke
General management

IV thrombolysis

**Thrombolytic: IV r-TPA
(Alteplase)**

Dose: 0.9 mg/kg (max. 90mg)
10% bolus in 1 min
90% in 60 min



Indication



Contraindication

IV Thrombolysis in 4.5 hr

```
graph TD; A[IV Thrombolysis in 4.5 hr] --> B[Inclusion criteria]; B --> C[Exclusion criteria]; C --> D[Onset 3 hr]; C --> E[Onset 3 - 4.5 hr];
```

Inclusion criteria

Exclusion criteria

Onset 3 hr

Onset 3 – 4.5 hr

Inclusion criteria

โรงพยาบาลนราธิวาสราชนครินทร์ Thrombolysis Checklist

Inclusion Criteria	YES	NO
1. มีอาการของหลอดเลือดสมองตีบ ภายใน 4.5 ชั่วโมง		
2. อายุมากกว่า 18 ปี		
3. ผล CT brain ปกติ หรือพบลักษณะ early ischemic change		

IV Thrombolysis in 4.5 hr

```
graph TD; A[IV Thrombolysis in 4.5 hr] --> B[Inclusion criteria]; B --> C[Exclusion criteria]; C --> D[Onset 3 hr]; C --> E[Onset 3 - 4.5 hr];
```

Inclusion criteria

Exclusion criteria

Onset 3 hr

Onset 3 – 4.5 hr



Exclusion criteria



Onset 3 hr

Previous stroke in 3 months
ยังถือเป็น contraindication
จาก AHA/ASA 2019

กรณี Onset time ภายใน 3 ชั่วโมง

Exclusion Criteria	YES	NO
1. ความดันโลหิตช่วงก่อนให้การรักษาสุง (SBP>185 mmHg, DBP>110 mmHg) 		
2. มีประวัติเลือดออกในสมองมาก่อน		
3. ตรวจพบเนื้องอกในสมอง		
4. มีประวัติบาดเจ็บที่ศีรษะรุนแรงภายใน 3 เดือน		
5. มีประวัติได้รับยา a. warfarin โดย PT> 15วินาที หรือ INR > 1.7 b. Non vitamin K antagonist oral anticoagulant ภายใน 48 ชั่วโมง และการแข็งตัวของเลือดผิดปกติ (aPTT, INR, Plt. Count, ECT, TT, factor Xa activity)		
6. ได้รับยา heparin ภายใน 48 ชั่วโมง และ aPTT prolong		
7. Platelet count < 100,000 /mm3		
8. CT brain พบ hypodensity ที่เกิดจากการอุดตันของหลอดเลือด MCA > 1/3 distribution หรือพบเลือดออกในสมอง		
9. ระดับน้ำตาลในเลือด < 50 mg/dl (2.7mmol/L) 		
10. มีประวัติผ่าตัดเนื้อสมอง (intracerebral) หรือเนื้อไขสันหลัง (intraspinal) ภายใน 3 เดือน		
11. มีภาวะเลือดออกภายใน active internal bleeding		
12. ประวัติสงสัยภาวะ subarachnoid hemorrhage		
13. ประวัติ arterial puncture at noncompressible site ภายใน 7 วัน		

Exclusion criteria

ซึ่ง risk & benefit

Special considerations

Unruptured AVM
Not well established (Class IIa, LOE-C)

Unruptured intracranial aneurysm < 10 mm:
reasonable (Class IIa, LOE-C)

CMB > 10
↑ sICH with uncertain benefit (Class IIb, LOE-B)

Acute MI: reasonable PCI (Class IIb, LOE-C)

Recent MI in 3 mo:
NSTEMI (Class IIa, LOE-C)
STEMI RCA (Class IIa, LOE-C)
STEMI LAD (Class IIb, LOE-C)

Pregnancy:
If clinical moderate or severe stroke and benefit > risk bleeding (Class IIb, LOE-C)

ให้TPAก่อนแล้วrefer PCI

Powers WJ, et al. Stroke. 2018;49(3):e46-e110.

Relative Exclusion Criteria	YES	NO
1. อาการทางระบบประสาทไม่รุนแรง (NIHSS น้อยกว่า 4) หรือดีขึ้นอย่างรวดเร็ว		
2. มีอาการชักตั้งแต่เริ่ม		
3. มีประวัติผ่าตัดใหญ่หรืออุบัติเหตุรุนแรงภายใน14วัน		
4. มีเลือดออกในทางเดินอาหารหรือทางเดินปัสสาวะภายใน21วัน		
5. ประวัติกล้ามเนื้อหัวใจขาดเลือดภายใน3เดือน		
6. ตั้งครรภ์		

IV Thrombolysis in 4.5 hr

```
graph TD; A[IV Thrombolysis in 4.5 hr] --> B[Inclusion criteria]; B --> C[Exclusion criteria]; C --> D[Onset 3 hr]; C --> E[Onset 3 - 4.5 hr];
```

Inclusion criteria

Exclusion criteria

Onset 3 hr

Onset 3 – 4.5 hr

Exclusion criteria



Onset 3 - 4.5 hr

The benefit of tPA is uncertain in patients with very severe stroke symptoms (NIHSS score >25)

กรณี Onset time ภายใน 3-4.5 ชั่วโมง

Exclusion Criteria	YES	NO
1. NIHSS > 25		

Relative Exclusion Criteria	YES	NO
1. Previous stroke with DM		
2. Age > 80 years		
3. History of anticoagulant regardless of INR		

Post rtPA management

- ประเมิน neurological signs (GCS และ NIHSS)
- ทุก 15 นาที เป็นเวลา 2 ชั่วโมง
- ทุก 30 นาที เป็นเวลา 6 ชั่วโมง
- ทุก 60 นาที จนกระทั่งครบ 24 ชั่วโมง
- ควรทำ CT scan ซ้ำที่ 24 hr เพื่อติดตามว่ามีเลือดออกในสมอง
- หลีกเลี่ยงการทำหัตถการหรือการเจาะเลือดที่ไม่จำเป็นแก่ผู้ป่วยใน 24 ชั่วโมงแรก

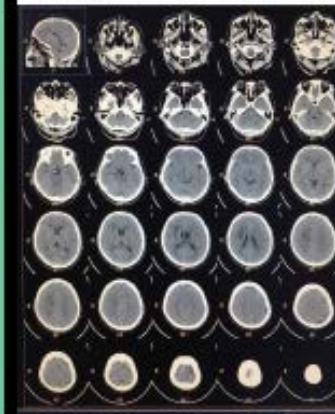
ใบตรวจประเมินภาวะหลอดเลือด
NIHSS (NINDS/SCA) (NIHSS)

ชื่อผู้ป่วย: _____ วันที่: _____ เวลา: _____

ชื่อแพทย์: _____ ชื่อพยาบาล: _____

ITEM	SCORING	MAX SCORE
1. Level of Consciousness	1-Alert 2-Responsive to voice stimuli 3-Responsive to painful stimuli 4-Unresponsive	
2. Eye Closure	0-Closed 1-One eye closed 2-Neither eye closed	
3. Verbal Response	0-Orally oriented 1-Orally confused 2-Nonverbal 3-Nonverbal with effort 4-Nonverbal without effort	
4. Best Language Understanding/Comprehension	0-Understands all 1-Understands most 2-Understands some 3-Does not understand	
5. Motor Response	0-Obeys commands 1-Localizes pain 2-Localizes pain with effort 3-Does not respond to pain 4-Does not respond to pain with effort	
6. Motor Response to Pain	0-Obeys commands 1-Localizes pain 2-Localizes pain with effort 3-Does not respond to pain 4-Does not respond to pain with effort	
7. Limb Ataxia	0-Independent 1-Needs guidance 2-Needs guidance with effort 3-Does not respond to command 4-Does not respond to command with effort	
8. Sensory	0-Recognizes objects 1-Recognizes objects with effort 2-Does not recognize objects 3-Does not recognize objects with effort	
9. Motor Language	0-Independent 1-Needs guidance 2-Needs guidance with effort 3-Does not respond to command 4-Does not respond to command with effort	
10. Extinction/Response Modifiability	0-Independent 1-Needs guidance 2-Needs guidance with effort 3-Does not respond to command 4-Does not respond to command with effort	

NIHSS (NIHSS) 0-28



Post rtPA management

1. หลีกเลี่ยงการให้ยาต้านเกล็ดเลือด หรือยาต้านการแข็งตัวของเลือด ภายใน 24 ชั่วโมง
2. ต้องหยุดให้rtPAทันทีที่สงสัยว่ามีเลือดออก และรีบทำการตรวจวินิจฉัย พร้อมทั้งให้การรักษาทันที
3. ไม่ควรใส่หลอดอาหาร (NG tube) รวมทั้งการแทงหลอดเลือดดำใหญ่ (central venous access) หรือแทงหลอดเลือดแดงภายใน 24 ชั่วโมง
4. หลีกเลี่ยงการใส่สายสวนปัสสาวะ ในช่วงเวลาที่ให้ยาหรือภายหลังจากให้ยา 30 นาที
5. ควบคุมความดันโลหิต ให้ SBP < 180 mmHg และ DBP < 105 mmHg เนื่องจากความดันสูง จะเสี่ยงต่อการเกิดเลือดออกในสมอง

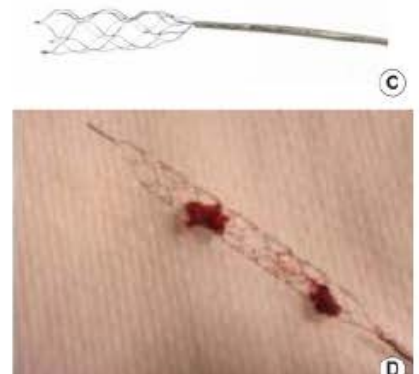
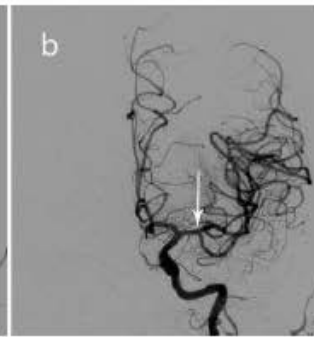
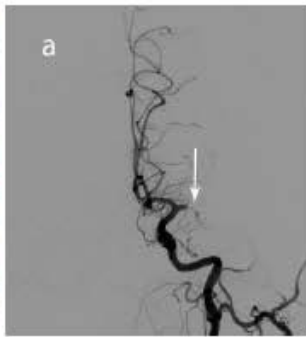
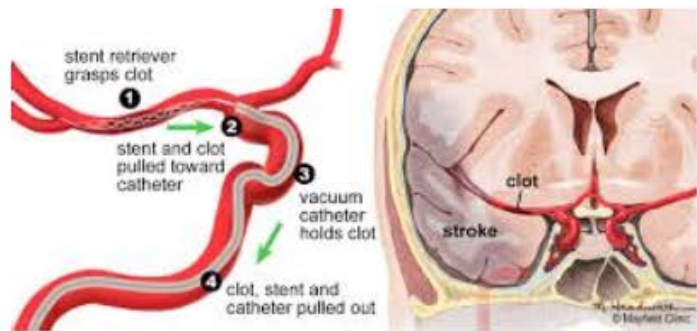
Keep BP

- Ischemic stroke **non rt-PA** < 220/120 mmHg
- Ischemic stroke **before rt-PA** < 185/110 mmHg
- Ischemic stroke **post rt-PA** < 180/105 mmHg
- Hemorrhagic stroke / **Hemorrhagic transformation**
< 140/90 mmHg



ถ้า **BP** เกินกว่าที่ **Keep** ให้ **Nicardipine**

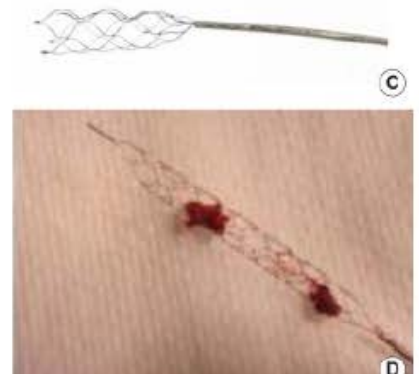
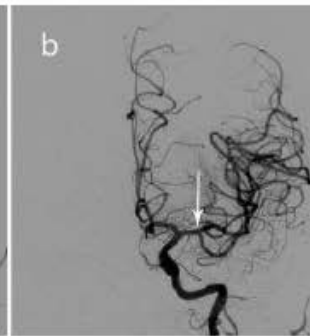
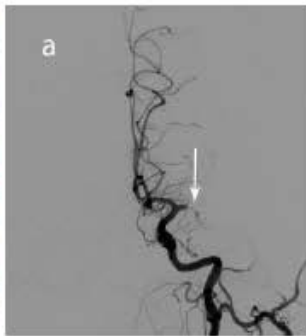
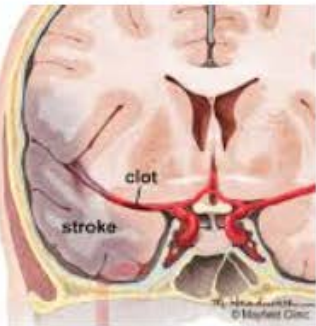
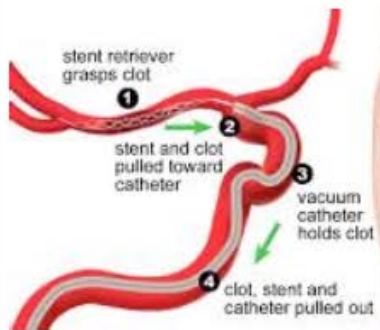
Mechanical thrombectomy



Mechanical thrombectomy

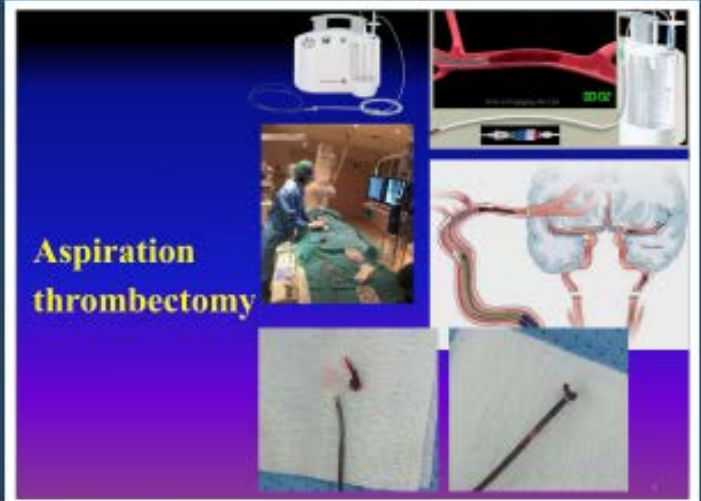
Indication

1. Prestroke mRS 0-1
2. ICA or proximal MCA (M1) occlusion or severe stenosis
3. Age > 18
4. NIHSS > 6
5. ASPECT score > 6
6. Able to do groin puncture within 6 hours after onset (12 hr in posterior circulation stroke)

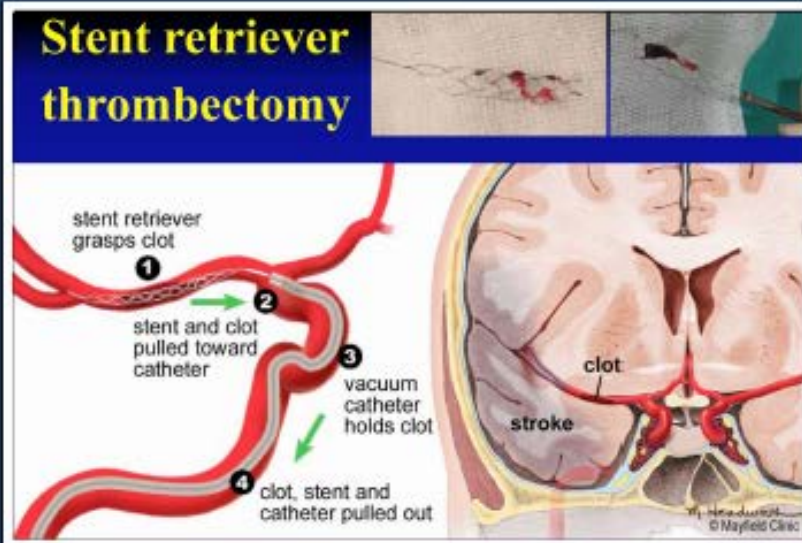


Mechanical thrombectomy

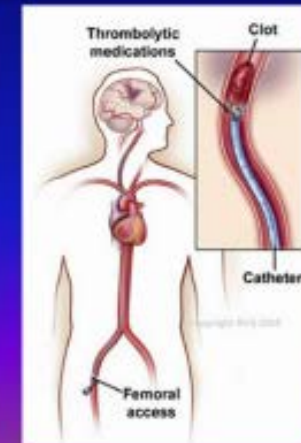
- Stent retriever thrombectomy
- Aspiration thrombectomy
- Intra-arterial thrombolysis



Stent retriever thrombectomy



Intra-arterial thrombolysis



rt-PA infusion via microcatheter



Antiplatelet in 48 hr



Antiplatelet in 48 hr



ให้ **aspirin 300 - 325 mg/d** ภายใน 48 ชั่วโมง
ยกเว้น

- Large infarct with midline shift
- แพ้ยา **aspirin** อาจพิจารณาให้ยาต้านเกล็ดเลือดตัวอื่น เช่น **cilostazol 200 mg/d**

ASA gr.5 sig 1 tab OD oral with stat x 14 d then
ASA (81) sig 1 tab OD oral life long

Antiplatelet in 48 hr



Aspirin resistance

- clopidogrel 75 mg
- cilostazol 200 mg/d
- aspirin 25 mg ร่วมกับ extended release dipyridamole 200 mg 2 เม็ดต่อวันแทน

Dual Antiplatelet



- Acute ischemic stroke NIHSS ≤ 3
- High risk TIA ABCD2 ≥ 4
- Initiate within 24 hr

CHANCE Trial

ASA gr.5 sig 1 tab oral stat + Clopidogrel(75) 4 tab oral stat
Then ASA (81) sig 1 tab OD oral + Clopidogrel(75) 1 tab OD
oral x 21 d then ASA(81) 1 tab OD oral life long

Dual Antiplatelet



How to use the ABCD² score?

Risk factor	Points
Age (≥60)	1
Blood pressure (systolic ≥ 140 or diastolic ≥ 90)	1
Clinical feature TIA (choose one) Unilateral weakness with or without speech impairment	2
Speech impairment without unilateral weakness	1
Duration TIA duration ≥ 60 minutes	2
TIA duration 10 - 59 minutes	1
Diabetes	1

Anticoagulant



ไม่แนะนำให้ใช้ในผู้ป่วย **acute stroke** เนื่องจากหลักฐานข้อมูลยังไม่เพียงพอ แต่อาจพิจารณาต่อไปนี้

- cardio-embolic stroke
- cerebral venous thrombosis
- extracranial carotid หรือ vertebral dissection

Control risk factor

- HT control BP < 140/90 mmHg (lacunar stroke < 130/80 mmHg)
- Hyperdyslipidemia control with statin (LDL < 100)
- DM control HbA1C < 7
- Obesity control BMI < 23
- Regular exercise
- Quit smoking

Thank You

The text "Thank You" is rendered in a highly decorative, cursive script. The letters are primarily black with a thin, elegant gold outline. The 'T' is particularly large and features a long, sweeping horizontal stroke that extends to the right. The 'Y' and 'o' also have long, flowing tails. The text is embellished with clusters of small, four-pointed gold stars and dots, one cluster positioned above the 'o' and another below the 'T'. The overall style is classic and celebratory.