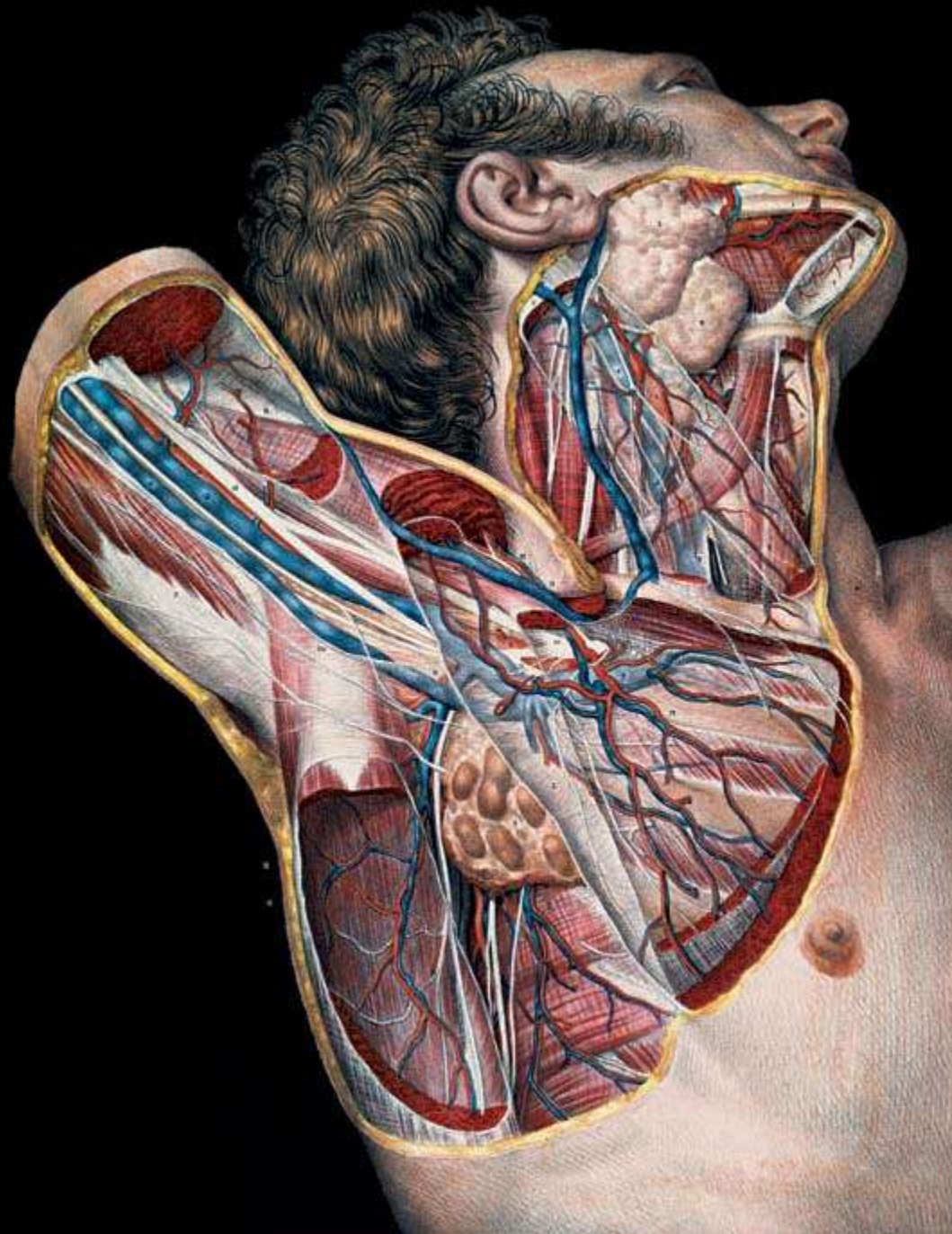


Collège des Enseignants de Radiologie de France (CERF)

**Enseignements DES
Module national "Anatomie"
Paris – 6 février 2015**

Variabilité anatomique vasculaire (artères, veines, et lymphatiques)

Jean-Marie LE MINOR
Faculté de Médecine de Strasbourg



1. Variabilité humaine

Variabilité individuelle = polymorphisme
Notion fondamentale en biologie





VARIABILITÉ

MORPHOLOGIQUE EXTERNE

- PIGMENTATION CUTANÉE
- COULEUR DES YEUX (IRIS)
- COULEUR DES CHEVEUX
 - PILOSITÉ

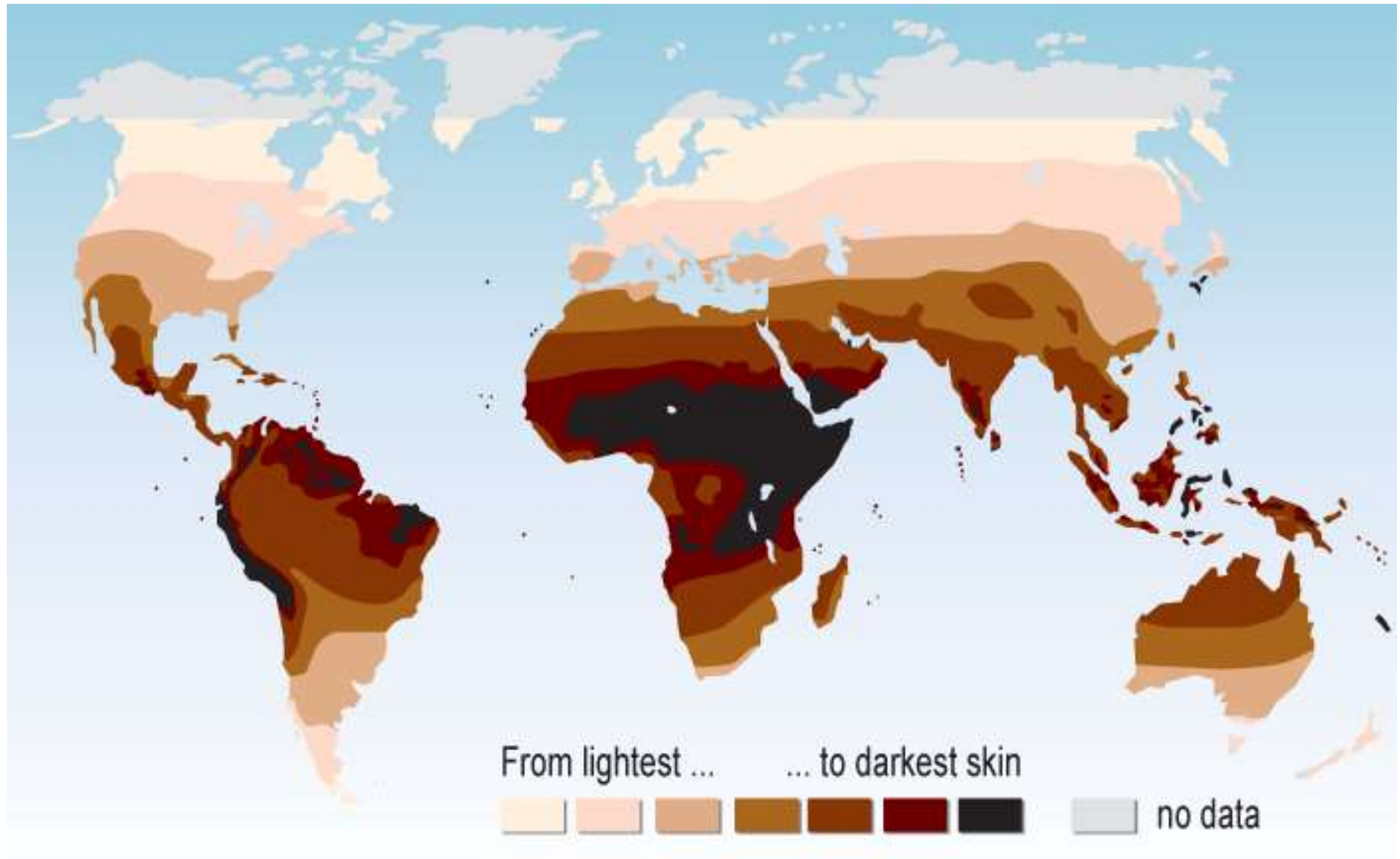


Pigmentation cutanée

	1	10			19	28	
	2	11			20	29	
	3	12			21	30	
	4	13			22	31	
	5	14			23	32	
	6	15			24	33	
	7	16			25	34	
	8	17			26	35	
	9	18			27	36	



Pigmentation cutanée



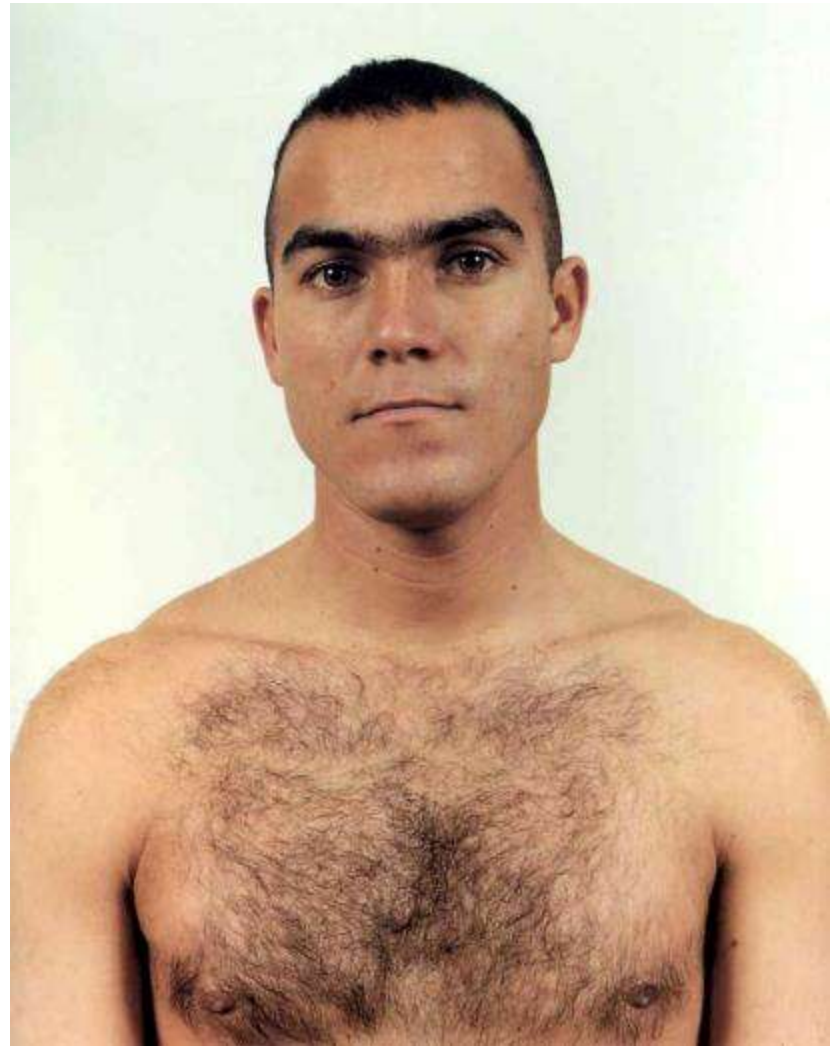
Couleur des yeux (iris)



Couleur des cheveux



Pilosité corporelle



VARIABILITÉ

MORPHOLOGIQUE EXTERNE

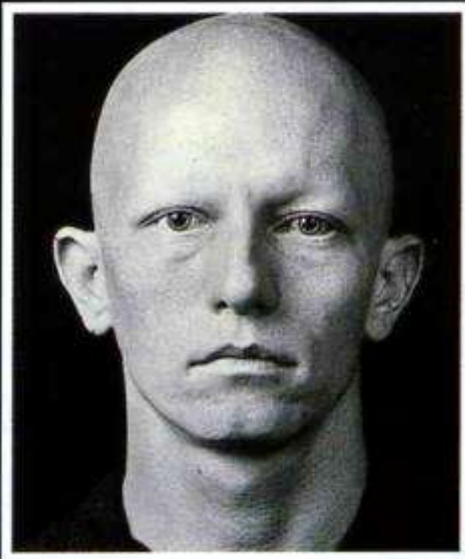
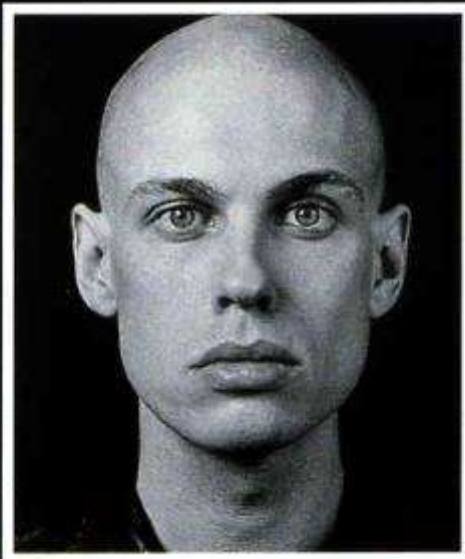
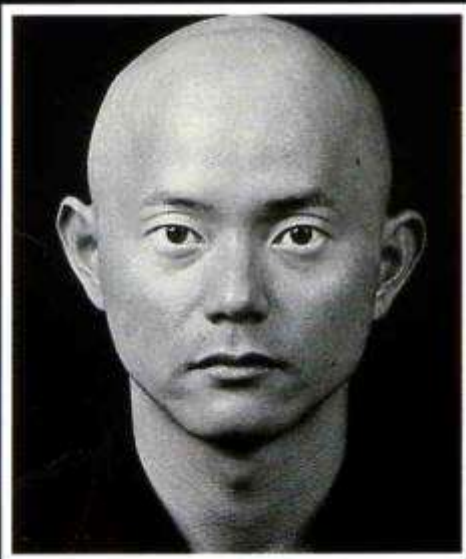
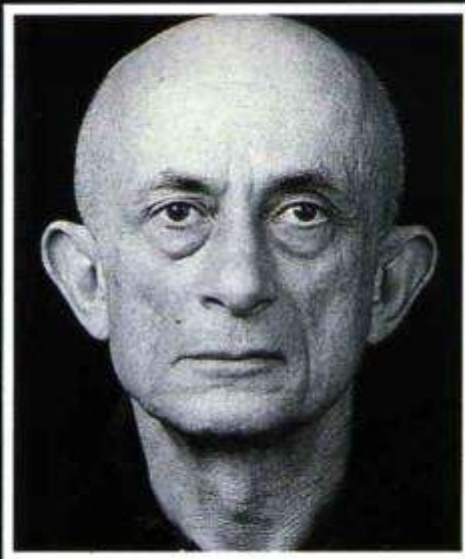
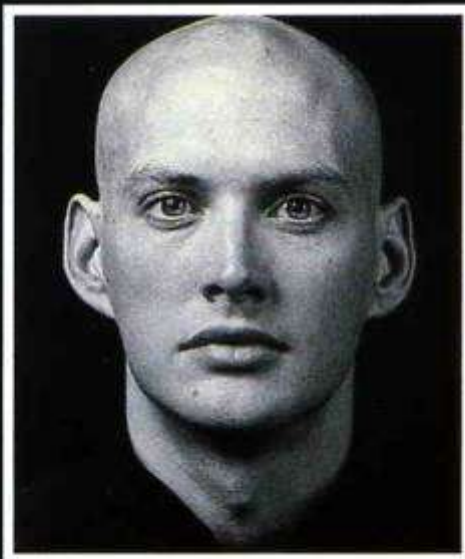
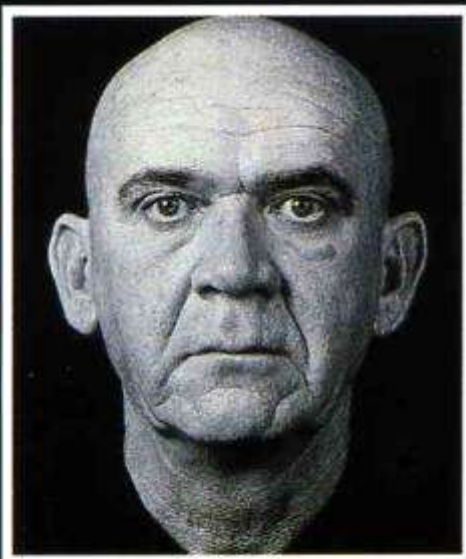
➤ FORME DES DIFFÉRENTES PARTIES DU CORPS

("portrait-robot")

L'avez-vous vu ?

- Homme blanc, âgé de 20 à 35 ans
- 1,78 m à 1,83 m (5 pi 10 po à 6 pi)
- 90 kg et plus (200 lb et plus)
- Francophone, sans accent
- Costaud naturel sans toutefois être obèse
- Petit ventre, grosses mains, allure négligée
- Teint légèrement olive, comme une personne qui n'est pas en santé.
- N'avait ni barbe ni moustache lorsqu'il a été aperçu le 23 août 2011.
- Cheveux foncés, probablement courts. Il portait une casquette.
- Regard qualifié d'intimidant et inquiétant par les témoins.
- Toute personne qui détient des renseignements peut les communiquer en appelant au 819 243-2346, poste 6677.
- Une récompense de 10 000 \$ est offerte par le biais de Jeunesse au Soleil à toute personne fournissant de l'information menant à une arrestation.





Alphonse BERTILLON (1853-1914)

1870 : premier laboratoire de police d'identification criminelle
anthropologie judiciaire– "bertillonage"

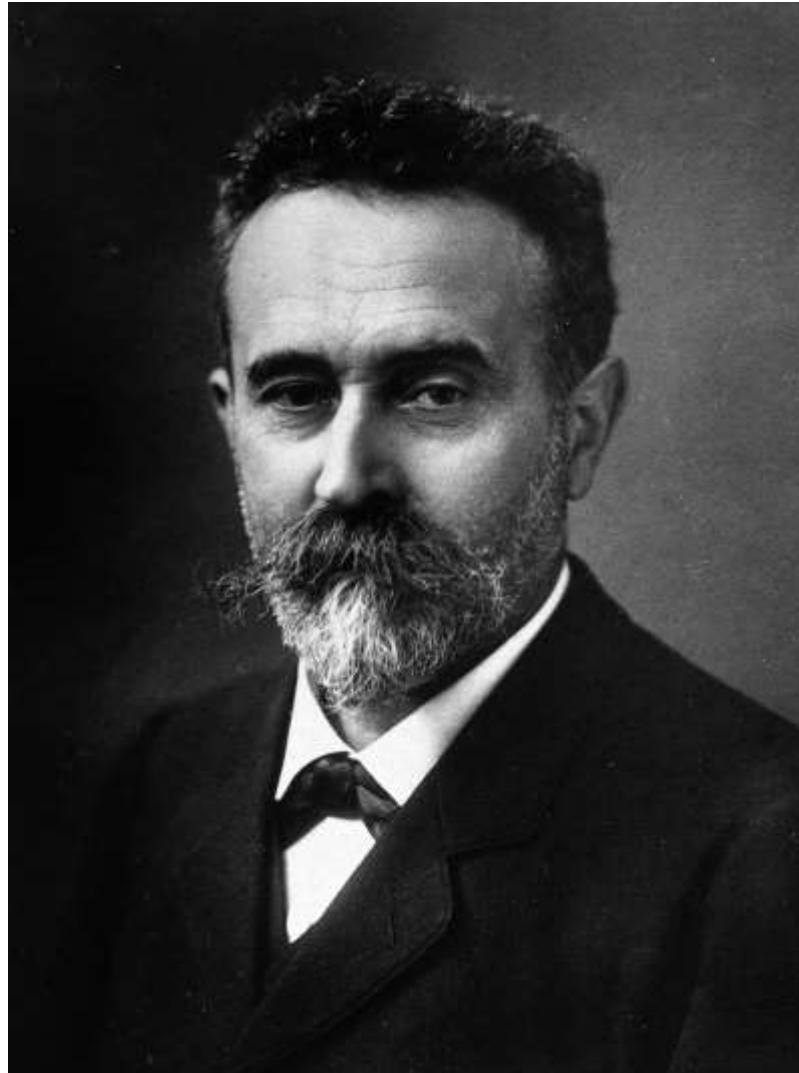


TABLEAU SYNOPTIQUE DES TRAITS PHYSIONOMIQUES POUR SERVIR A L'ETUDE DU " PORTRAIT PARLE ".

Front

Archevues (proéminence des)



Inclinaison



Hauteur



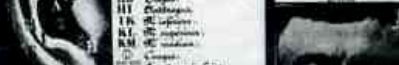
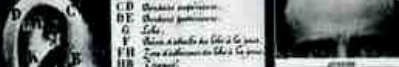
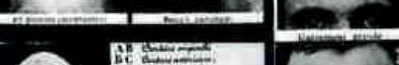
Particularités



Cheveux

Insertion frontale

Calvitie



Nez

Racine (profondeur de la)



Do



Base



Hauteur



Saillie



« Largeur »



Particularités



racine



do



base



hauteur



Lèvres

Hauteur naso-labiale



Proéminence



Bordure



Epaisseur



Défaut d'adhérence



Particularités



Bouche

Dimension



Particularités



Particularités



Synthétiquement



Dentition



Menton

Inclinaison



Hauteur



« Largeur »



Particularités



Particularités



Contour général de la tête

vue de profil

Profil fronto-nasal



Profil naso-buccal



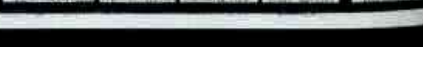
Synthétique



Contour général de la tête

vue de face

1° Synthétiquement



Nez

Racine (profondeur de la)



très petite petite légèr^e petite moyenne légèr^e grande grande très grande

Dos



très cave cave légèr^e cave rectiligne légèr^e vexé vexé très vexé



cave sinueux rect. sinueux vex sinueux busq sinueux légèr^e busqué busqué très busqué

Base



très relevée relevée légèr^e relevée horizontale légèr^e abaissée abaissée très abaissée

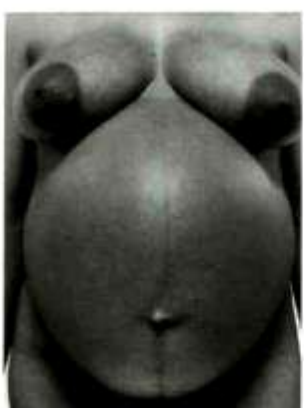
Hauteur



très petite petite légèr^e petite moyenne légèr^e grande grande très grande

Saillie.







VARIABILITÉ

MORPHOLOGIQUE EXTERNE

➤ DERMATOGLYPHES

Dermatoglyphes



ARC



BOUCLE



TOURBILLON

Dermatoglyphes



VARIABILITÉ ANATOMIQUE INTERNE

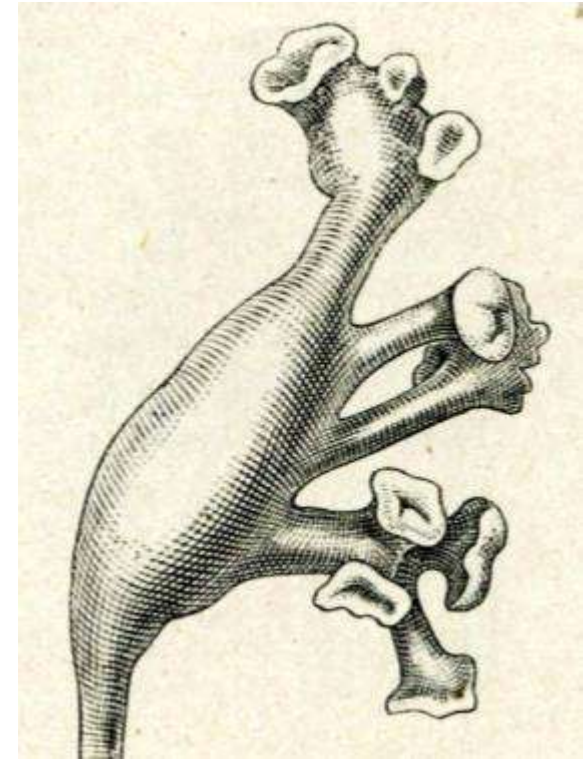
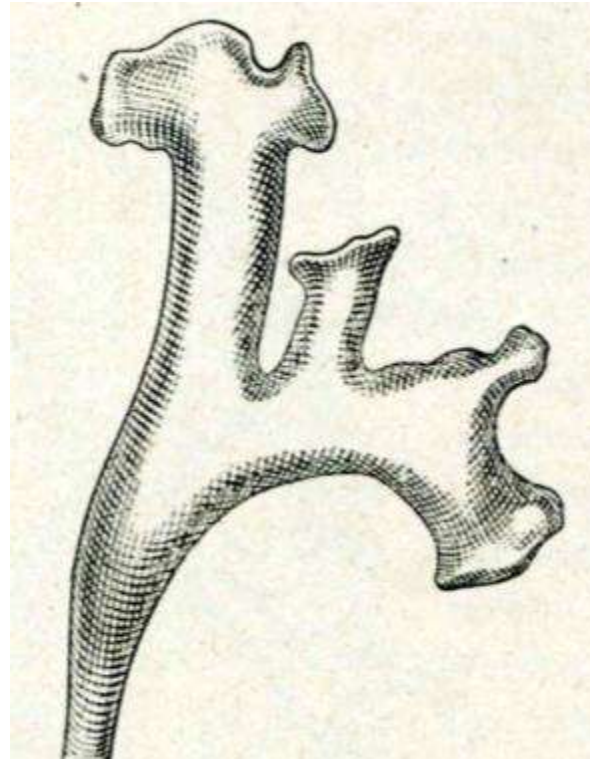
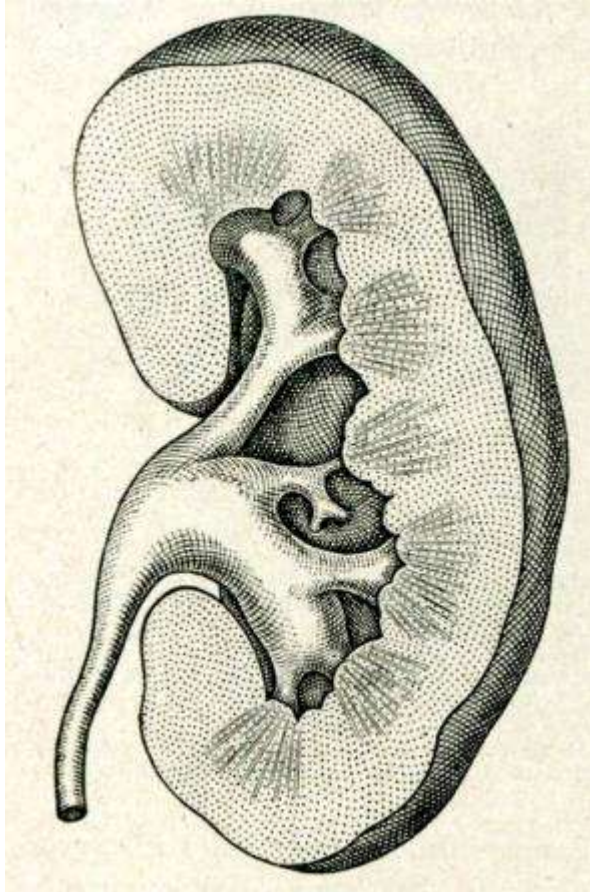
- OSSEUSE
- DENTAIRE
- ARTICULAIRE
- MUSCULAIRE
- VASCULAIRE (ARTÉRIELLE, VEINEUSE...)
 - NERVEUSE
 - VISCÉRALE



56,5 % des individus



41,0 % des individus



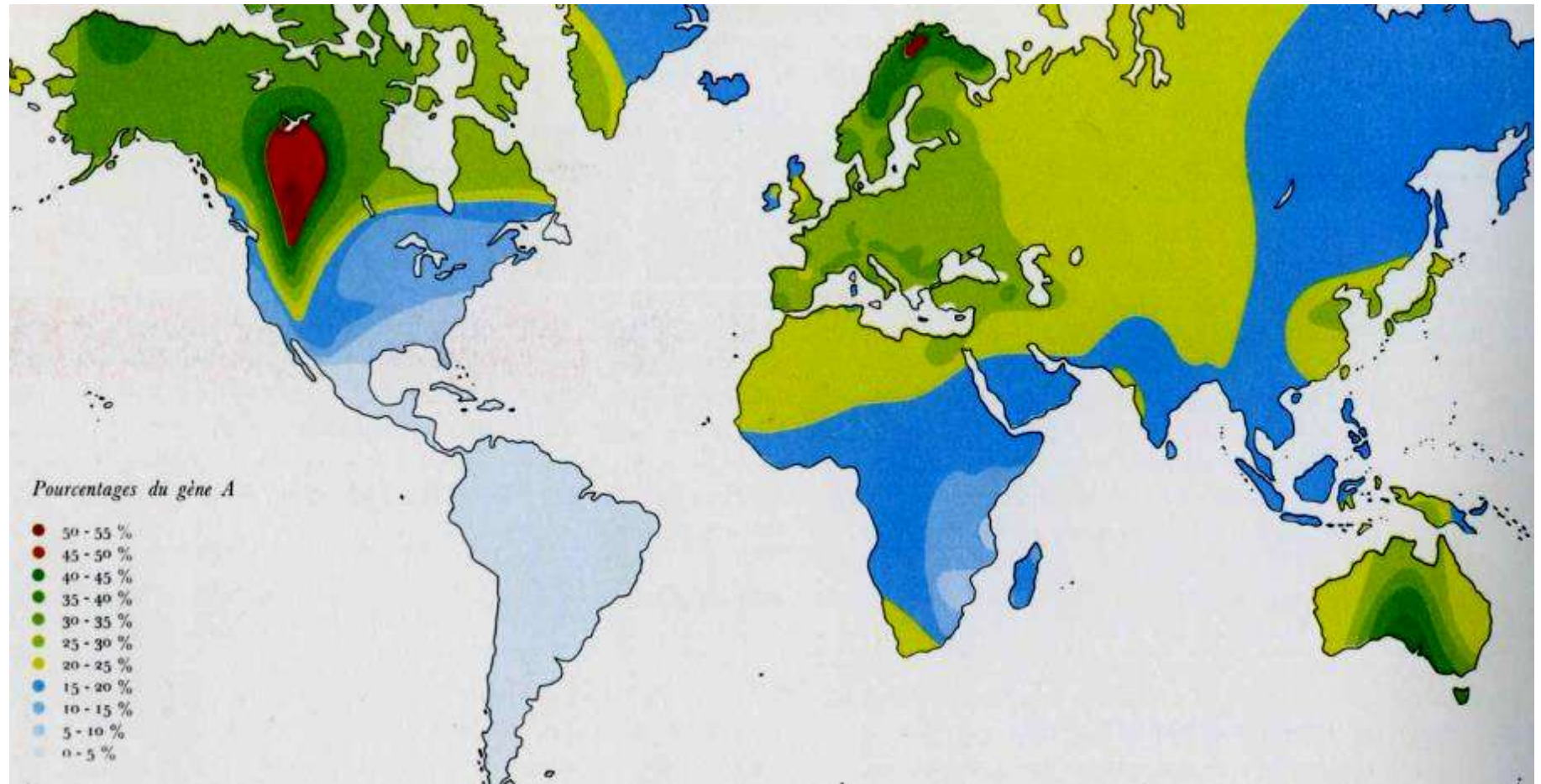
VARIABILITÉ VISCÉRALE (REIN) : SEGMENTATION PYÉLO-CALICIELLE

VARIABILITÉ BIOLOGIQUE ET MOLÉCULAIRE

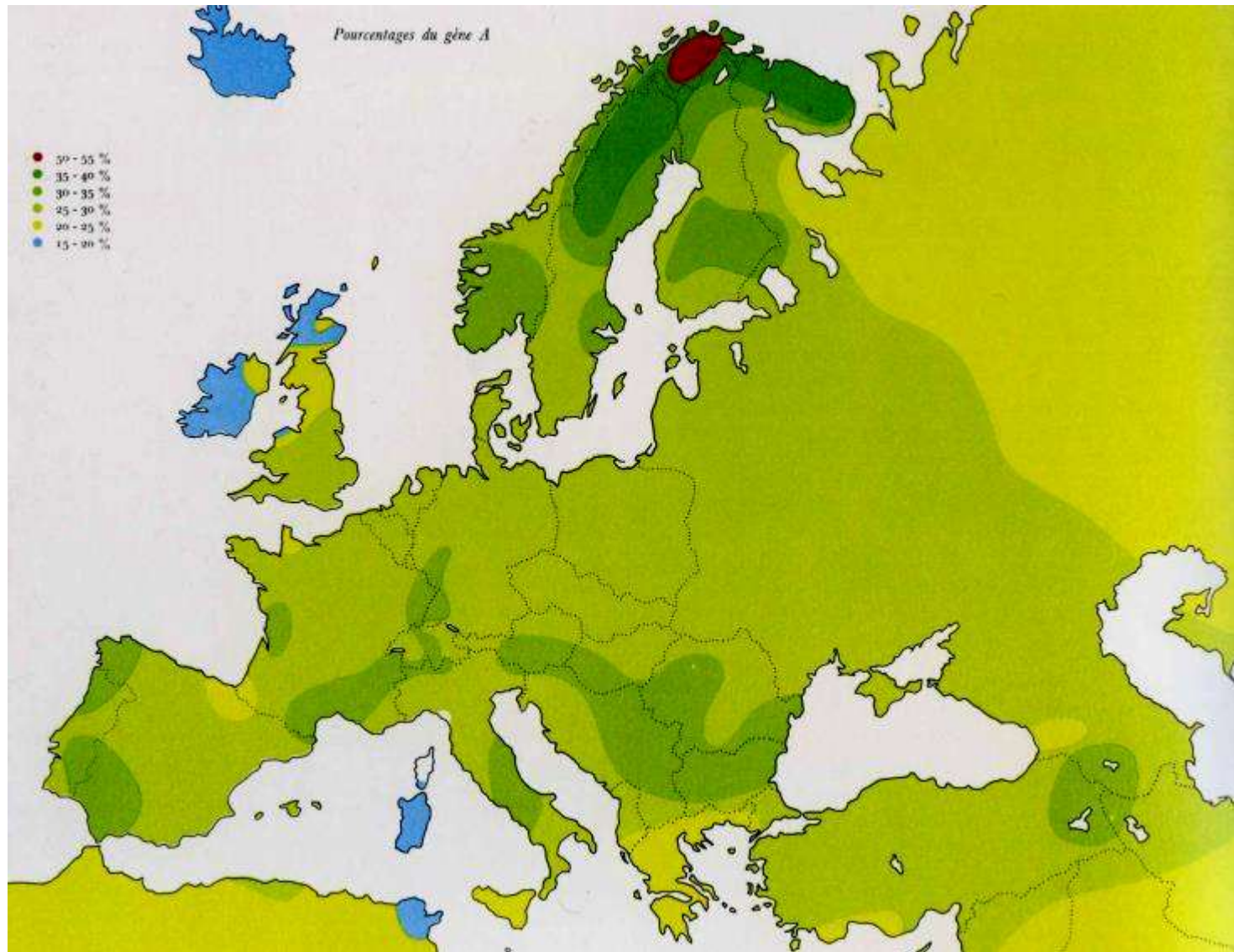
- GROUPES SANGUINS
- PROTÉINES ex: hémoglobine
 - ADN, ARN

polymorphisme génétique – empreintes génétiques

GROUPES SANGUINS (A, B, O) : FRÉQUENCE GROUPE A



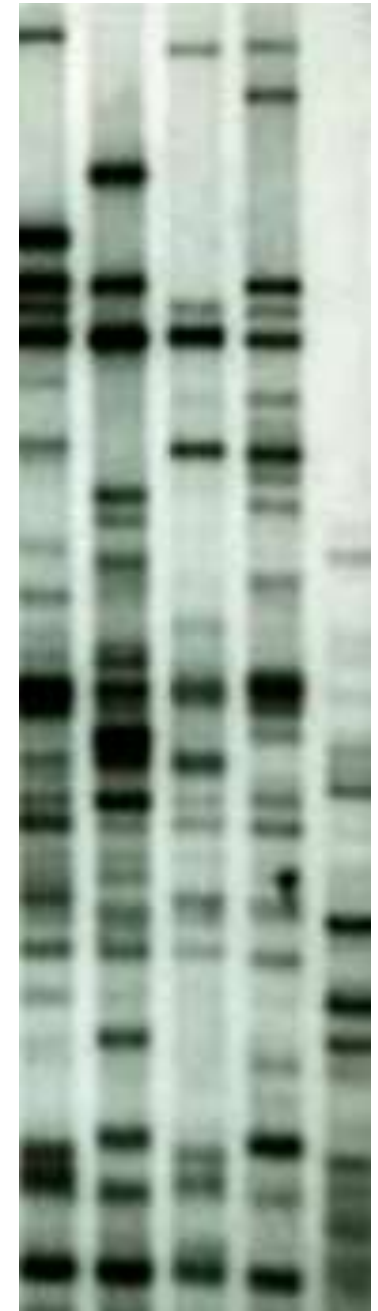
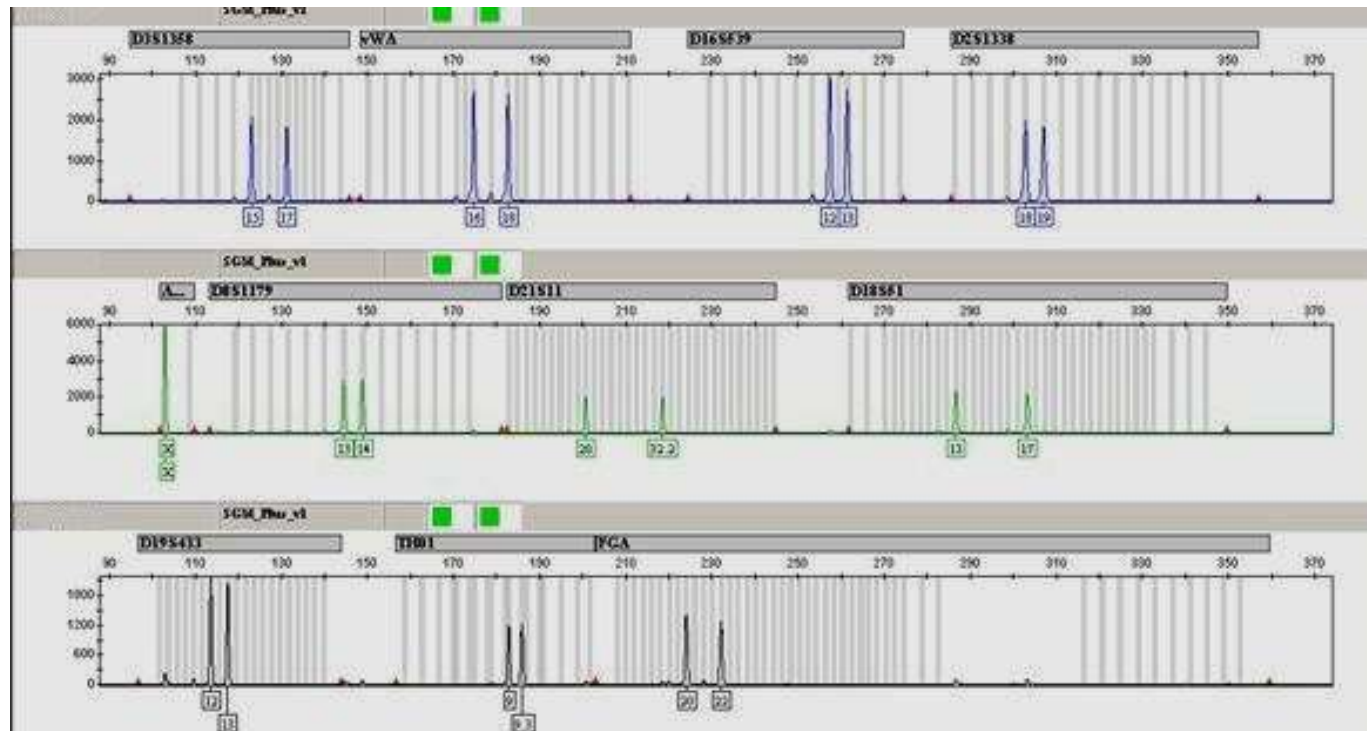
GROUPES SANGUINS (A, B, O) : FRÉQUENCE GROUPE A



FACTEURS SANGUINS RHÉSUS : FRÉQUENCE GROUPE D



POLYMORPHISME GÉNÉTIQUE : SÉQUENCAGE DE L'ADN



2. Aspects méthodologiques

TYPES DE VARIABILITÉ ANATOMIQUE

2 TYPES :

1°) VARIABILITÉ QUANTITATIVE
= CARACTÈRES MÉTRIQUES

2°) VARIABILITÉ QUALITATIVE
= CARACTÈRES NON-MÉTRIQUES
= CARACTÈRES DISCRETS

TYPES DE VARIABILITÉ ANATOMIQUE

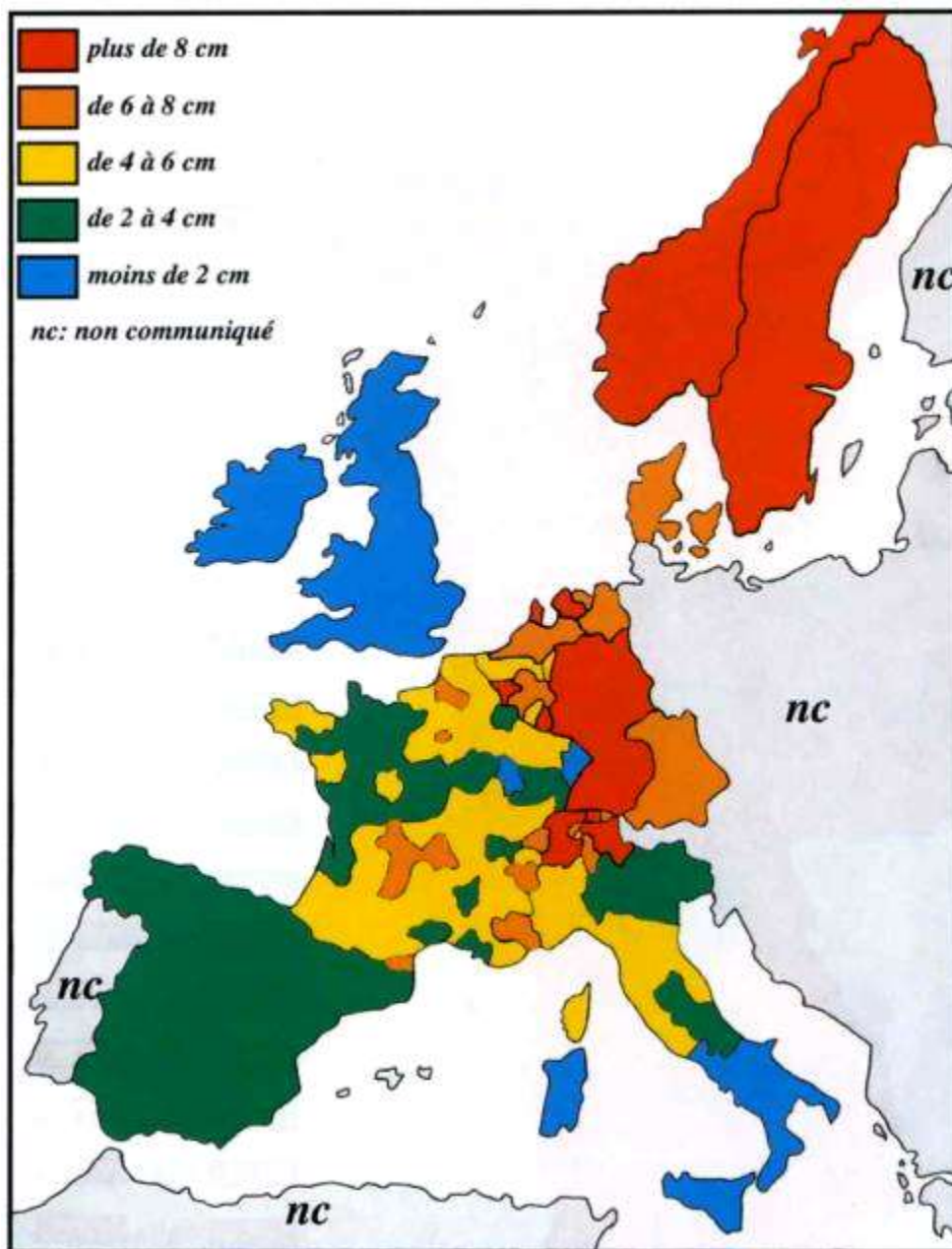
2 TYPES :

1°) VARIABILITÉ QUANTITATIVE
= CARACTÈRES MÉTRIQUES

2°) VARIABILITÉ QUALITATIVE
= CARACTÈRES NON-MÉTRIQUES
= CARACTÈRES DISCRETS



**VARIABILITÉ
DE LA TAILLE
INDIVIDUELLE**



POINTURE
CHAUSSURES

36



46



LINEAIRE ANGLAIRE SUBEAIGNE



- **paramètres linéaires (mm)**
 - longueurs
 - diamètres
- **paramètres angulaires (°)**
- **paramètres surfaciques (mm²)**
- **paramètres volumiques (mm³)**

TYPES DE VARIABILITÉ ANATOMIQUE

2 TYPES :

1°) VARIABILITÉ QUANTITATIVE

= CARACTÈRES MÉTRIQUES

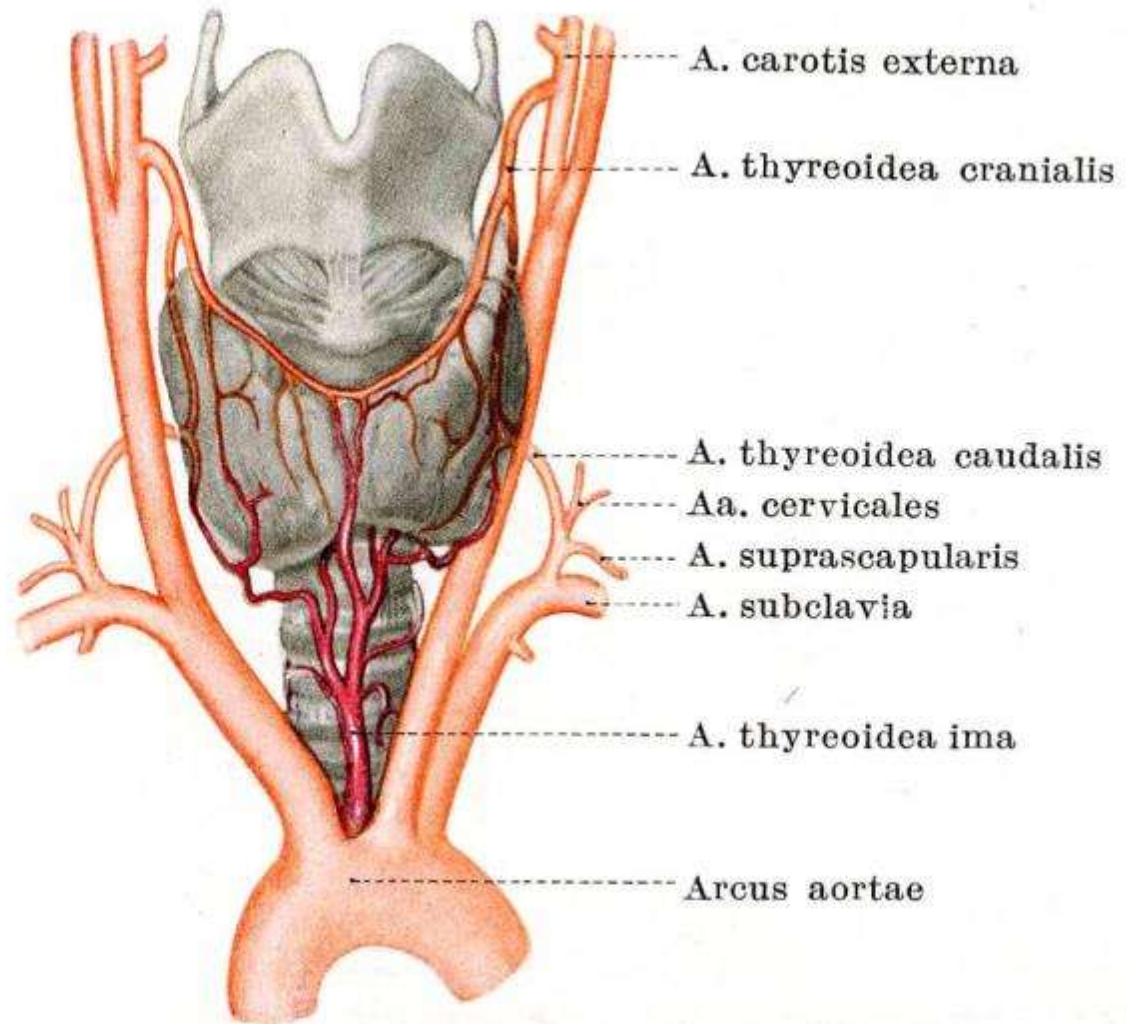
2°) VARIABILITÉ QUALITATIVE
= CARACTÈRES NON-MÉTRIQUES
= CARACTÈRES DISCRETS

ARTÈRE THYROIDIENNE IMA

Présente / Absente

= caractère binaire

Fréquence
(%°)



OCCURRENCE

Fréquence

Nombre de cas de variante

Nombre de cas totaux

OCCURRENCE

Fréquence (%)

$$\frac{\text{Nombre de cas de variante}}{\text{Nombre de cas totaux}} \times 100$$

VARIABILITÉ SELON LE CÔTÉ DROIT ou GAUCHE

1°) LATÉRALITÉ

2°) SYMÉTRIE

Latéralité d'une variante

Variante	Nombre de cas	Fréquence
Côté Gauche	71	14,2%
Côté Droit	81	16,2%
Total	152	15,2%

Symétrie d'une variante

Variante	Nombre de cas	Fréquence	Fréquence relative
Bilatérale	48	9,6%	46,2%
Unilatérale G	23	4,6%	22,1%
Unilatérale D	33	6,6%	31,7%
Total	104	20,8%	100,0%

Signification évolutive = phylogénétique

Présent → Absent

Absent → Présent

?

Signification évolutive = phylogénétique

Caractère PRIMITIF
= ANCESTRAL
= PLÉSIOMORPHIE

Caractère DÉRIVÉ
= APOMORPHIE

Méthodes d'étude

1°) DISSECTION

2°) INJECTION

3°) INJECTION-CORROSION

4°) ANGIOGRAPHIE (in vivo) / angioscan / angio-IRM

a) Artériographie

b) Phlébographie

c) Lymphographie

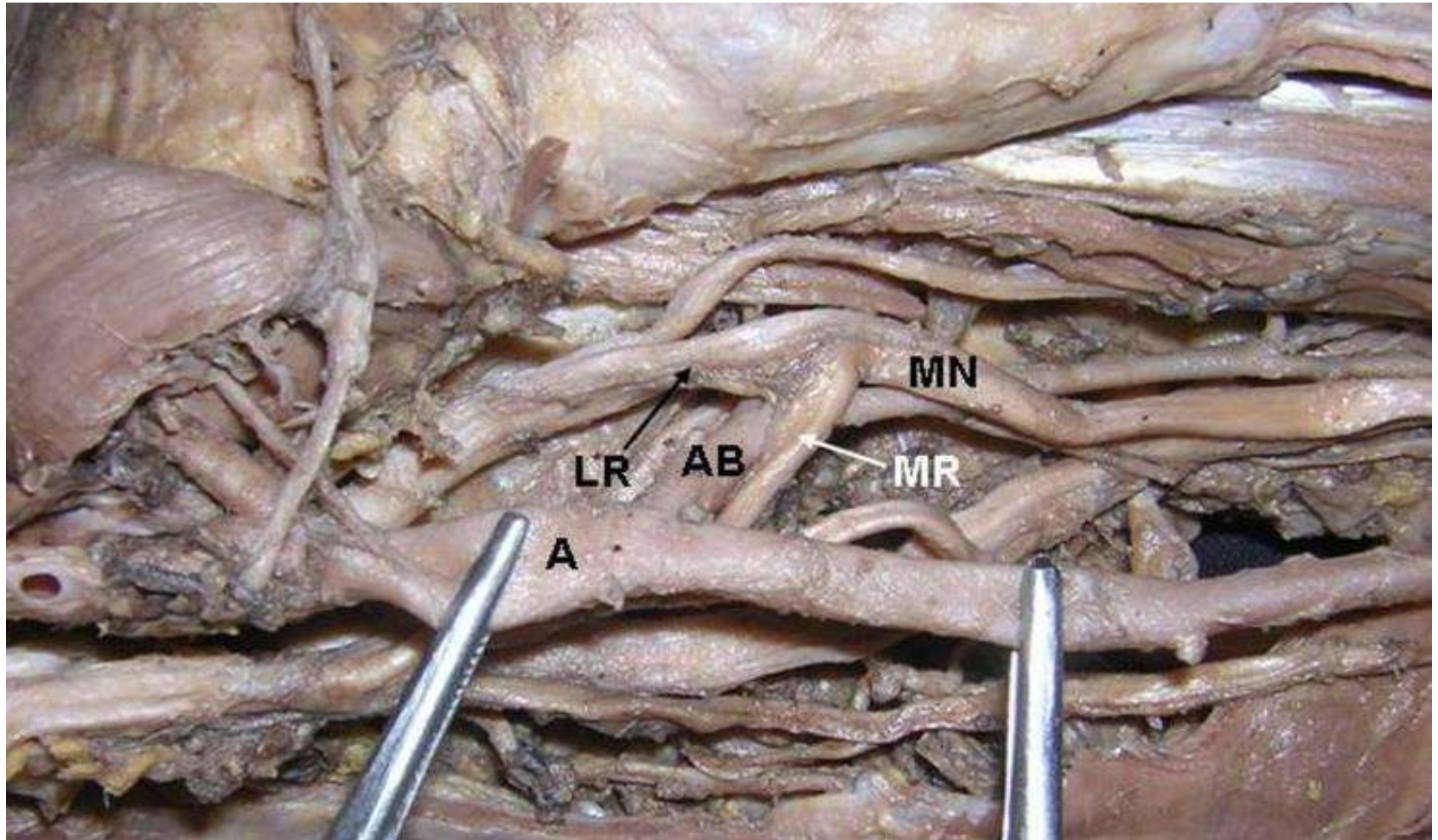


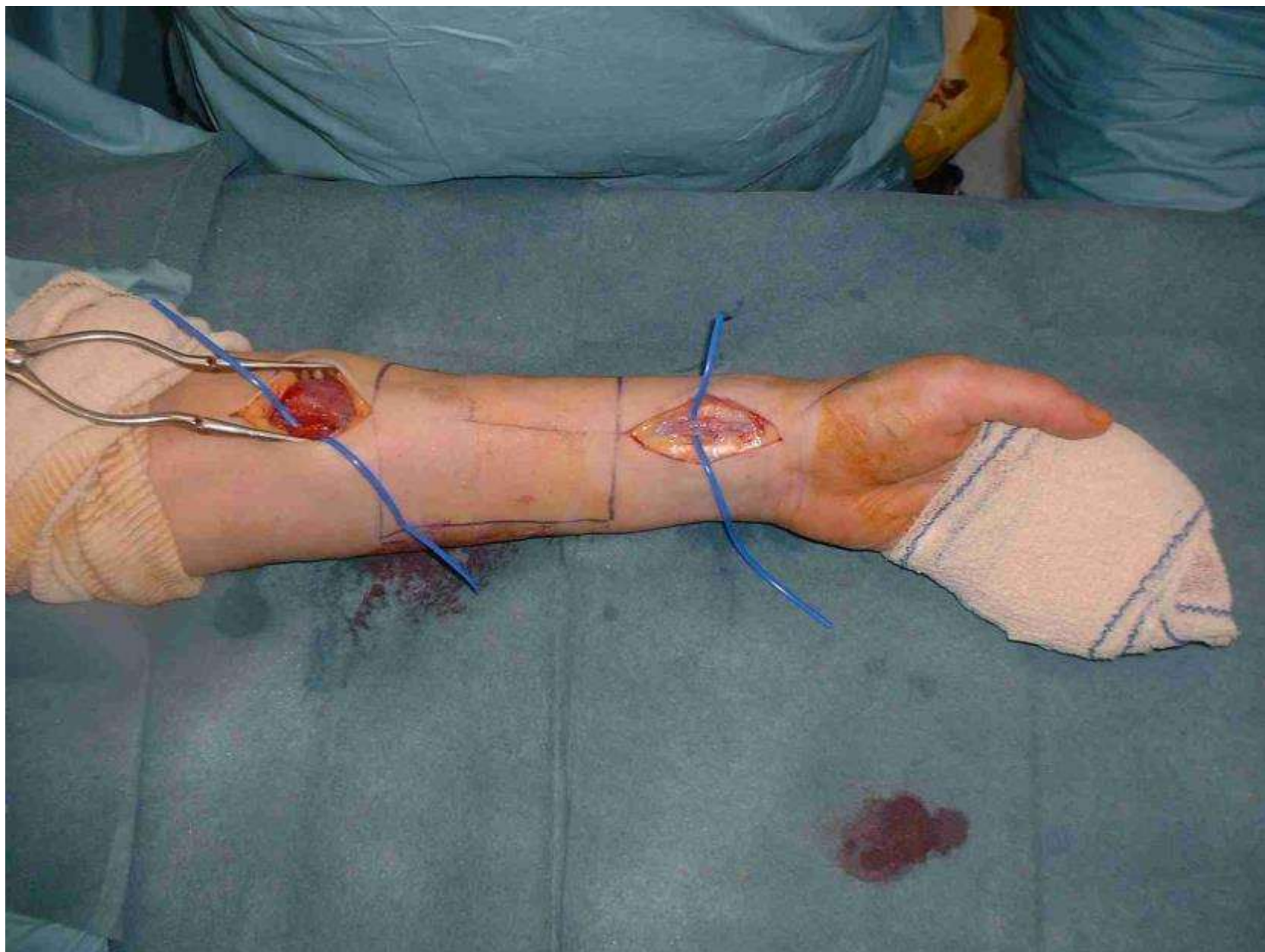


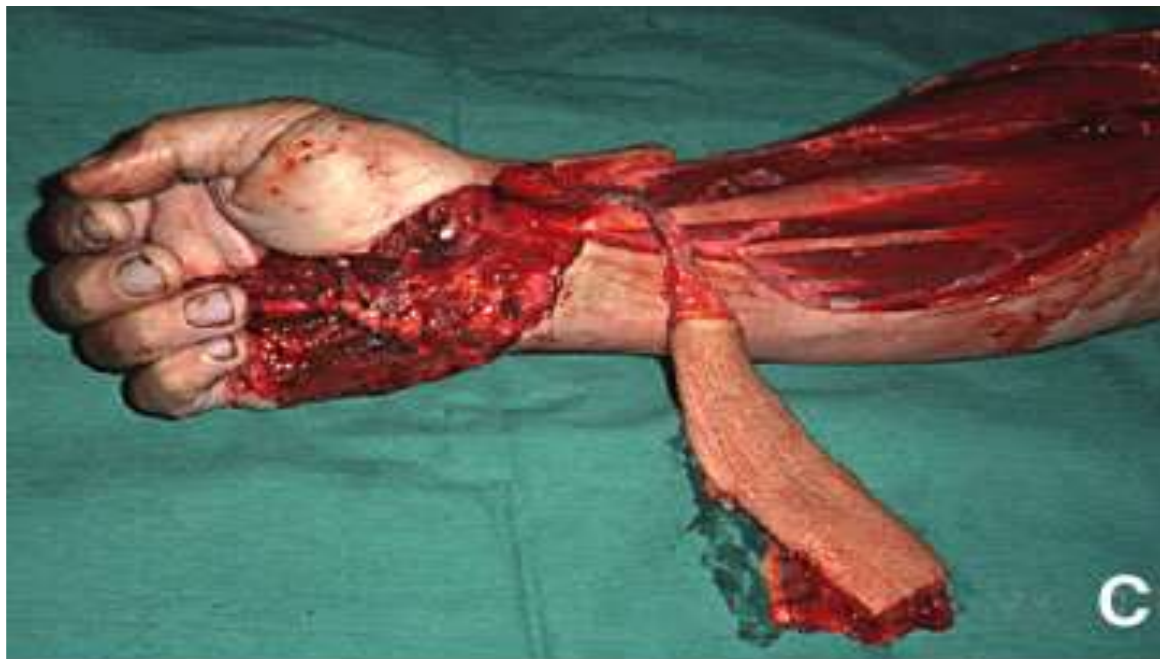


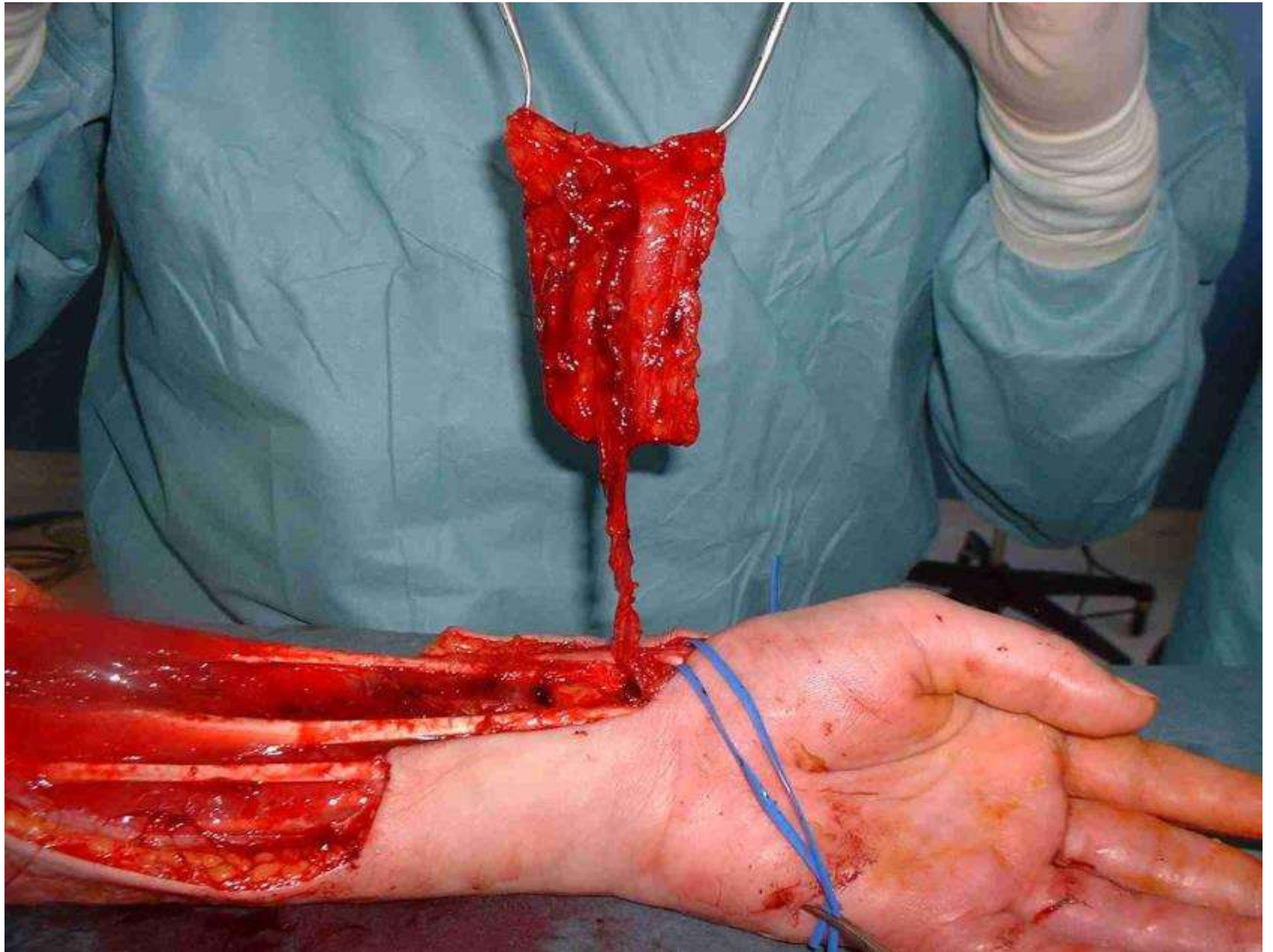


DISSECTION









Méthodes d'étude

1°) DISSECTION

2°) INJECTION

3°) INJECTION-CORROSION

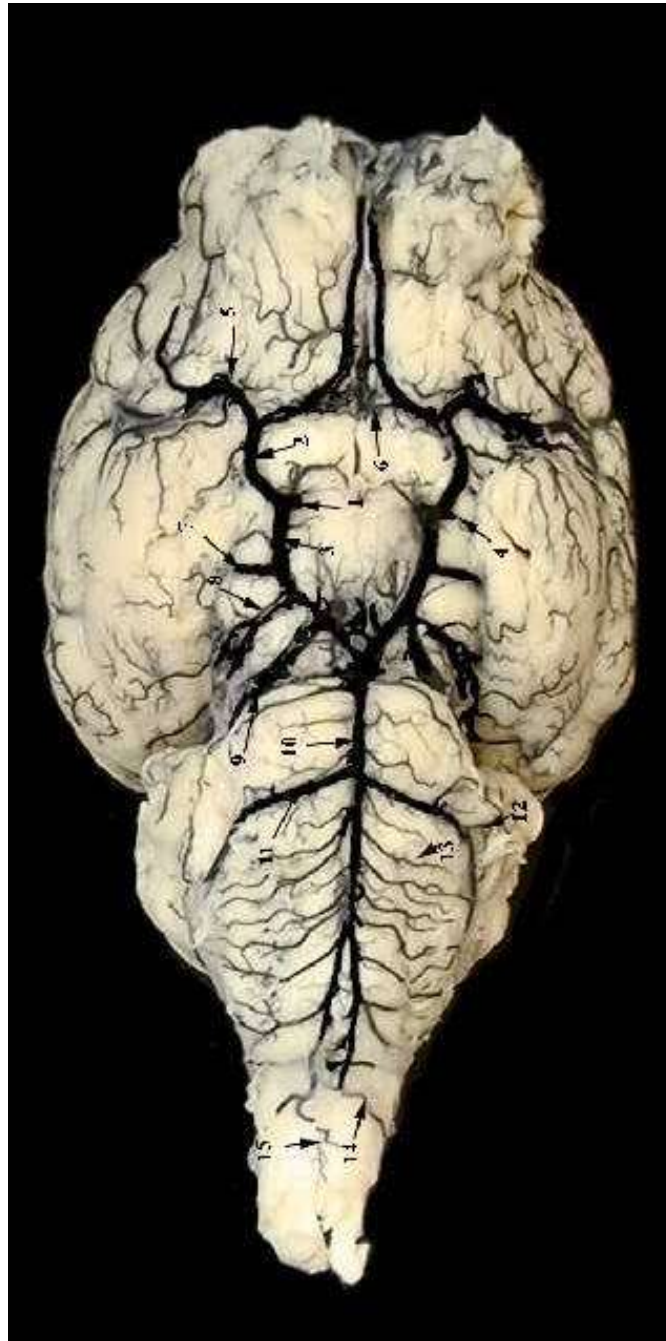
4°) ANGIOGRAPHIE (in vivo) / angioscan / angio-IRM

a) Artériographie

b) Phlébographie

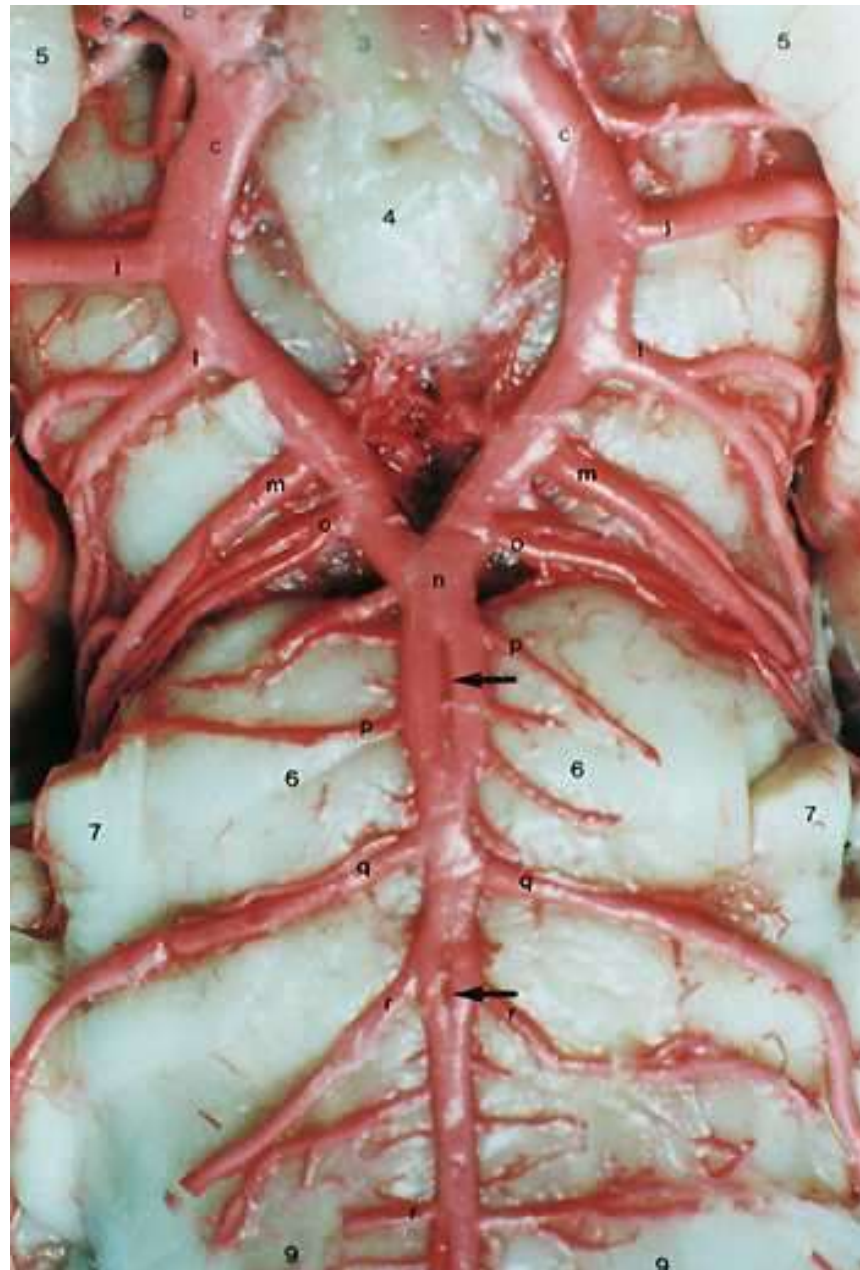
c) Lymphographie





INJECTION

encre de Chine



INJECTION

latex coloré



INJECTION

transparenification
(Spalteholtz)

Méthodes d'étude

1°) DISSECTION

2°) INJECTION

3°) INJECTION-CORROSION

4°) ANGIOGRAPHIE (in vivo) / angioscan / angio-IRM

a) Artériographie

b) Phlébographie

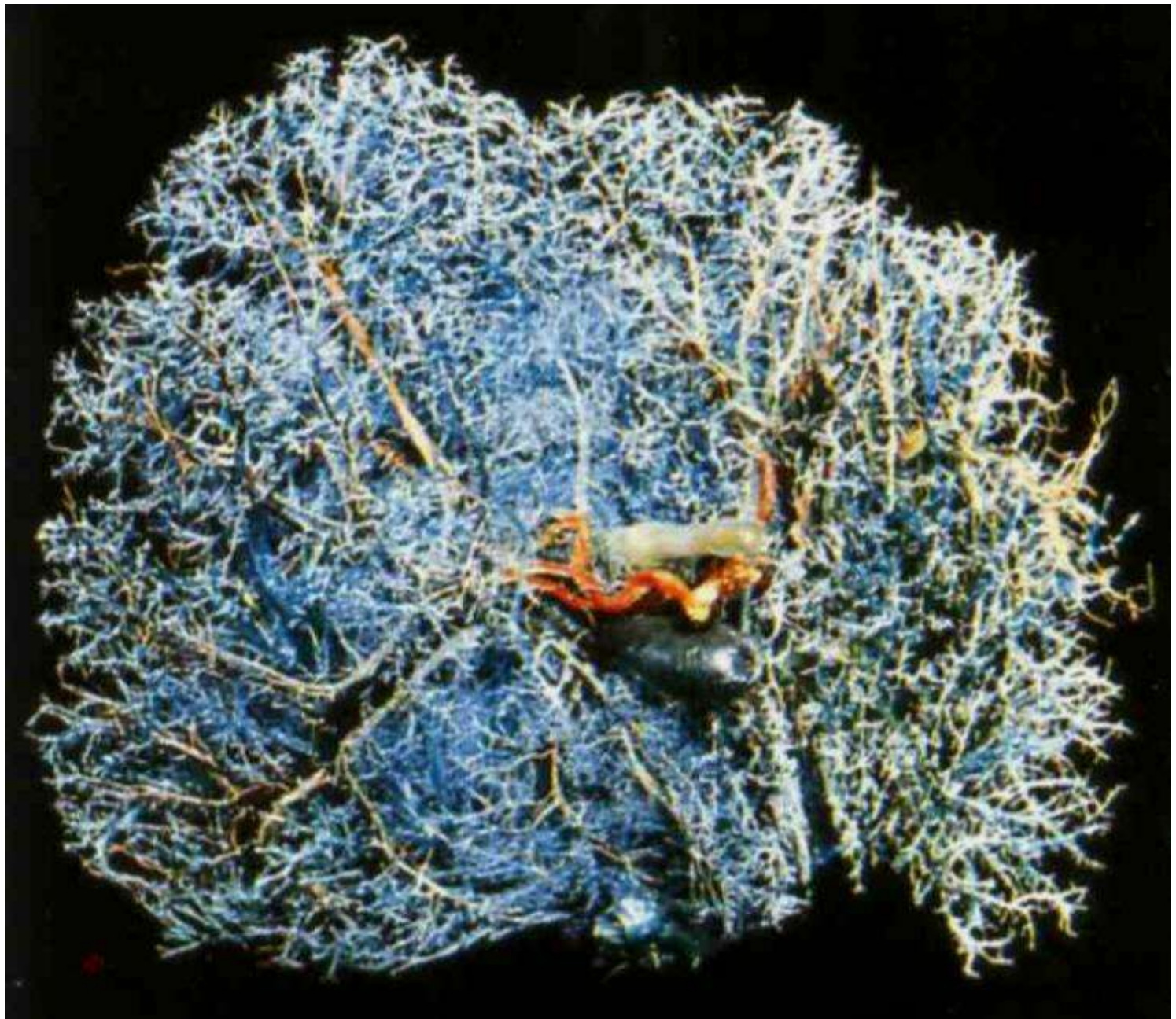
c) Lymphographie

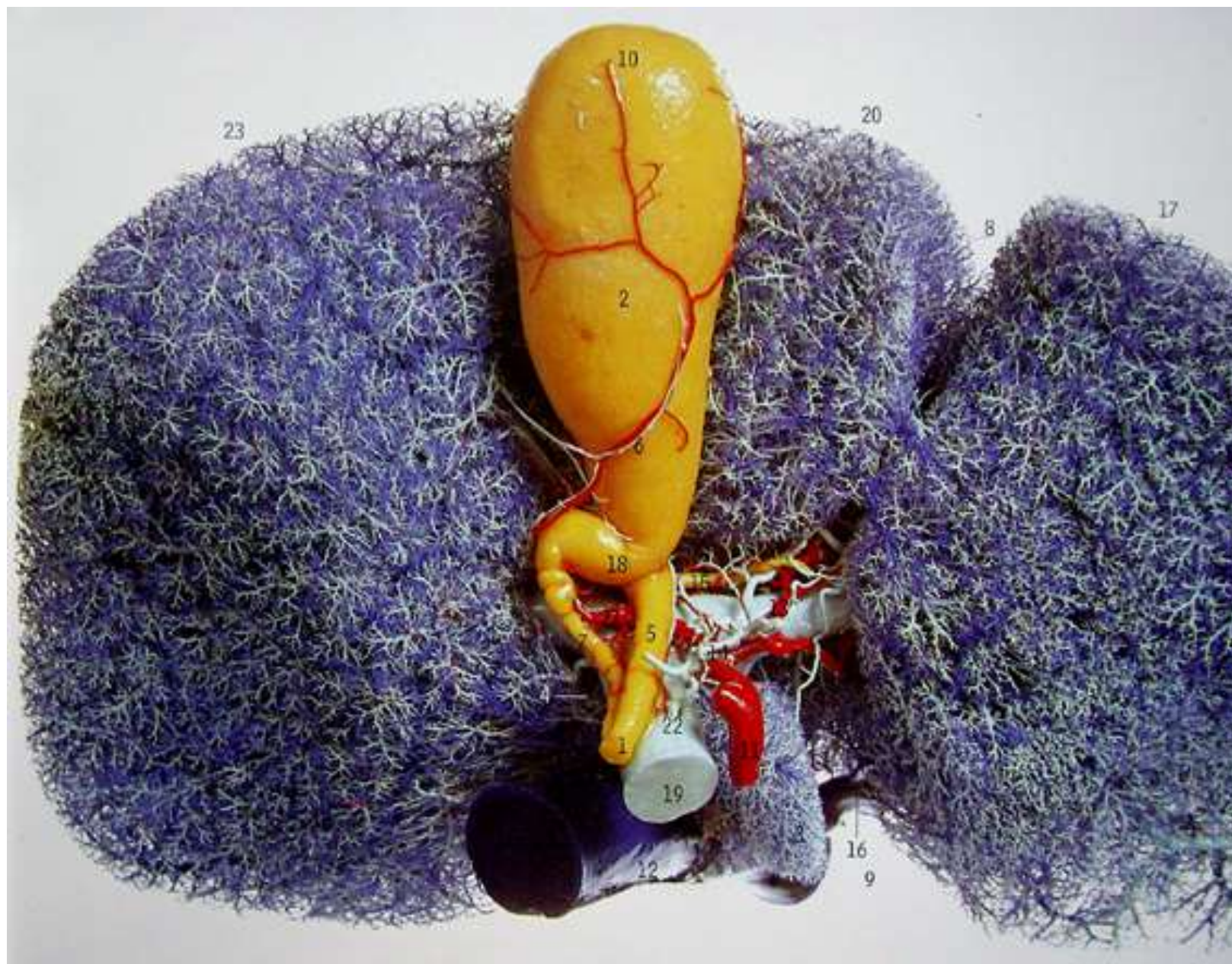












Méthodes d'étude

1°) DISSECTION

2°) INJECTION

3°) INJECTION-CORROSION

4°) ANGIOGRAPHIE (in vivo) / angioscan / angio-IRM

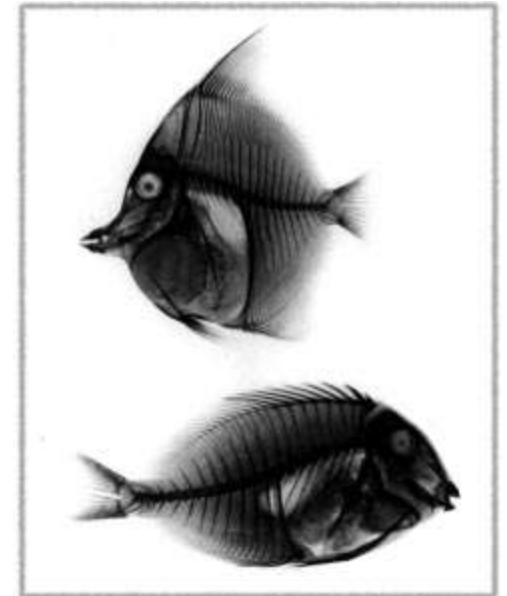
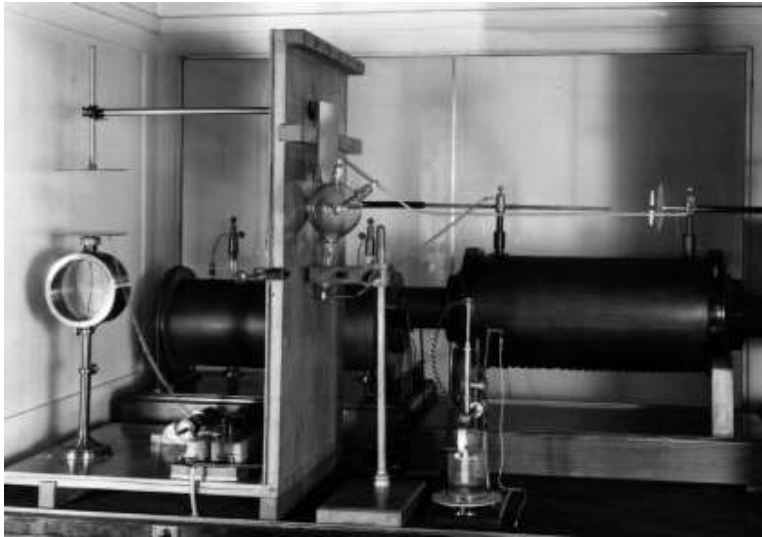
a) Artériographie

b) Phlébographie

c) Lymphographie

Rayons X

Roentgen 1895



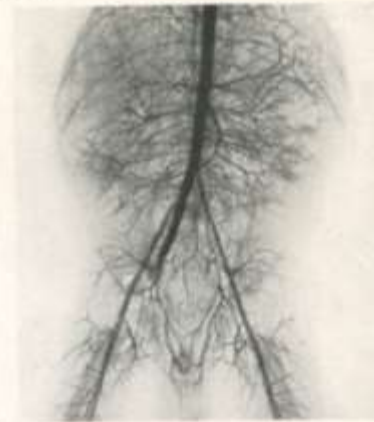
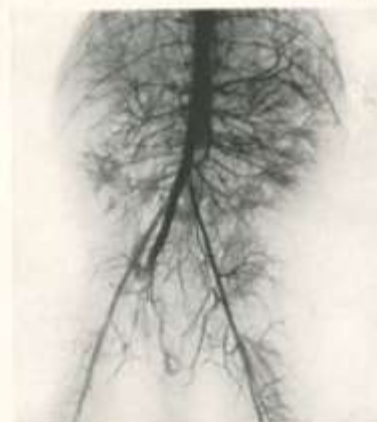
HEAD AND NECK.



THORAX.



ABDOMEN.





**Antonio
Egas Moniz
(1874-1955)**
Lisbonne

**Prix Nobel
1949**

1927

- première "encéphalographie artérielle"
- dénudation chirurgicale de l'artère carotide – artériotomie
- injection solution de 25% de iodure de sodium

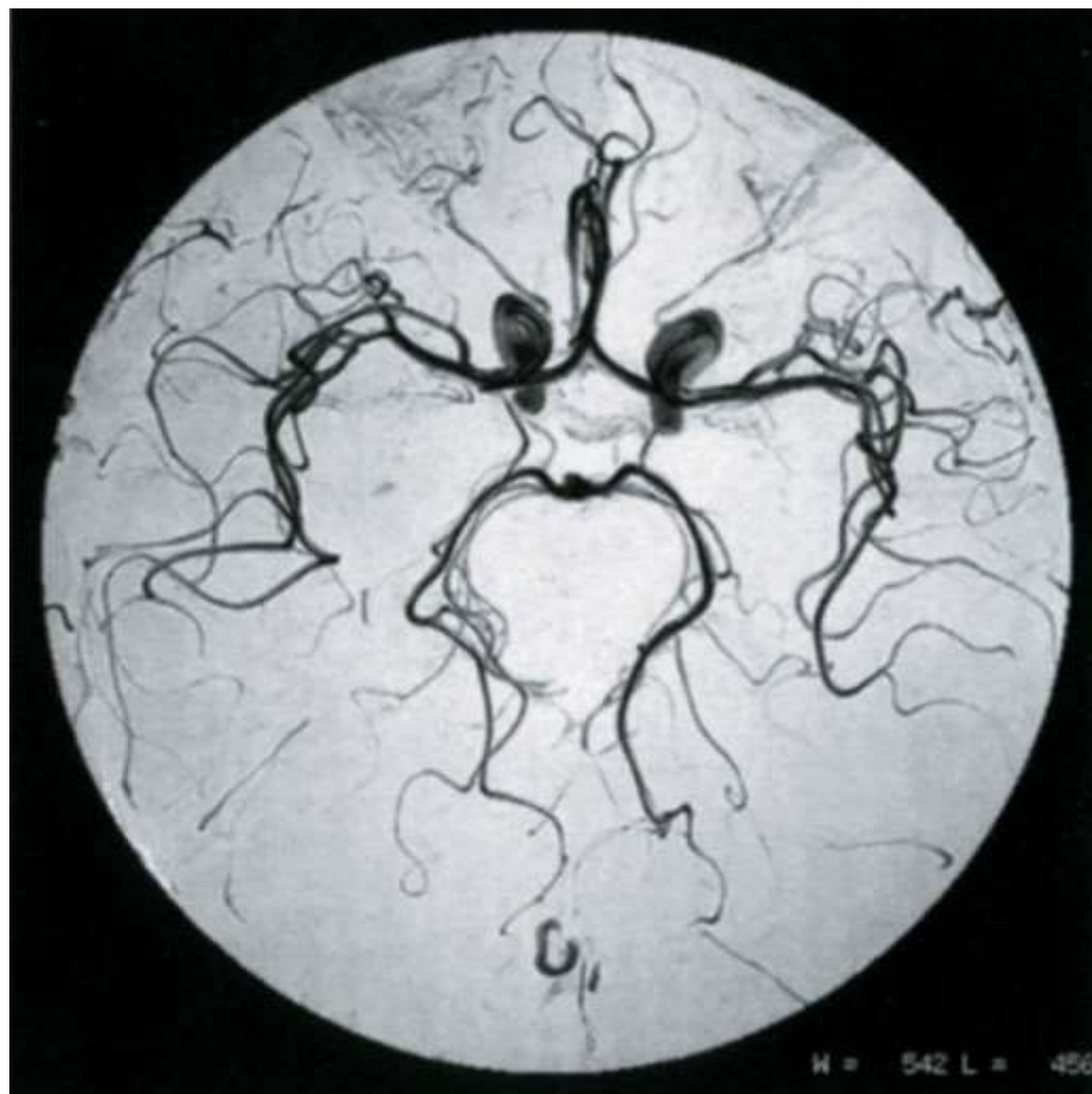
1931

- dioxyde de thorium (Thorotrast)
...radioactif

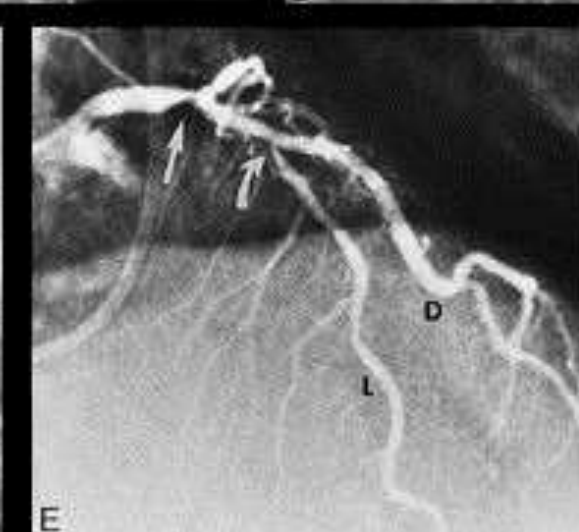
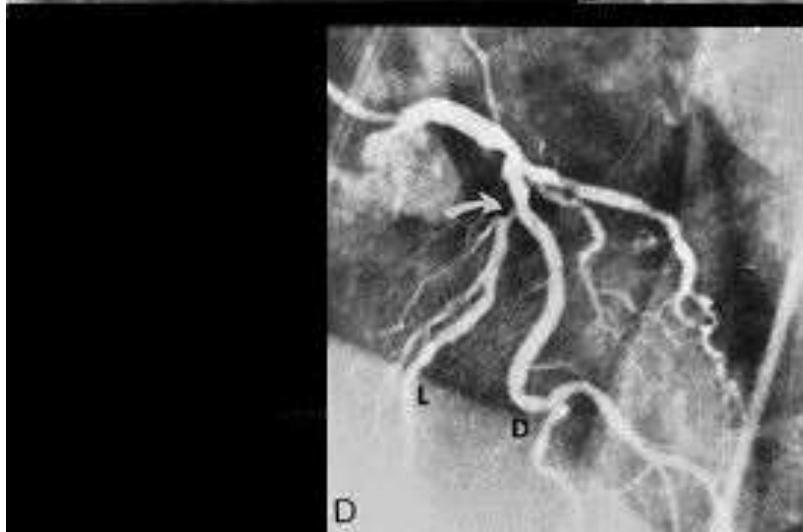
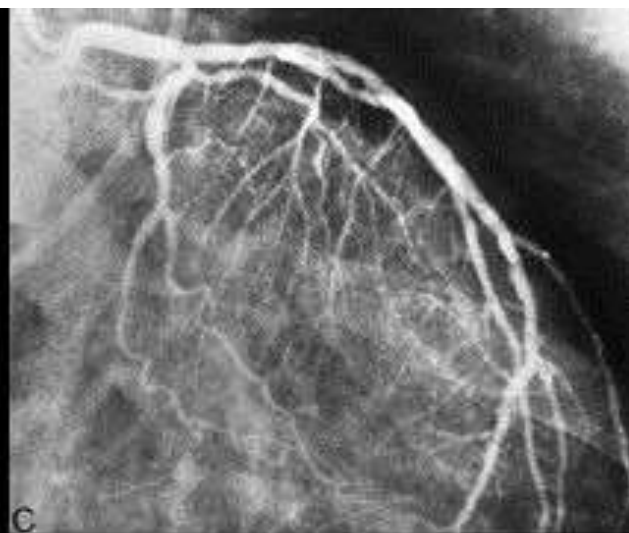
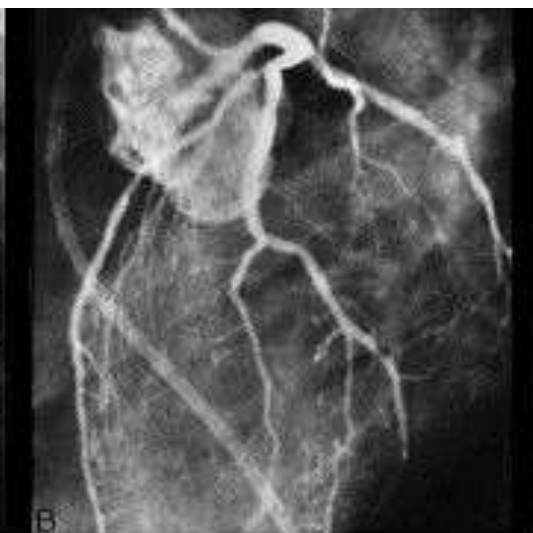
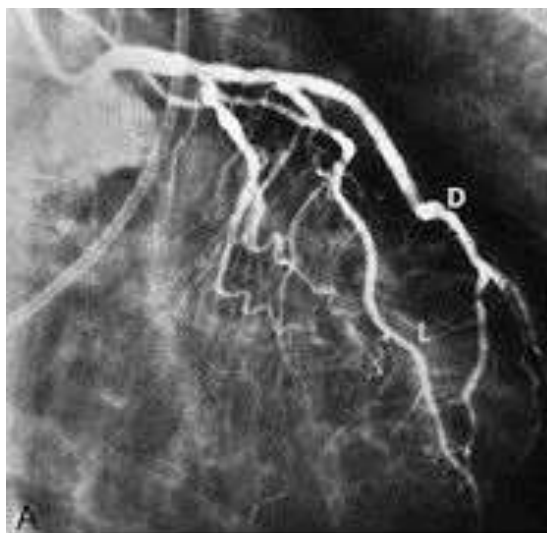
1953

Sven Ivar **Seldinger**

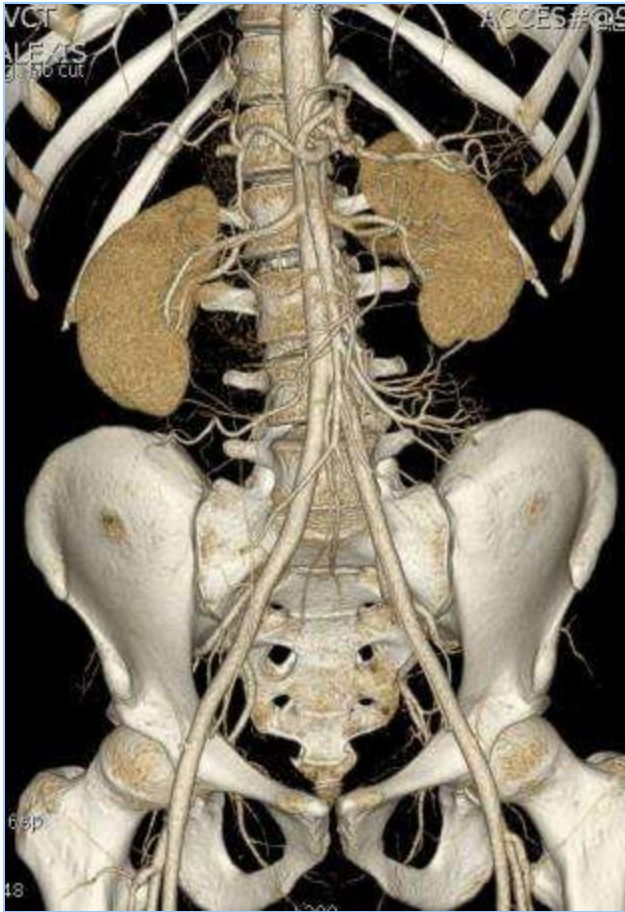
guide métallique flexible = cathétérisme percutané







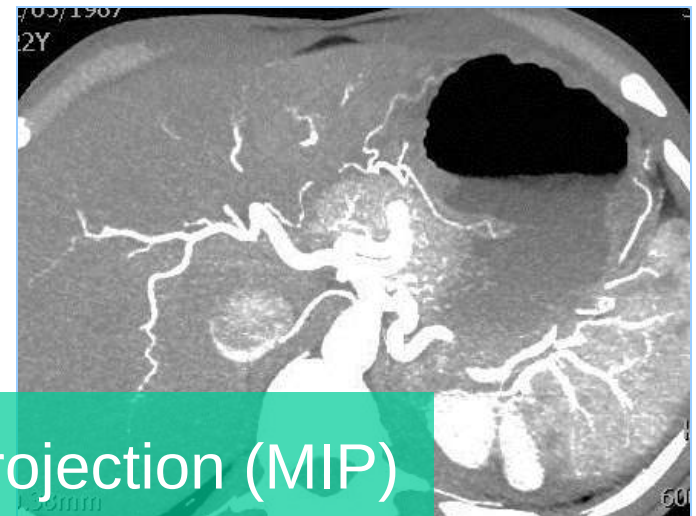
Angiographie



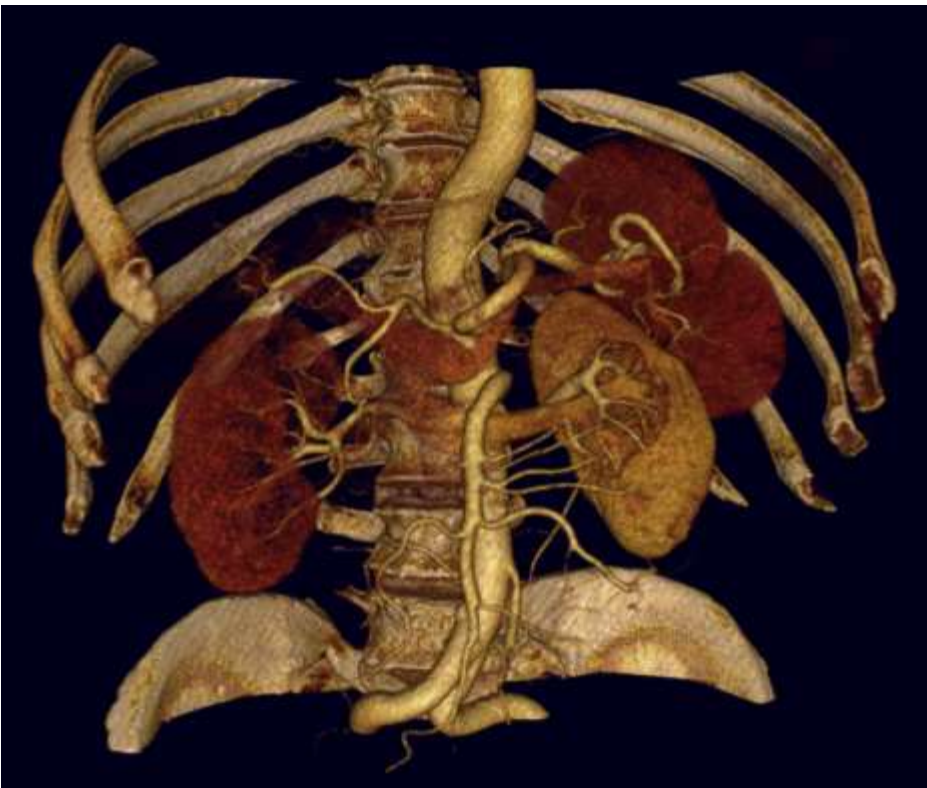
Volume Rendering
(VR)



Maximal Intensity Projection (MIP)

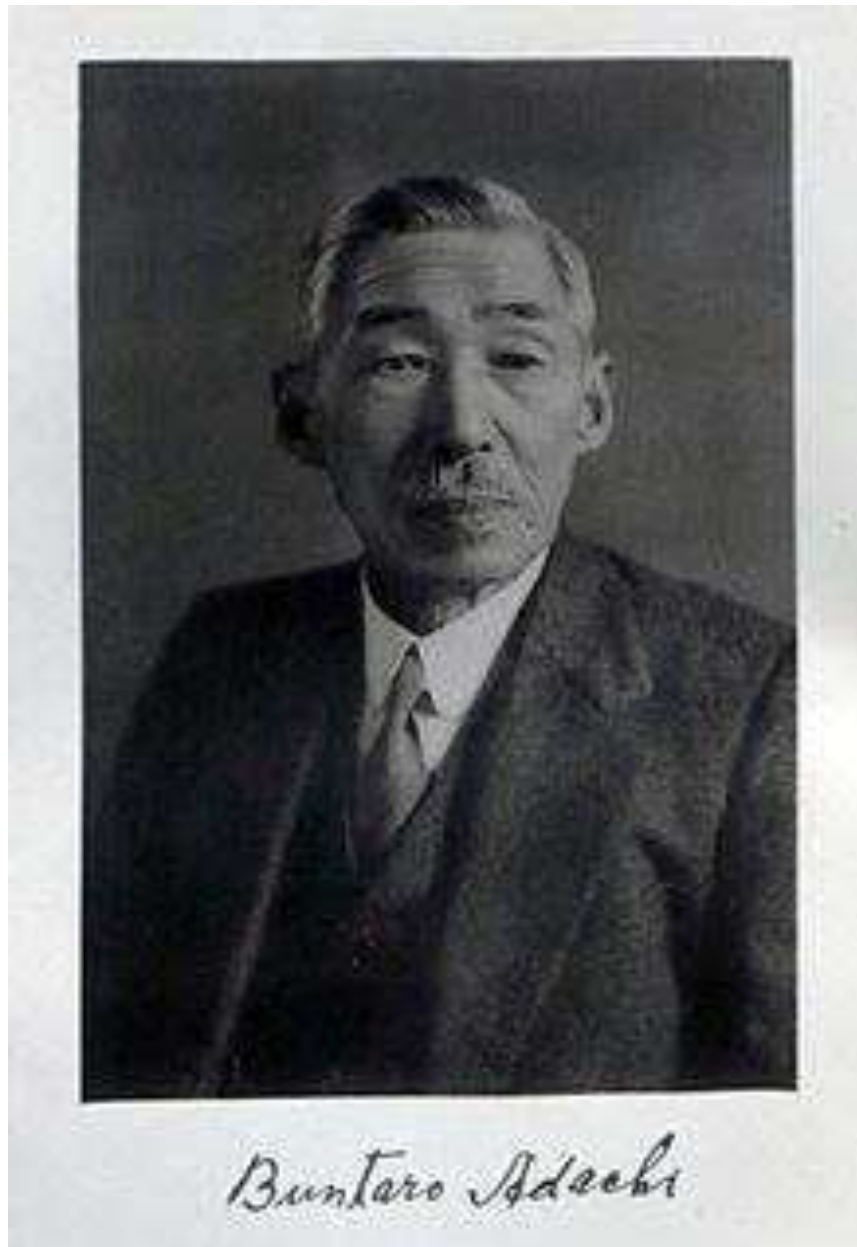


VOLUME RENDERING TECHNIQUE ANGIOGRAPHIE



3.

Ouvrages de référence



**Buntaro
ADACHI
(1865-1945)**
Kyoto

Anatomie der Japaner

von

PROF. DR. BUNTARO ADACHI

I

Das
Arteriensystem
der
Japaner

VON

DR. BUNTARO ADACHI

Professor der Anatomie an der Kaiserlichen Universität zu Kyoto

unter Mitwirkung von

DR. KOTONDO HASEBE

Lehrer des Anatomischen für Anatomie an der Kaiserlichen Universität zu Kyoto
assistent Professor der Anatomie an der Kaiserlichen Universität zu Sendai

In zwei Bänden

Mit 539 Abbildungen im Text und auf vier farblagen Tafeln sowie
mit etwa 700 Tabellen

Band I: A. pulmonalis, Aorta--Arcus volaris profundus

Band II: Aorta thoracalis--Arcus plantaris profundus

Kyoto 1928

Verlag der Kaiserlich-Japanischen Universität zu Kyoto
In Kommission bei „MARUZEN Co.“, Kyoto und Tokyo
Gebunden von „Kenshusha“ in Tokyo

Anatomie der Japaner
II
Das
Venensystem
der
Japaner

Von
DR. BUNTARO ADACHI

Professor (emer.) der Anatomie an der Kaiserlichen Universität Kyoto
Mitglied der Kaiserlichen Akademie

II
Zweite Lieferung

Mit 27 Abbildungen im Text und
74 Abbildungen auf 23 teilweise farbigen Tafeln
sowie mit etwa 120 Taebllen

Vv. thoracicae longitudinales
und Vv. intercostales
V. cava caudalis

PROF. DR. BUNTARO ADACHI

Anatomie der Japaner

III

Das

Lymphgefäßsystem

der

Japaner

von

DR. TAKUSABURO KIHARA

Professor der Anatomie an der Universität Kyoto

Erste Lieferung

Der Ductus thoracicus der Japaner

von

DR. BUNTARO ADACHI

Professor einer der Anatomie an der Universität Kyoto, Mitglied
der Kaiserlichen Akademie der Wissenschaften

Kyoto 1953

Druckverlag KENKYUSHA Tokyo



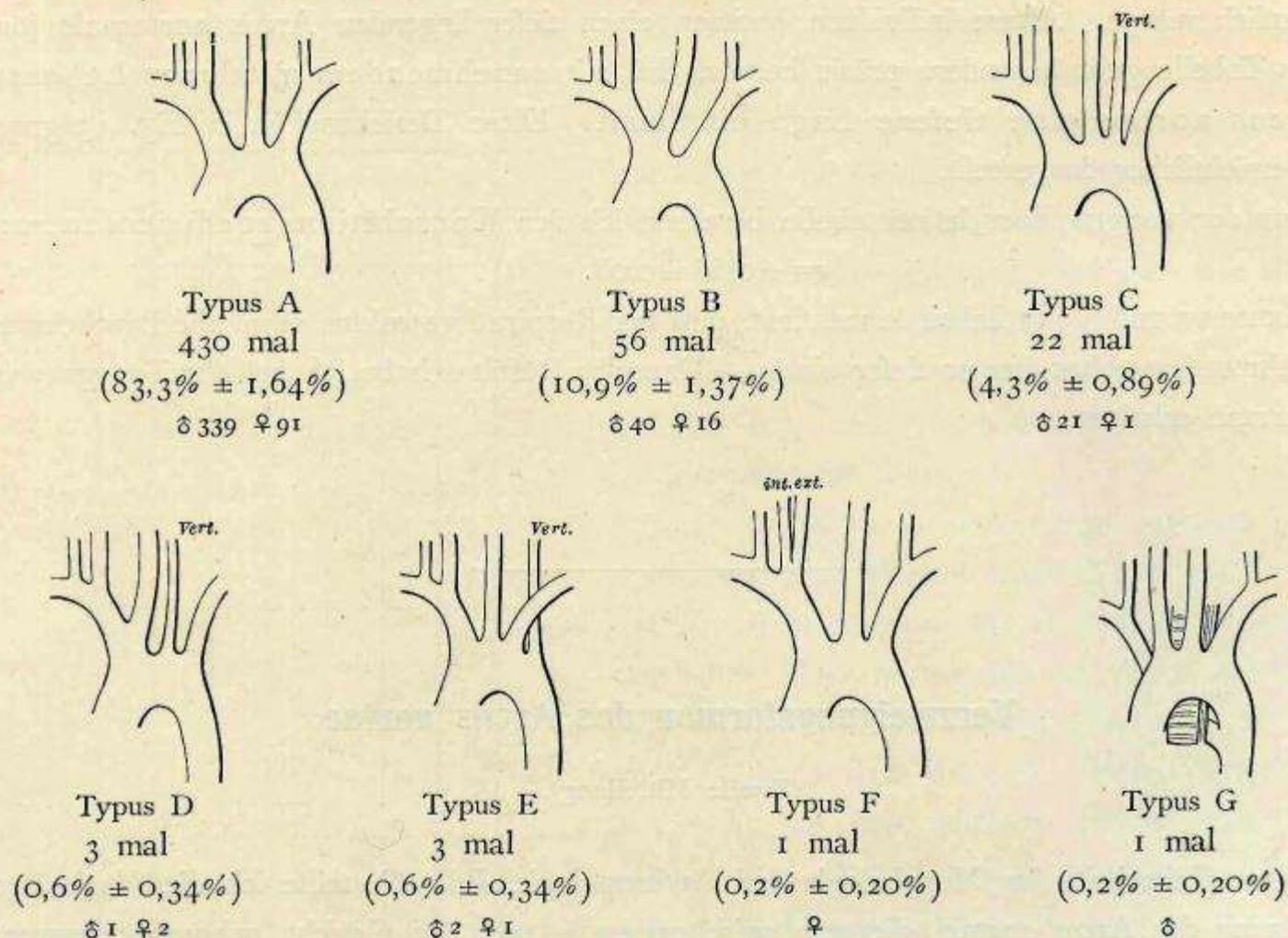
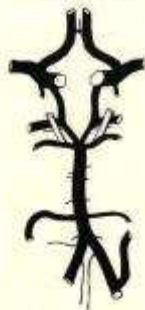


Fig. 14.

Verzweigungsformen des Arcus aortae mit Häufigkeit ihres Vorkommens
an 516 Japanern (♂ 404, ♀ 112).

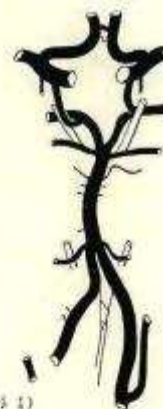
Nr. 20 (30 j. 1)



Nr. 21 (30 j. 1)



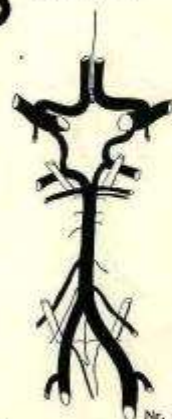
Nr. 22 (25 j. 1)



Nr. 23 (07 j. 1)



Nr. 24 (19 j. 1)



Nr. 25 (68 j. 1)



Nr. 26 (34 j. 1)



Nr. 27 (17 j. 1)



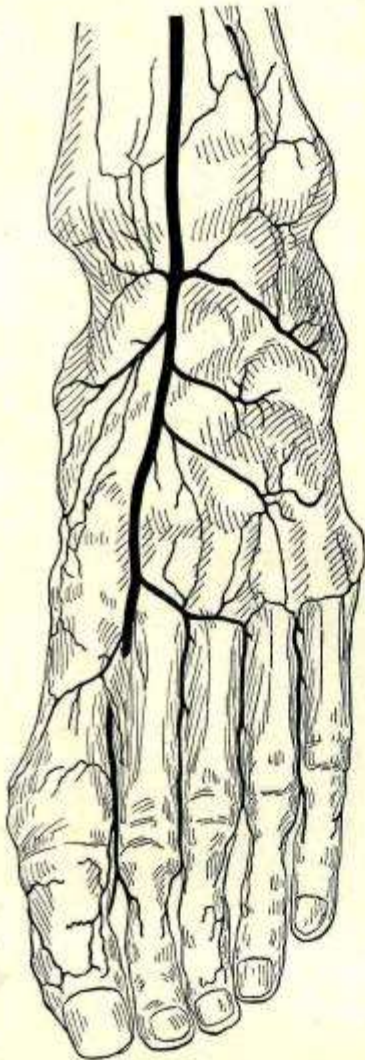


Fig. 175.
Gruppe 10.
 $\frac{2}{3}$. (36 jähr. Mann).



Fig. 176.
Gruppe 17.
 $\frac{2}{3}$. (Erwachsener Mann).

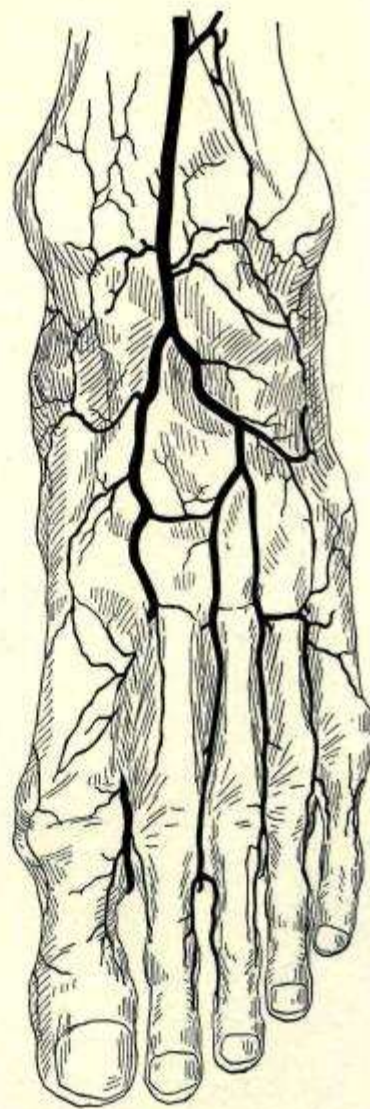


Fig. 177.
Gruppe 20.
 $\frac{2}{3}$. (30 jähr. Mann).



Dr A.-F. LEDOUBLE

Professeur à l'Ecole de Médecine de Tours.

Membre correspondant
de l'Académie de Médecine.

Lauréat de l'Institut (Académie des Sciences).

Président de la Société Médicale en 1882.



Louis Dubreuil-Chambardel (1879-1927)

TRAITÉ DES VARIATIONS
DU SYSTÈME ARTÉRIEL

VARIATIONS
DES ARTÈRES
DU
MEMBRE SUPÉRIEUR

PAR LE DOCTEUR

LOUIS DUBREUIL-CHAMBARDEL,
Ancien Président de la Société d'Anthropologie de Paris

PRÉFACE DU PROFESSEUR H. ANTHONY



MASSON ET C^e, ÉDITEURS
LIBRAIRES DE L'ACADÉMIE DE MÉDECINE
120, R^e ST-GERMAIN — PARIS (VI^e)

1925

TRAITÉ DES VARIATIONS
DU SYSTÈME ARTÉRIEL

VARIATIONS
DES ARTÈRES
DU PELVIS
ET DU
MEMBRE INFÉRIEUR

PAR LE D^r

LOUIS DUBREUIL-CHAMBARDEL
Président de la Société d'Anthropologie de Paris

PRÉFACE DU PROFESSEUR NICOLAS

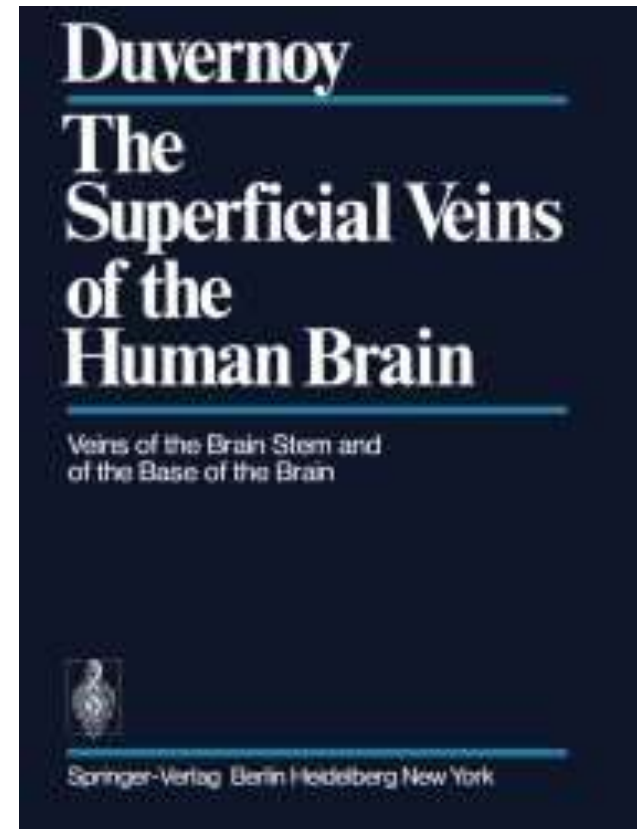
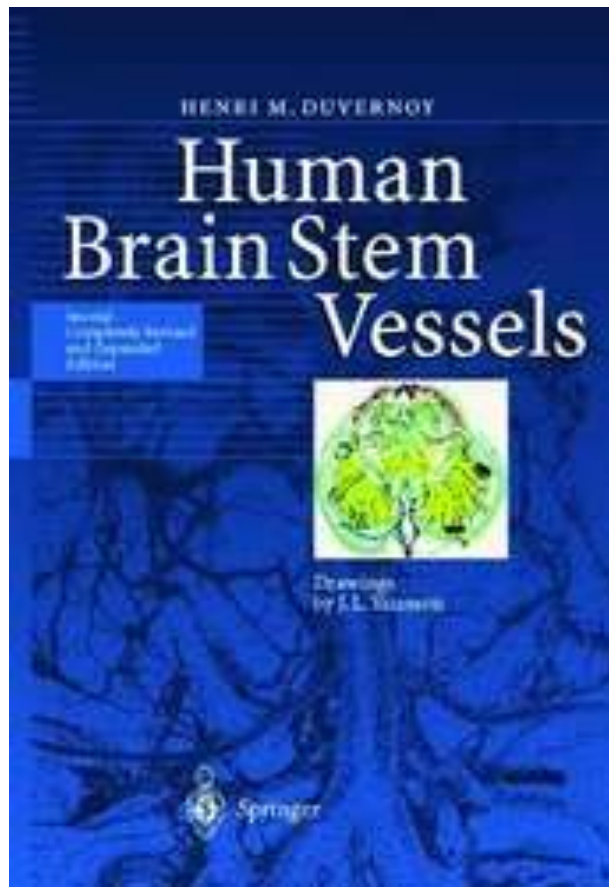


MASSON ET C^e, ÉDITEURS
LIBRAIRES DE L'ACADÉMIE DE MÉDECINE
120, R^e ST-GERMAIN — PARIS (VI^e)

1925

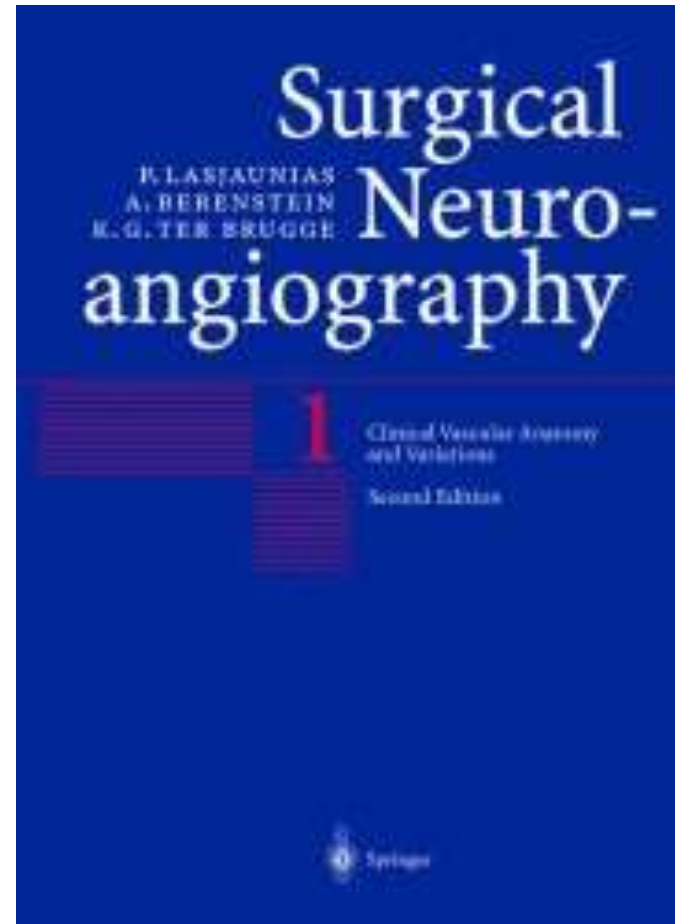
Henri Duvernoy

Besançon

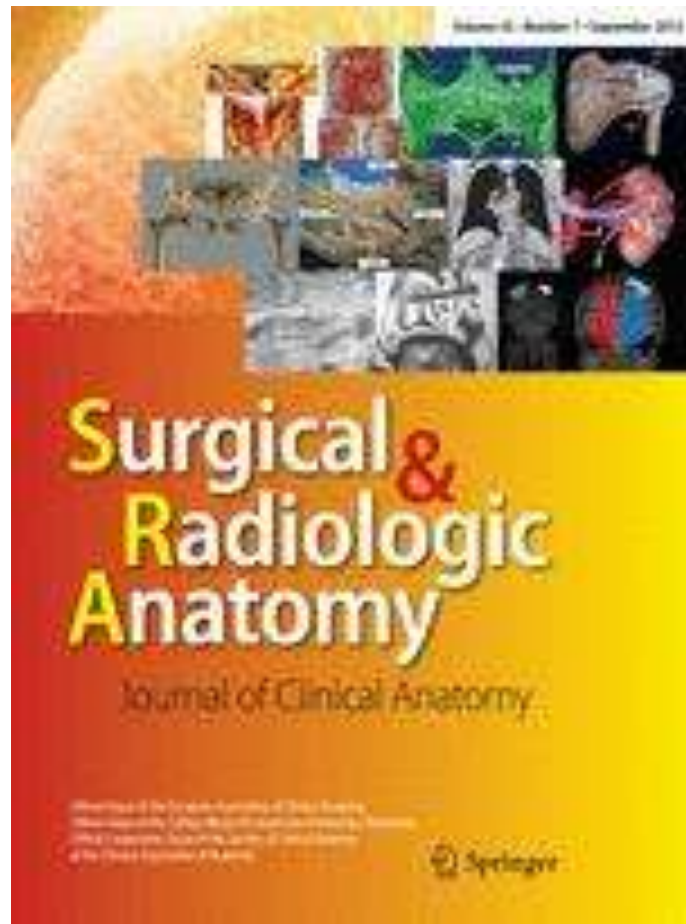


Pierre Lasjaunias (1948-2008)

Paris - Bicêtre



Surgical and Radiologic Anatomy (SRA)





Master

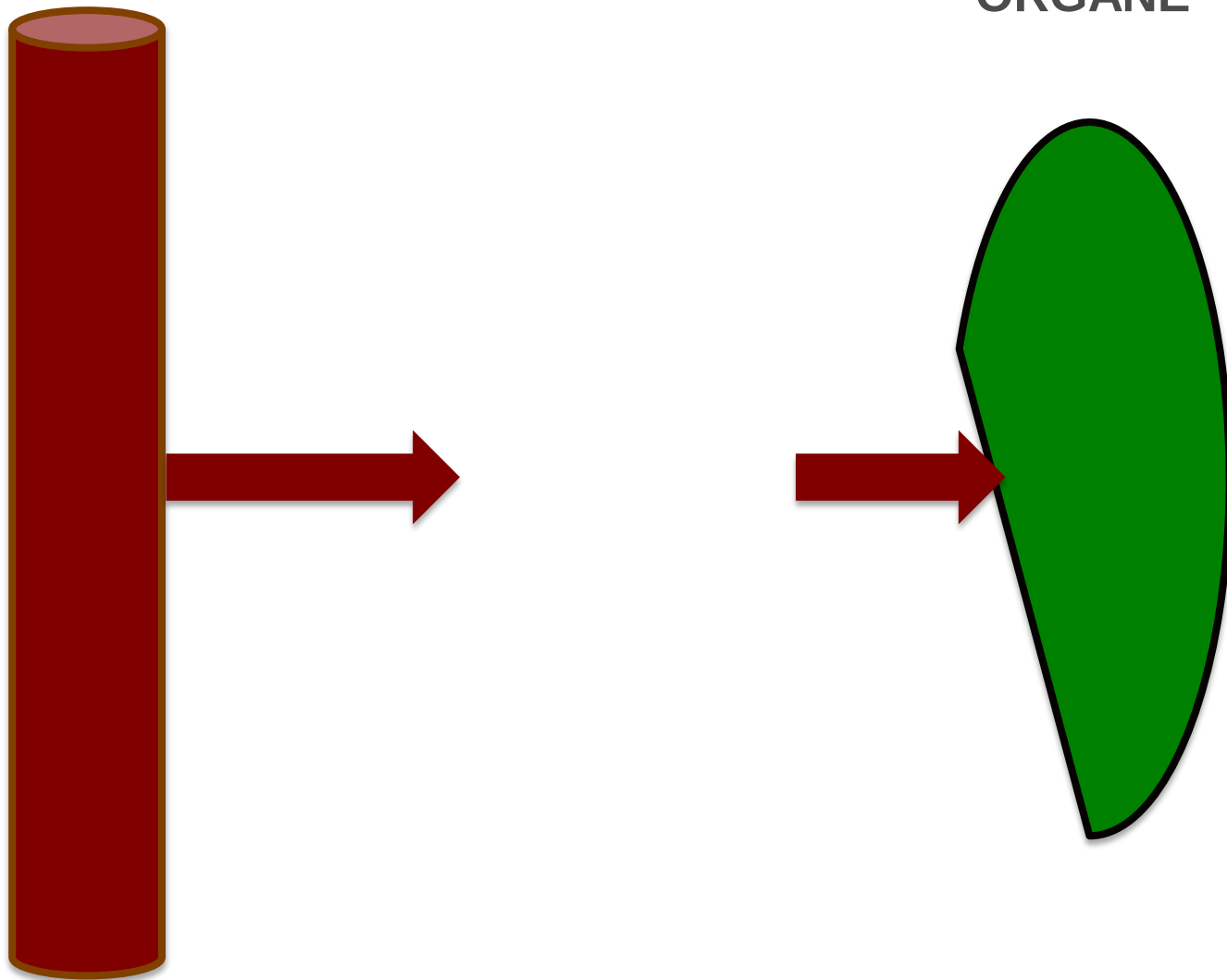
"BIOMORPHOLOGIE et BIOMATÉRIAUX"

M1 + M2

Université de Strasbourg

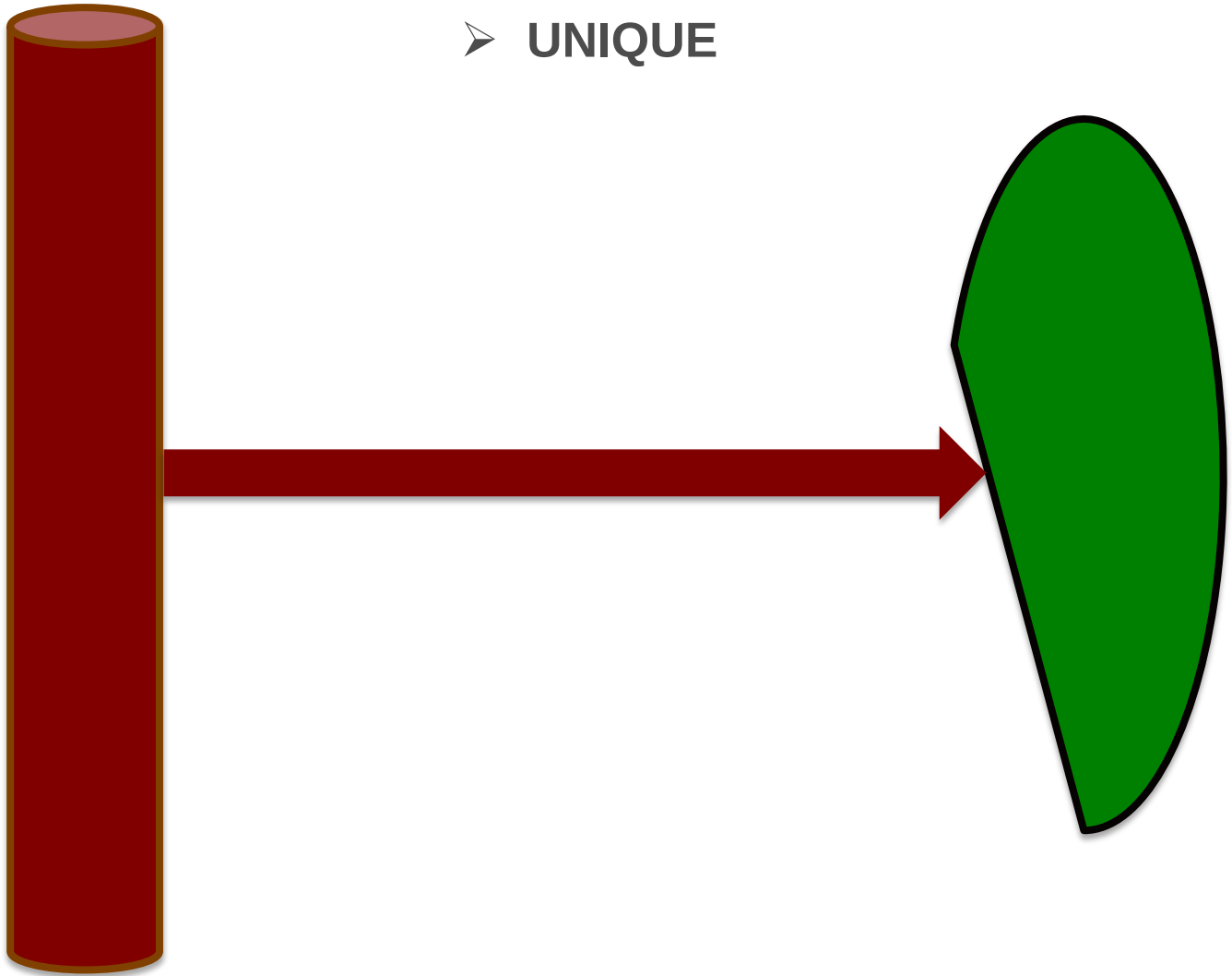
4. Modalités de la variabilité vasculaire

ORGANE



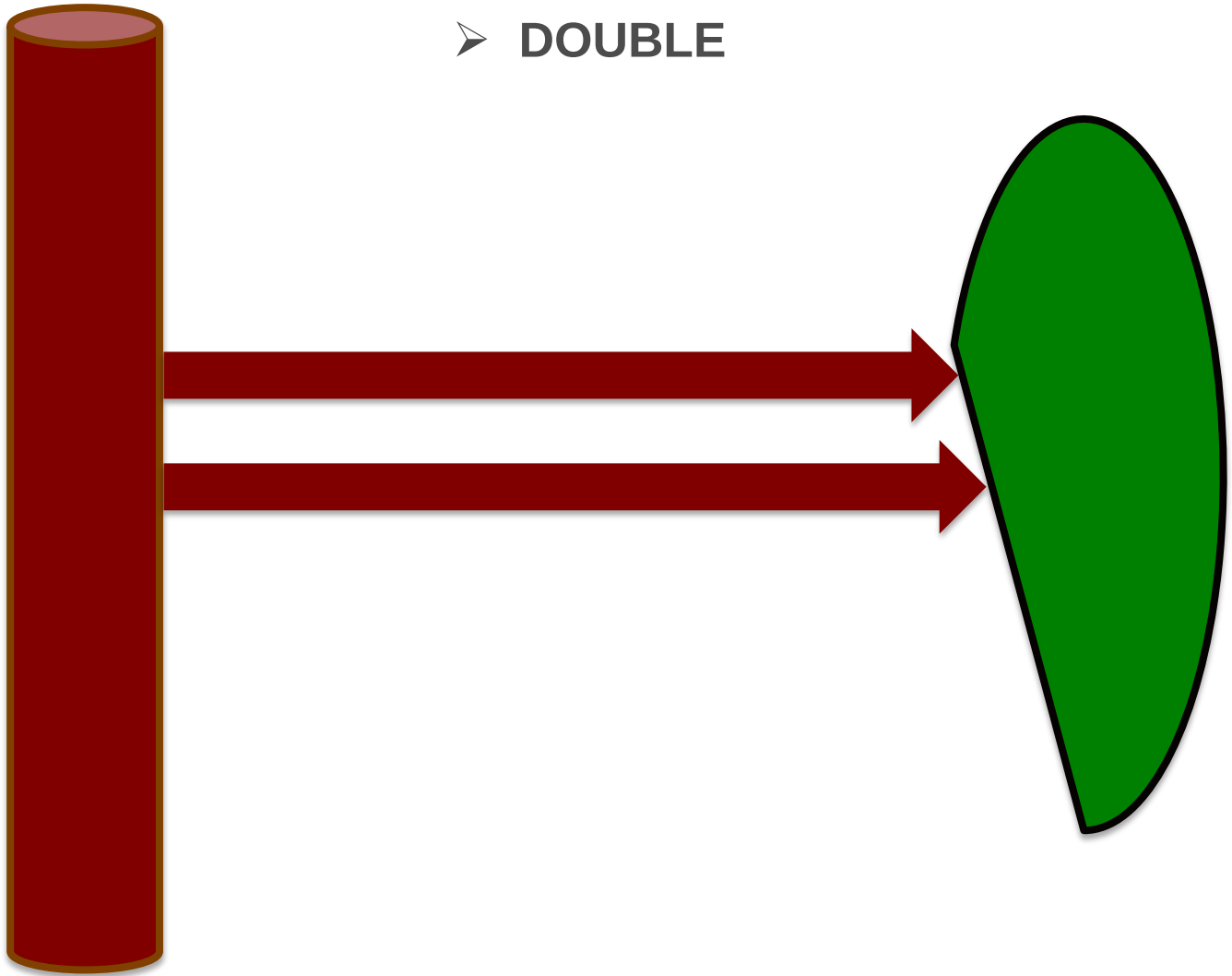
NOMBRE D'ARTÈRES POUR UN ORGANE DONNÉ

➤ UNIQUE



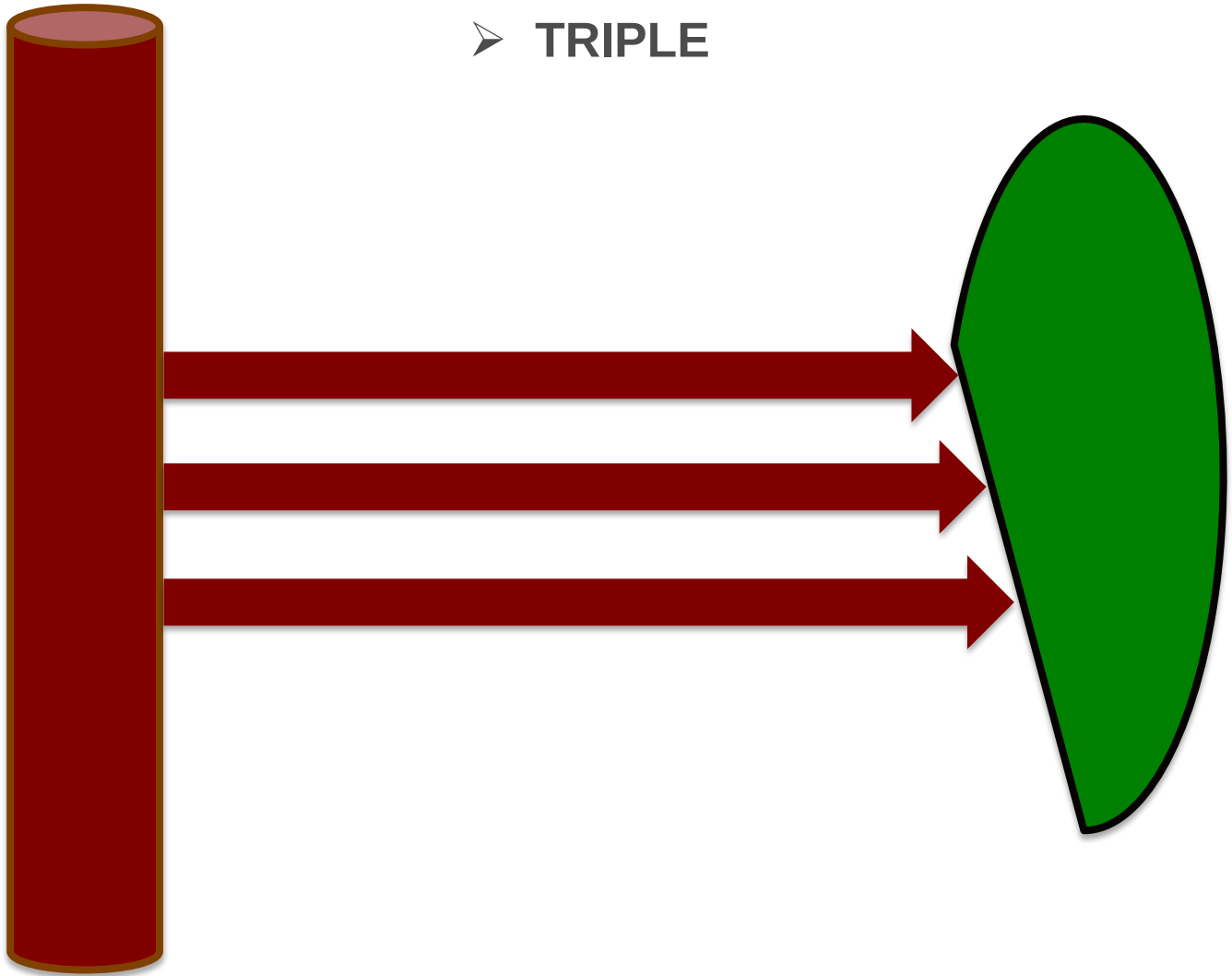
NOMBRE D'ARTÈRES POUR UN ORGANE DONNÉ

➤ DOUBLE



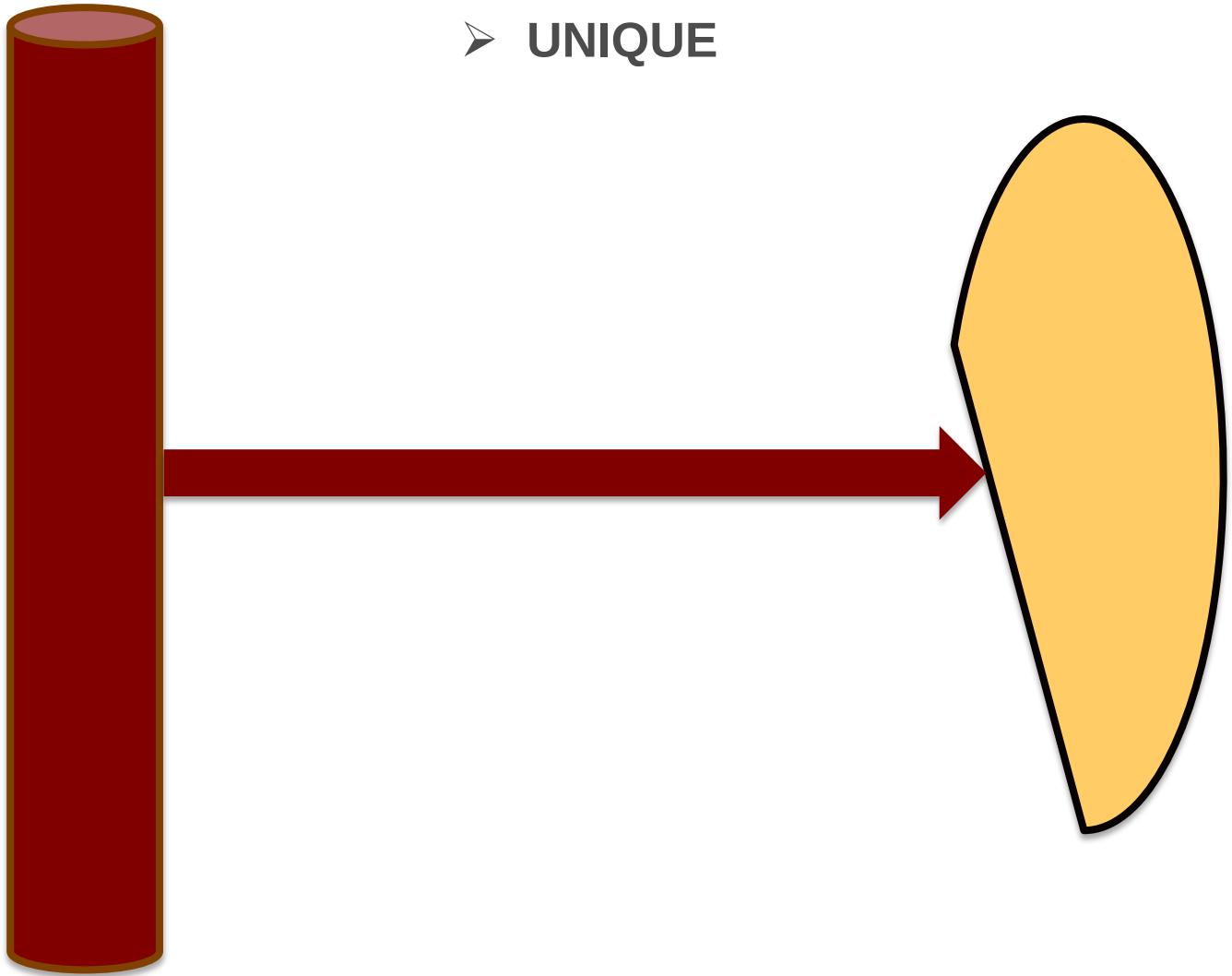
NOMBRE D'ARTÈRES POUR UN ORGANE DONNÉ

➤ TRIPLE



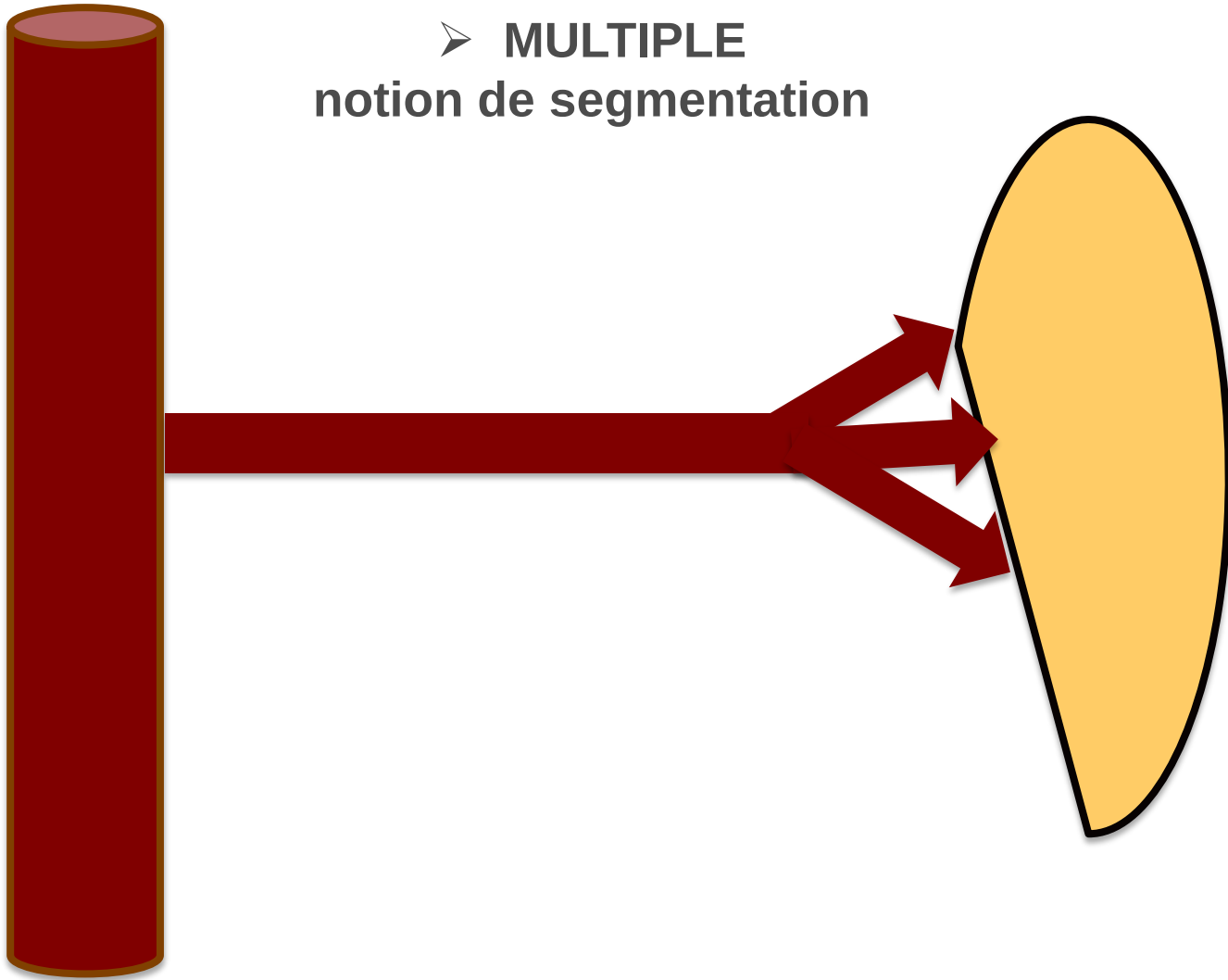
NOMBRE DE DIVISIONS TERMINALES

➤ UNIQUE

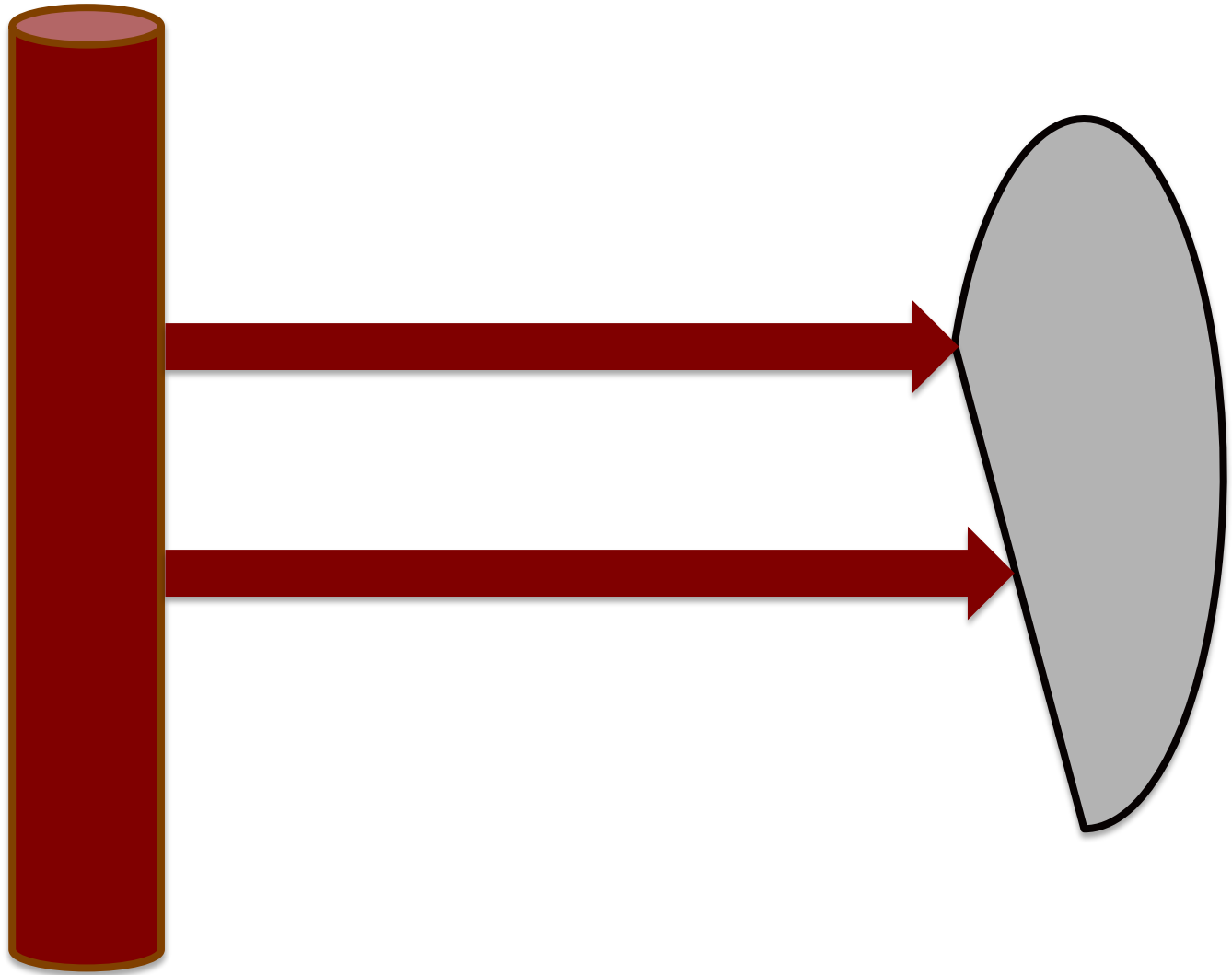


NOMBRE DE DIVISIONS TERMINALES

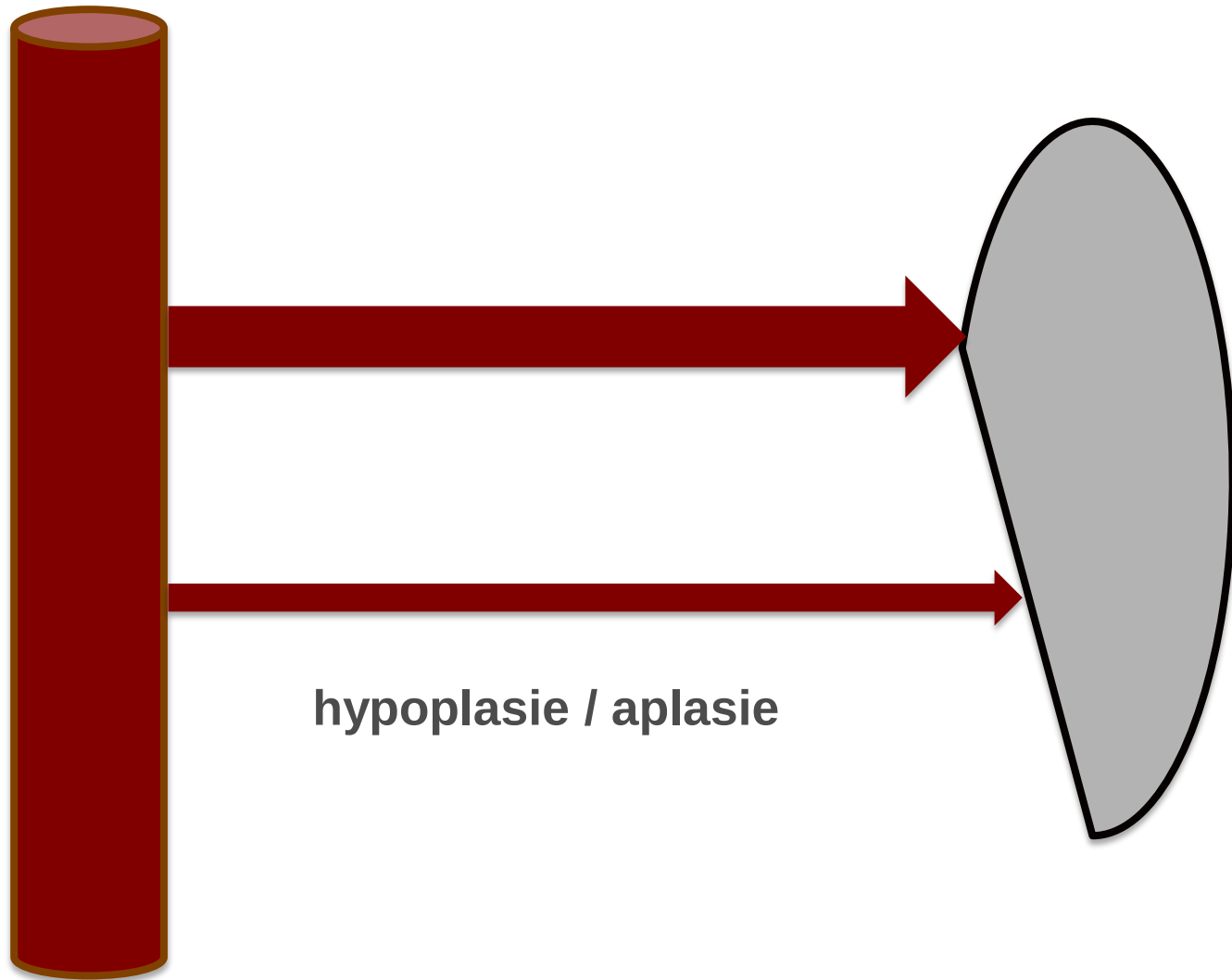
➤ **MULTIPLE**
notion de segmentation



ÉQUILIBRE ENTRE 2 ARTÈRES POUR UN ORGANE DONNÉ

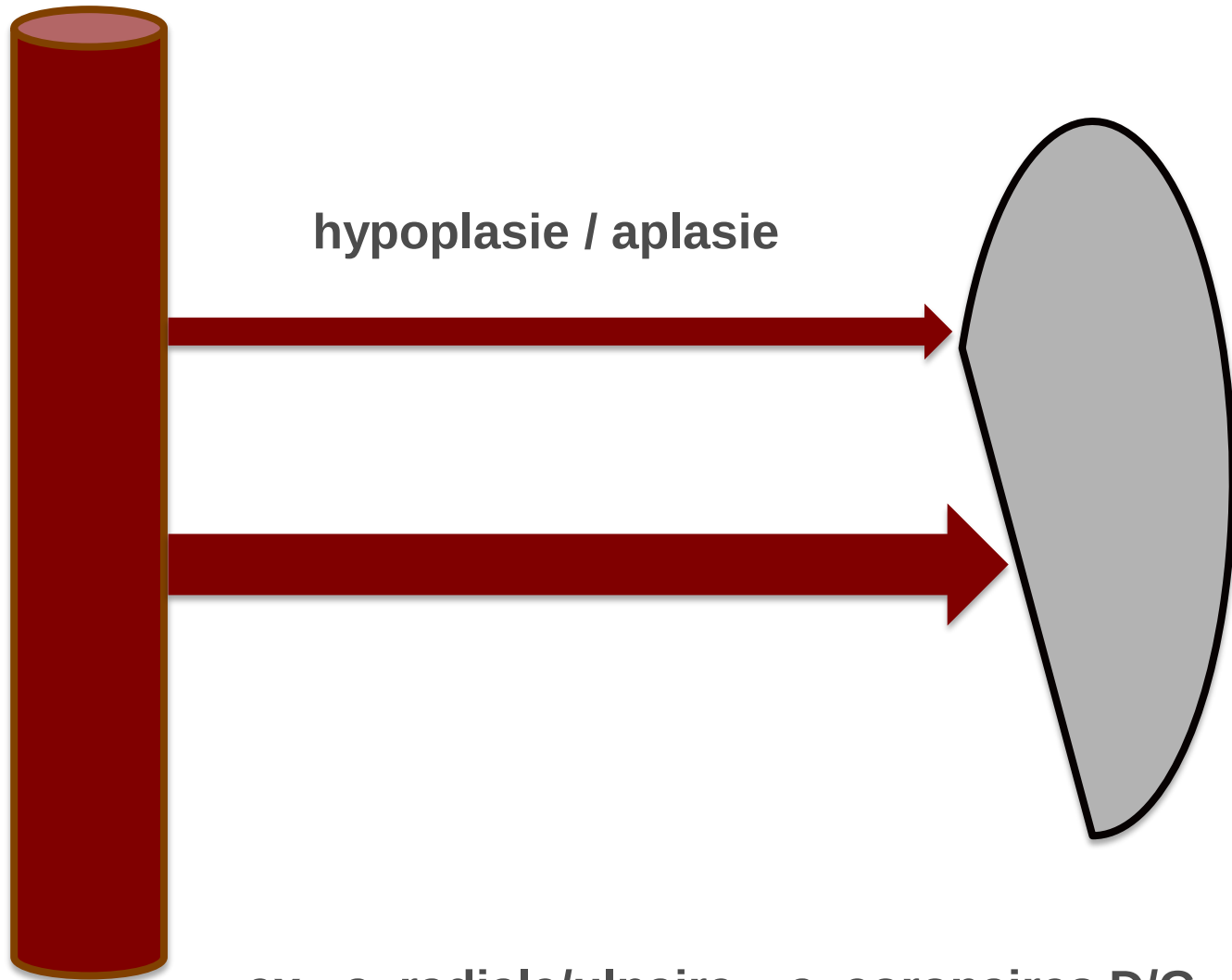


ÉQUILIBRE ENTRE 2 ARTÈRES POUR UN ORGANE DONNÉ



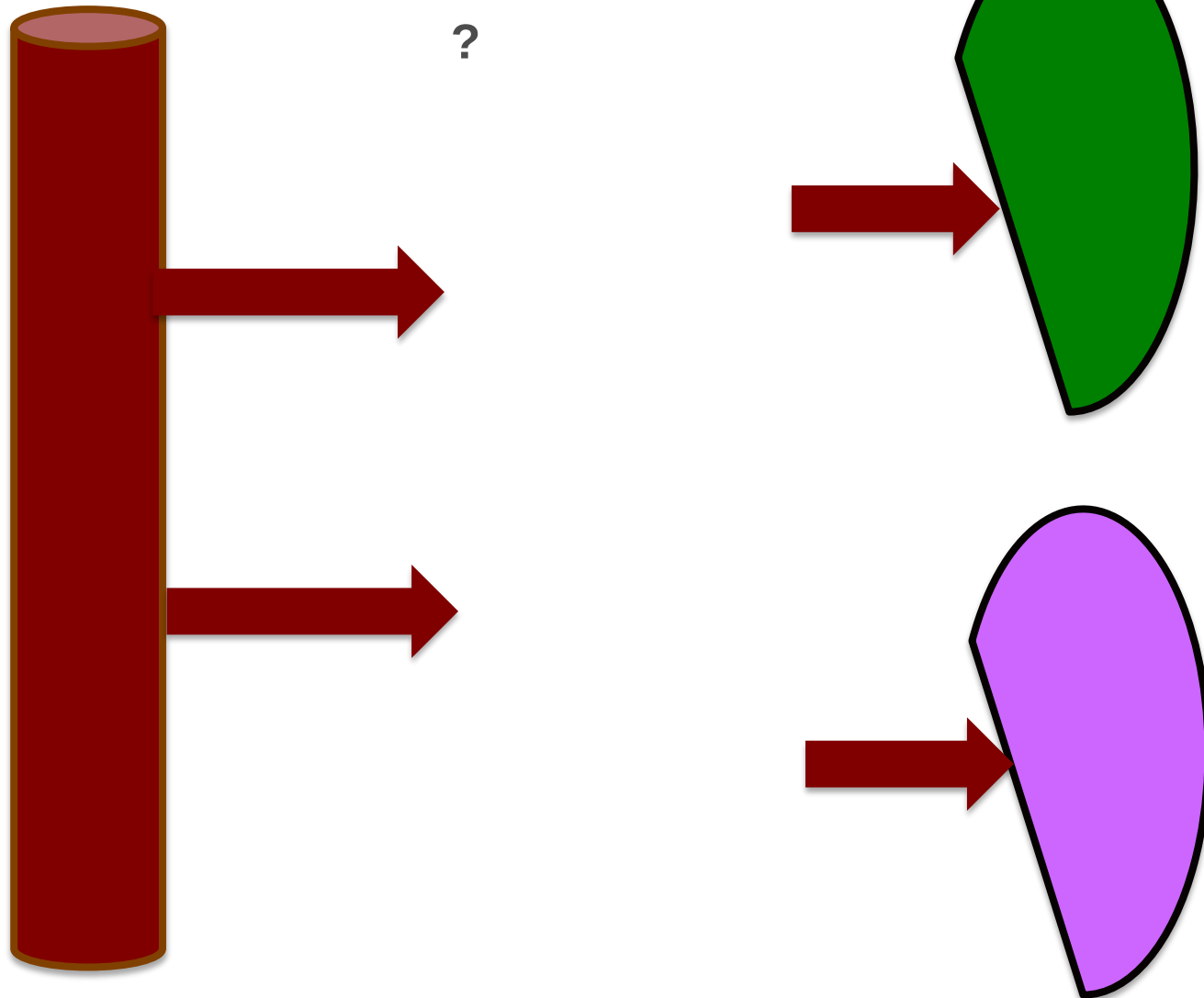
hypoplasie / aplasie

ÉQUILIBRE ENTRE 2 ARTÈRES POUR UN ORGANE DONNÉ

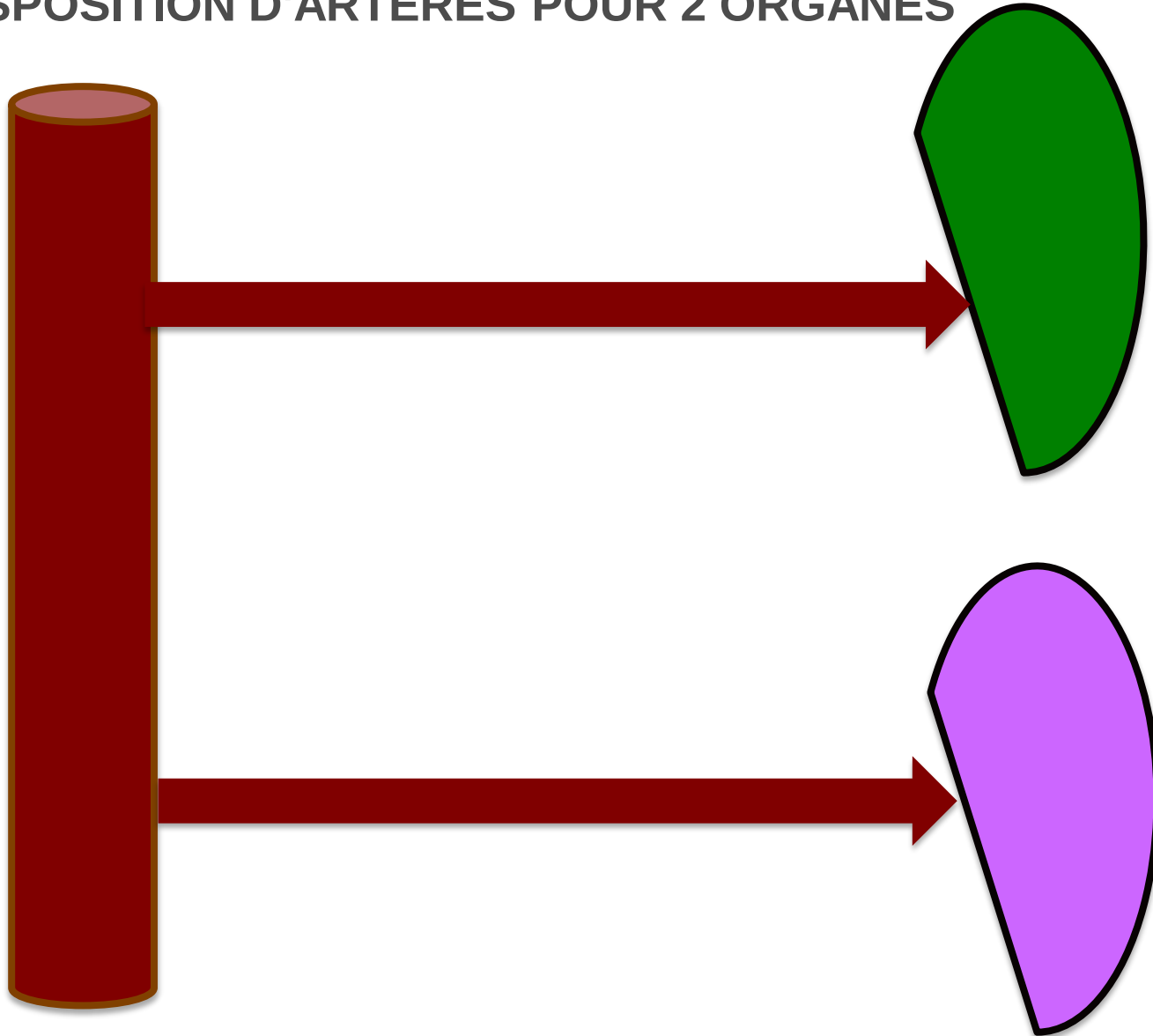


ex.: a. radiale/ulnaire – a. coronaires D/G

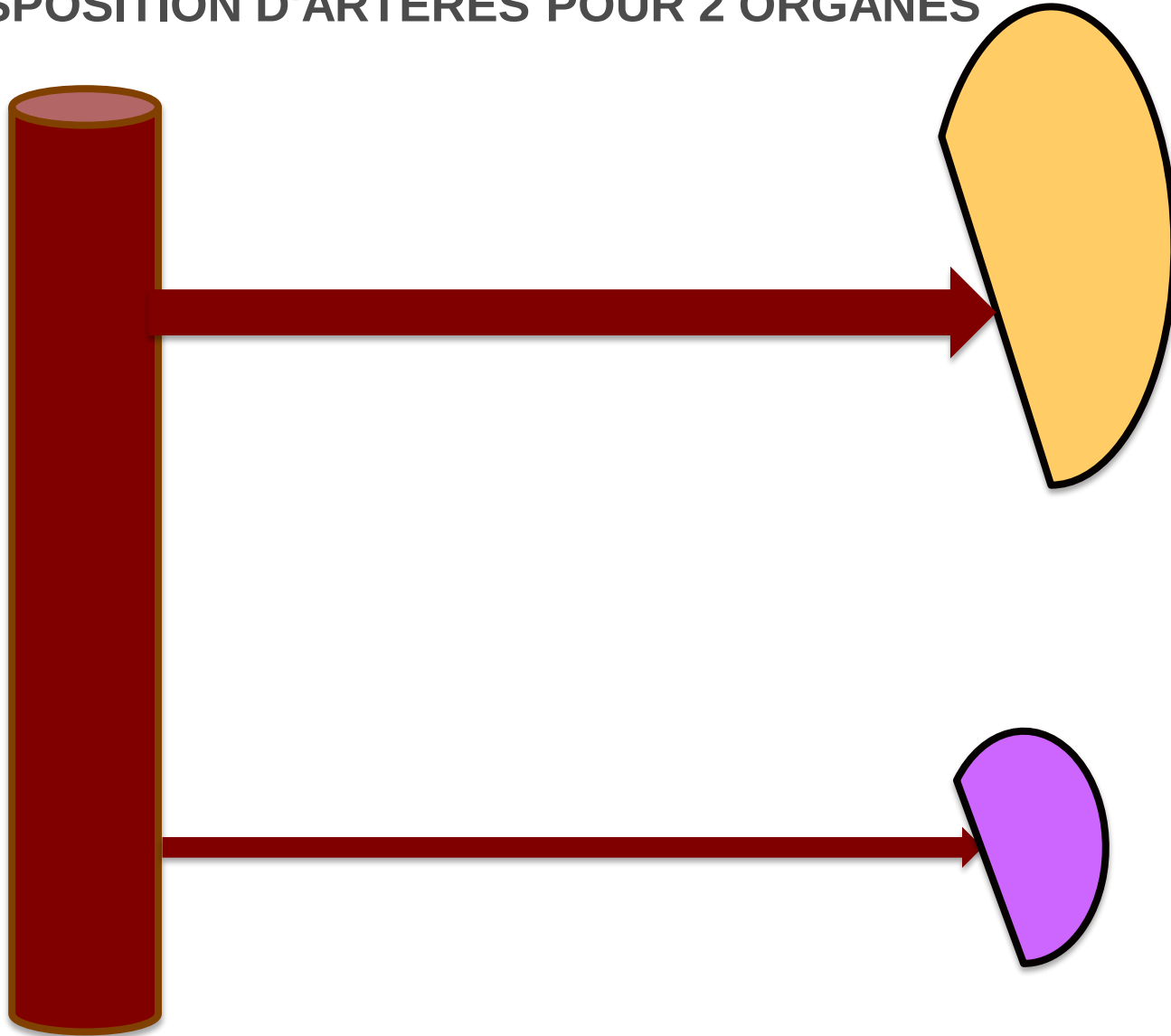
DISPOSITION D'ARTÈRES POUR 2 ORGANES



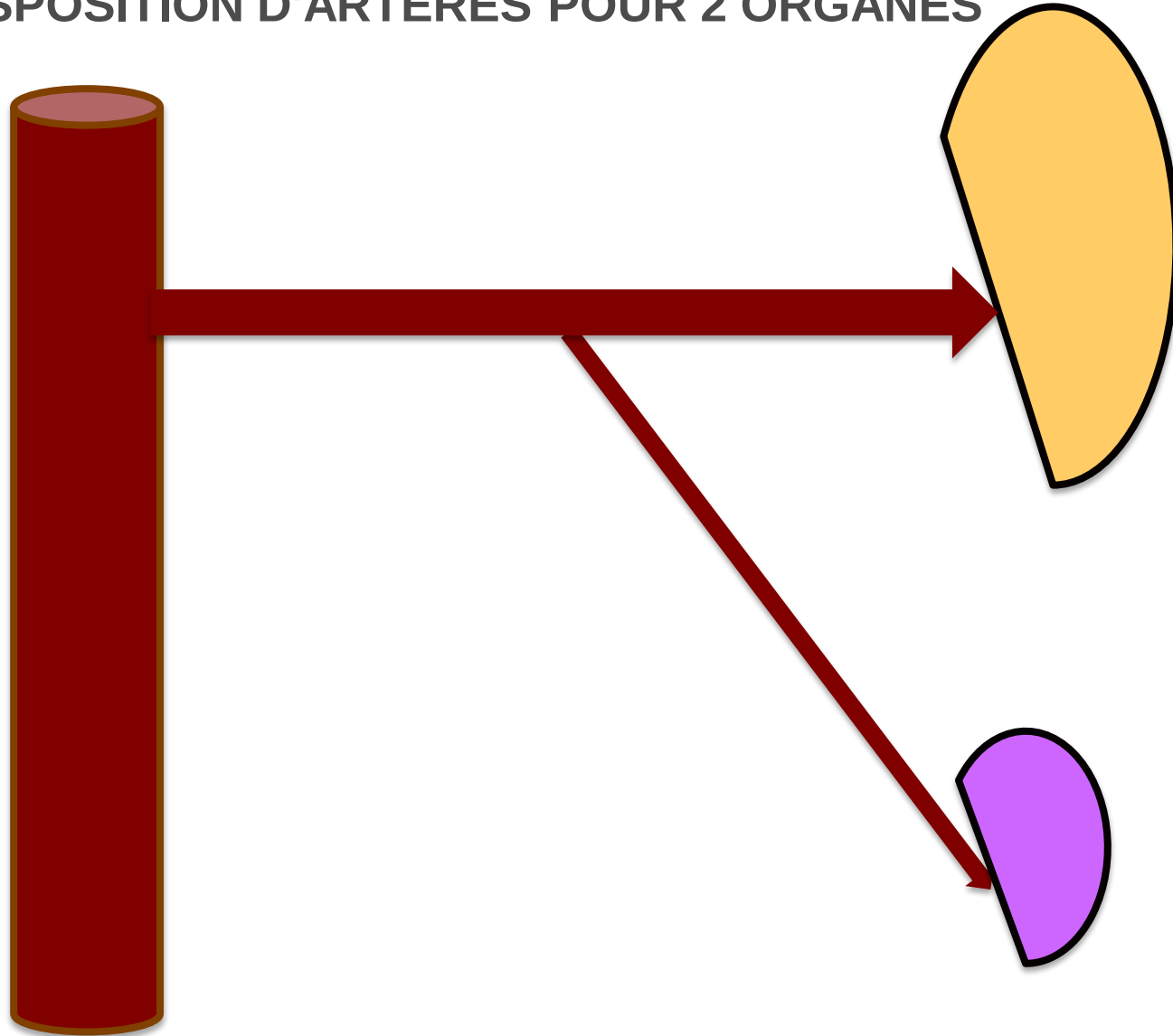
DISPOSITION D'ARTÈRES POUR 2 ORGANES



DISPOSITION D'ARTÈRES POUR 2 ORGANES

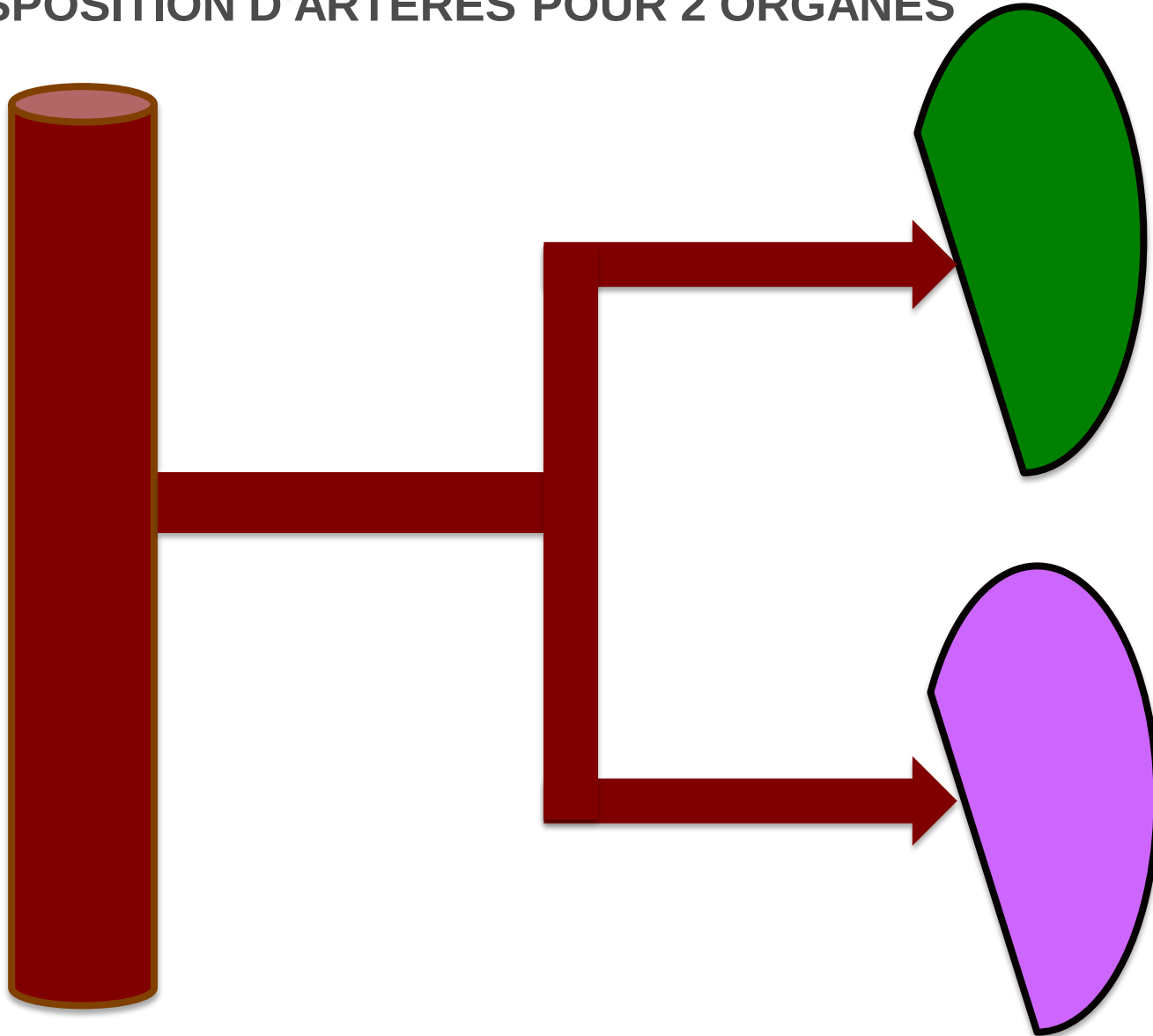


DISPOSITION D'ARTÈRES POUR 2 ORGANES

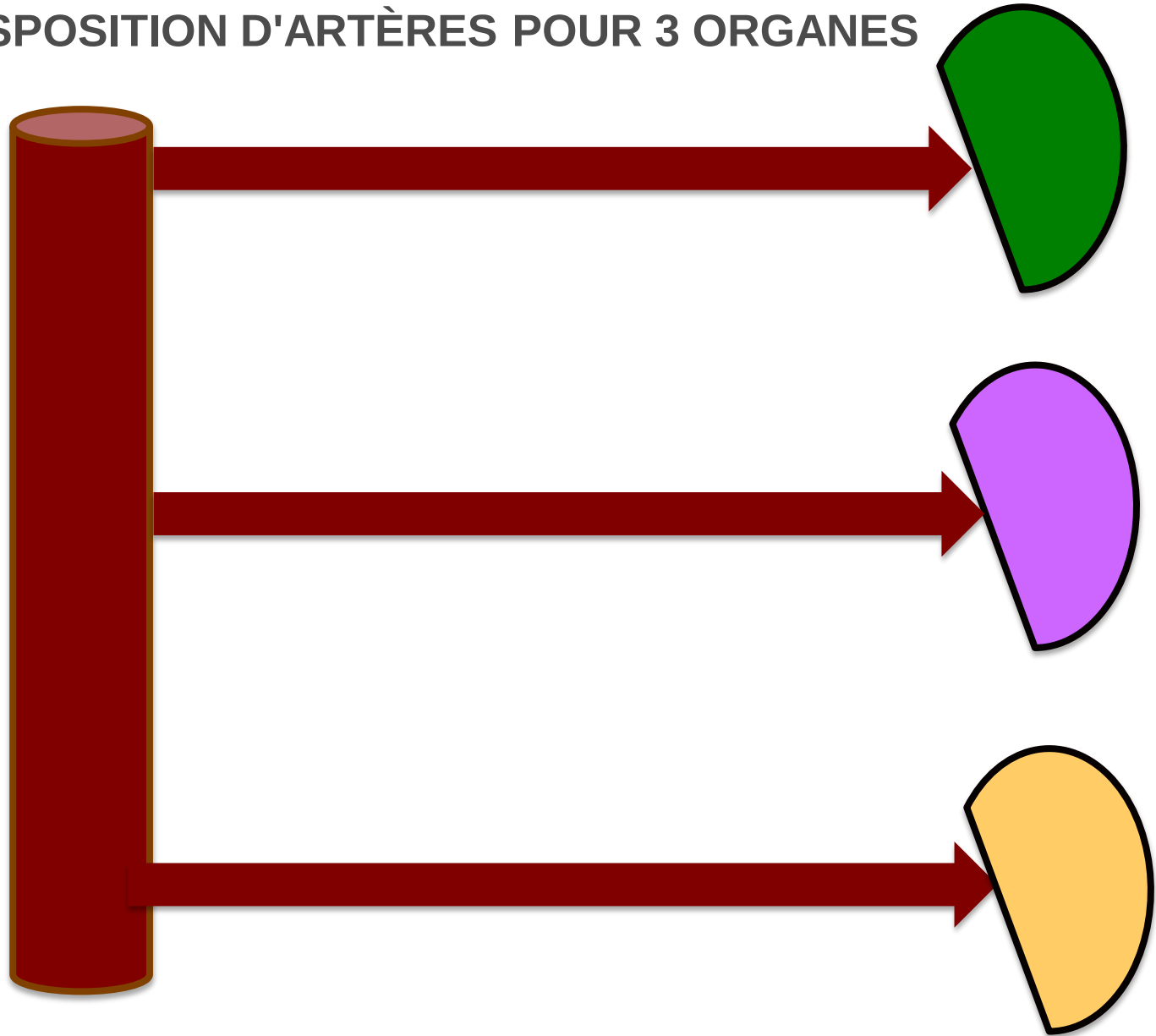


ex.: a. gonadiques – a. suprarénales

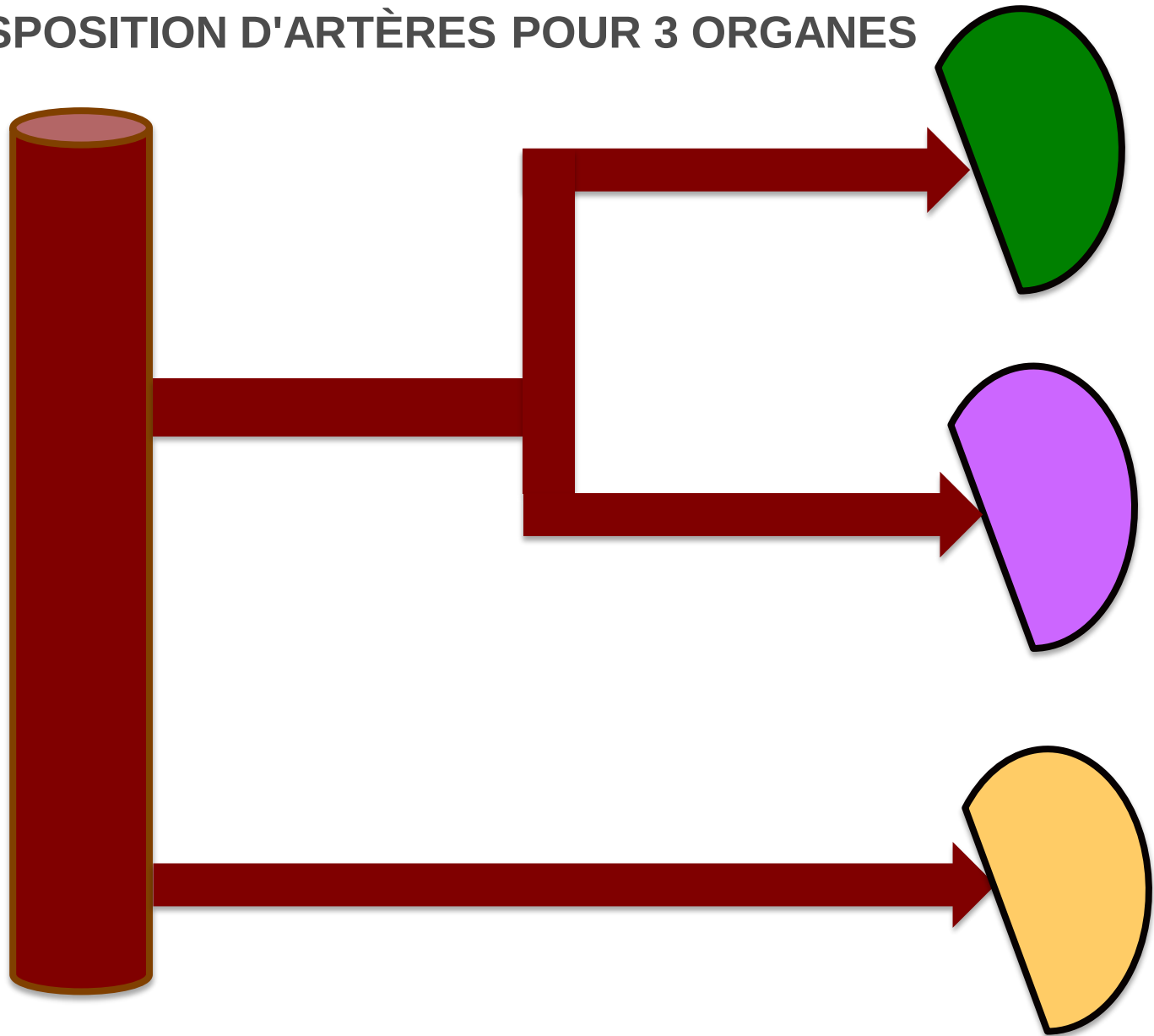
DISPOSITION D'ARTÈRES POUR 2 ORGANES



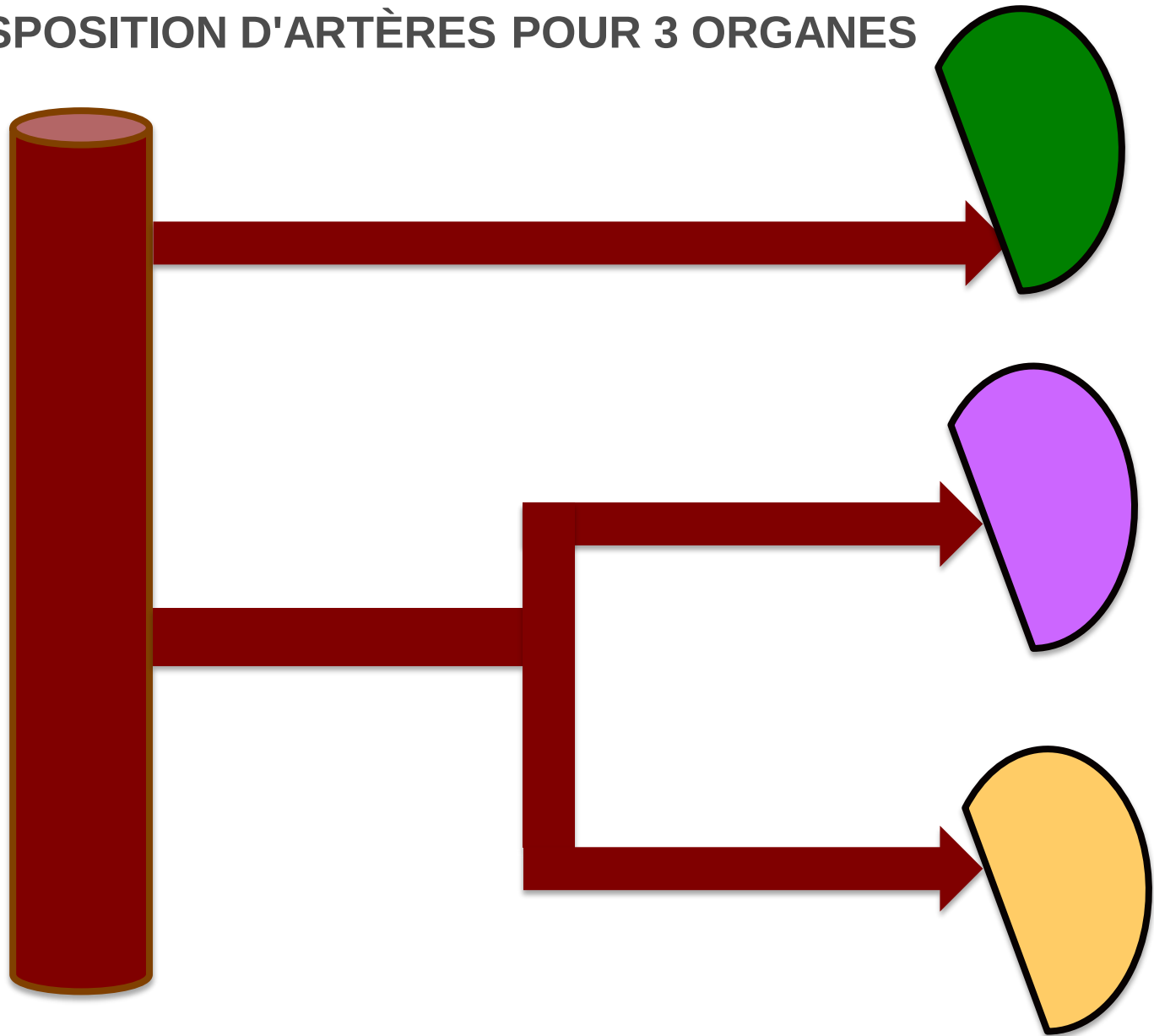
DISPOSITION D'ARTÈRES POUR 3 ORGANES



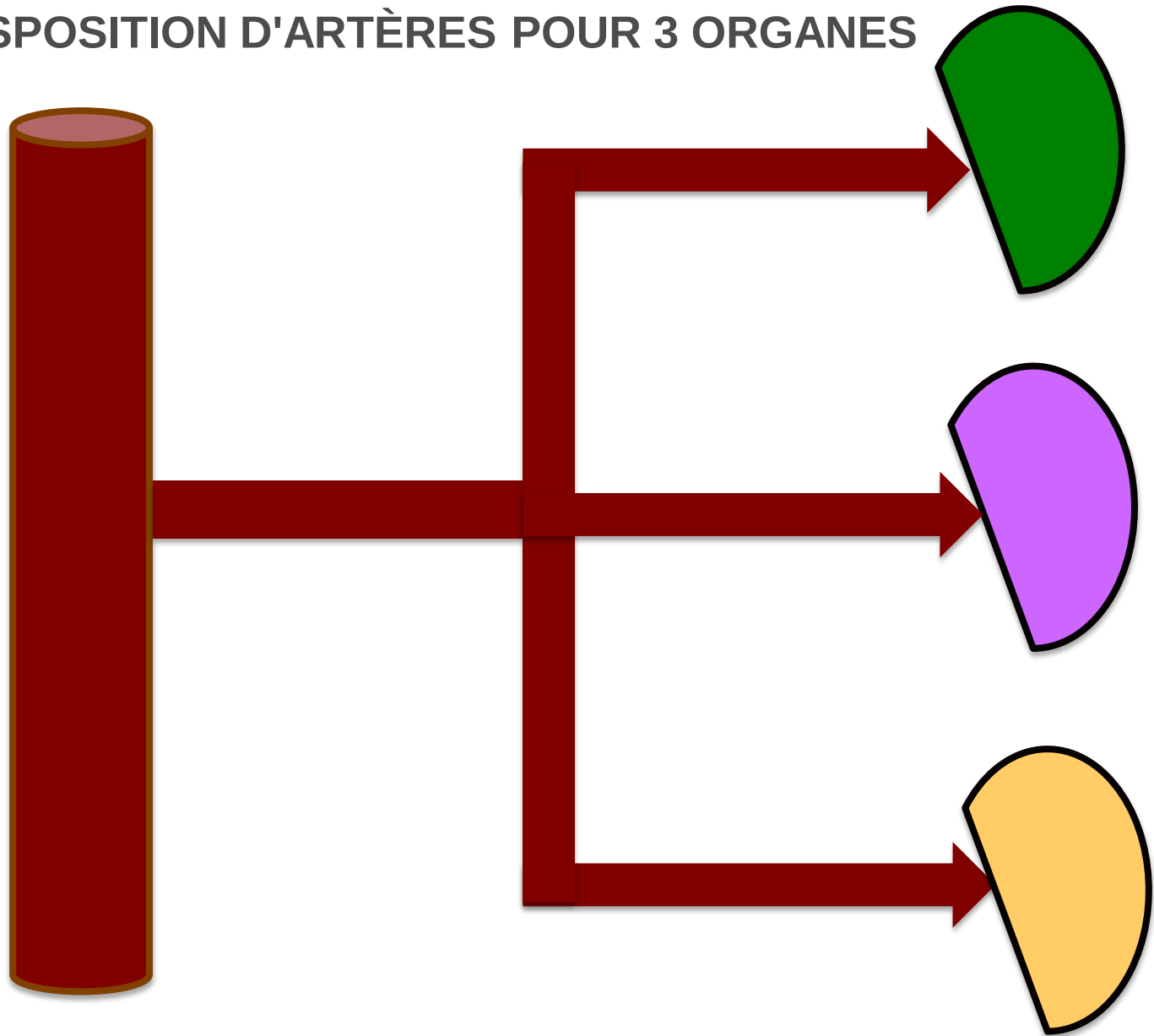
DISPOSITION D'ARTÈRES POUR 3 ORGANES



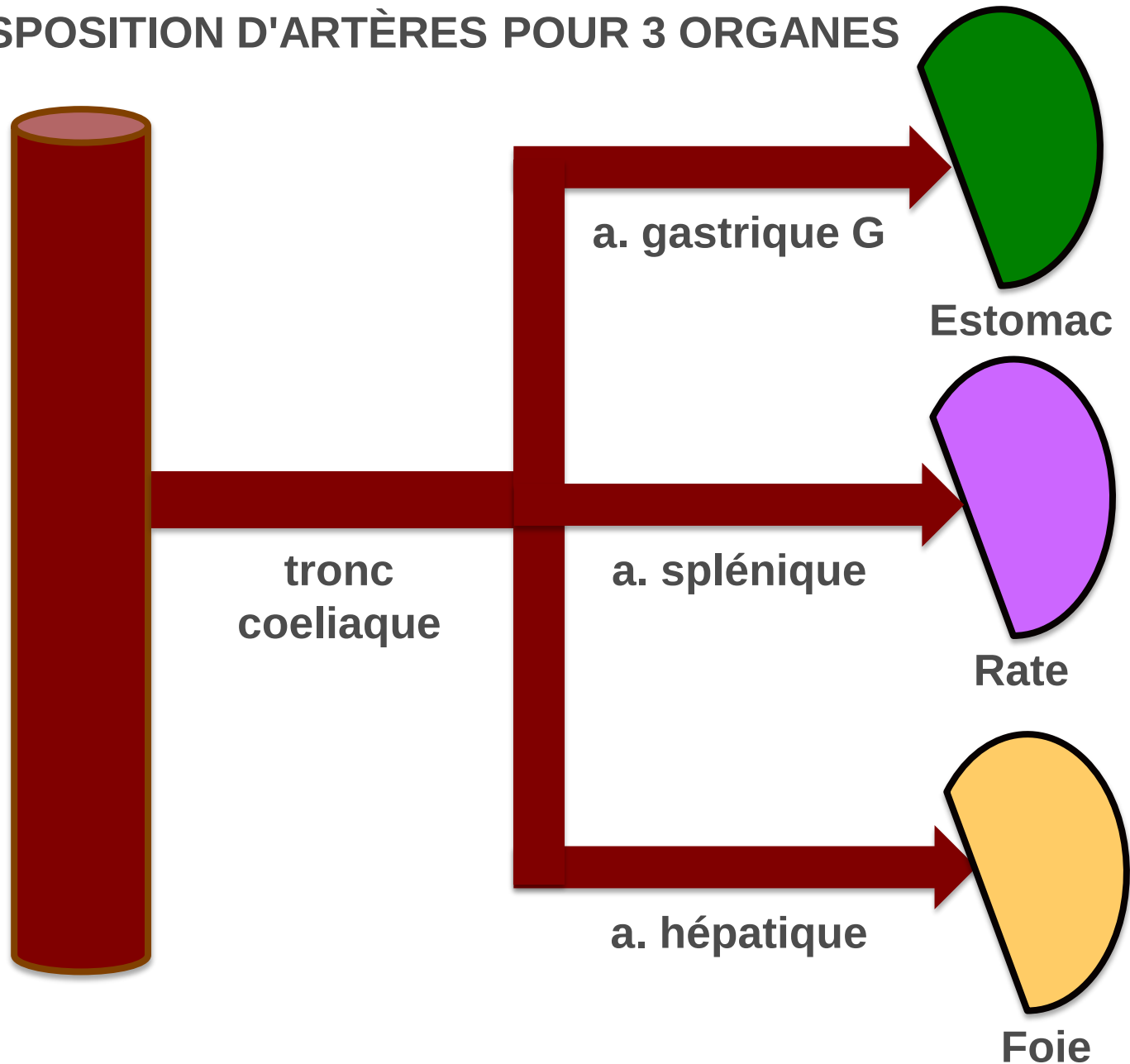
DISPOSITION D'ARTÈRES POUR 3 ORGANES



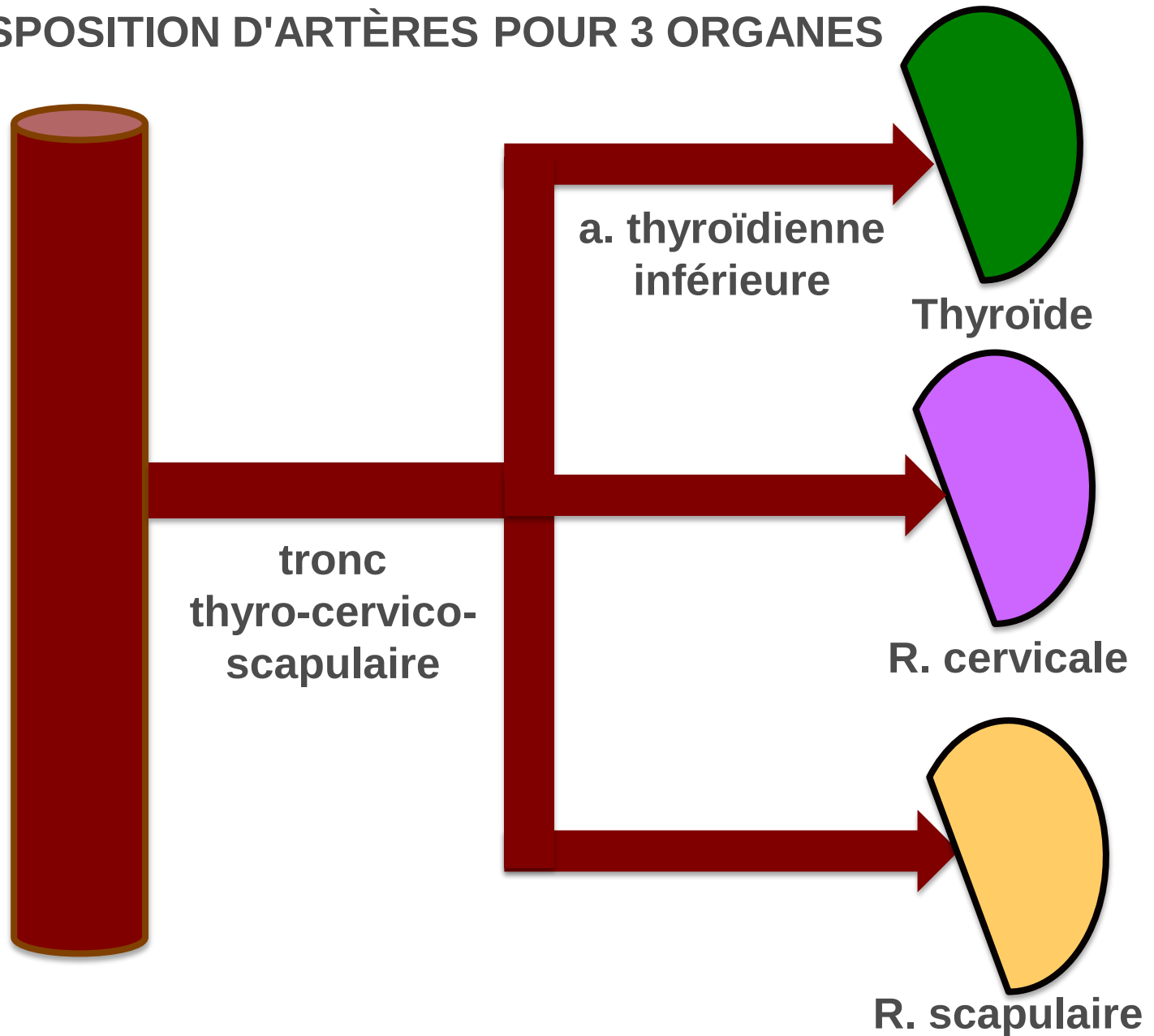
DISPOSITION D'ARTÈRES POUR 3 ORGANES



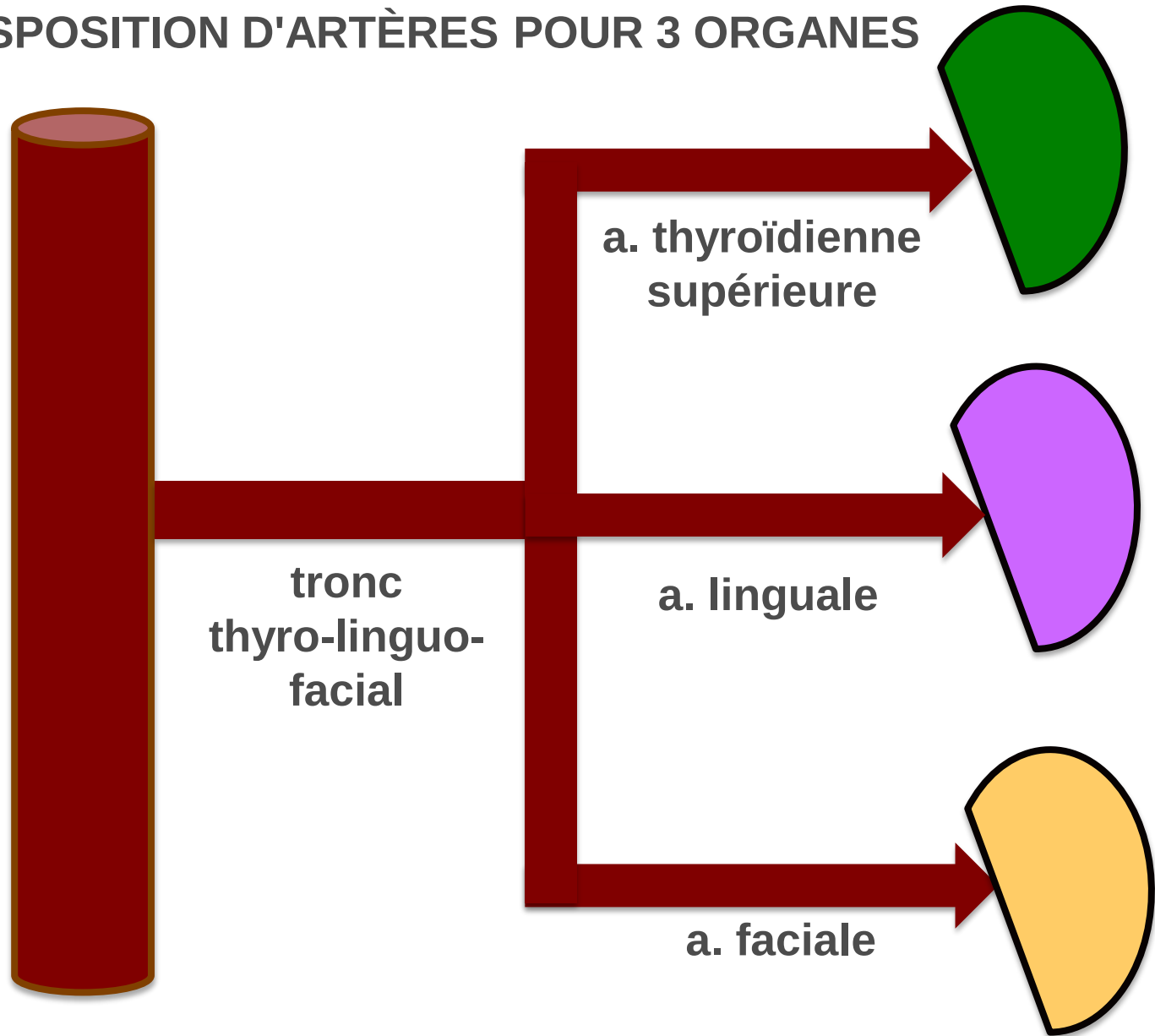
DISPOSITION D'ARTÈRES POUR 3 ORGANES



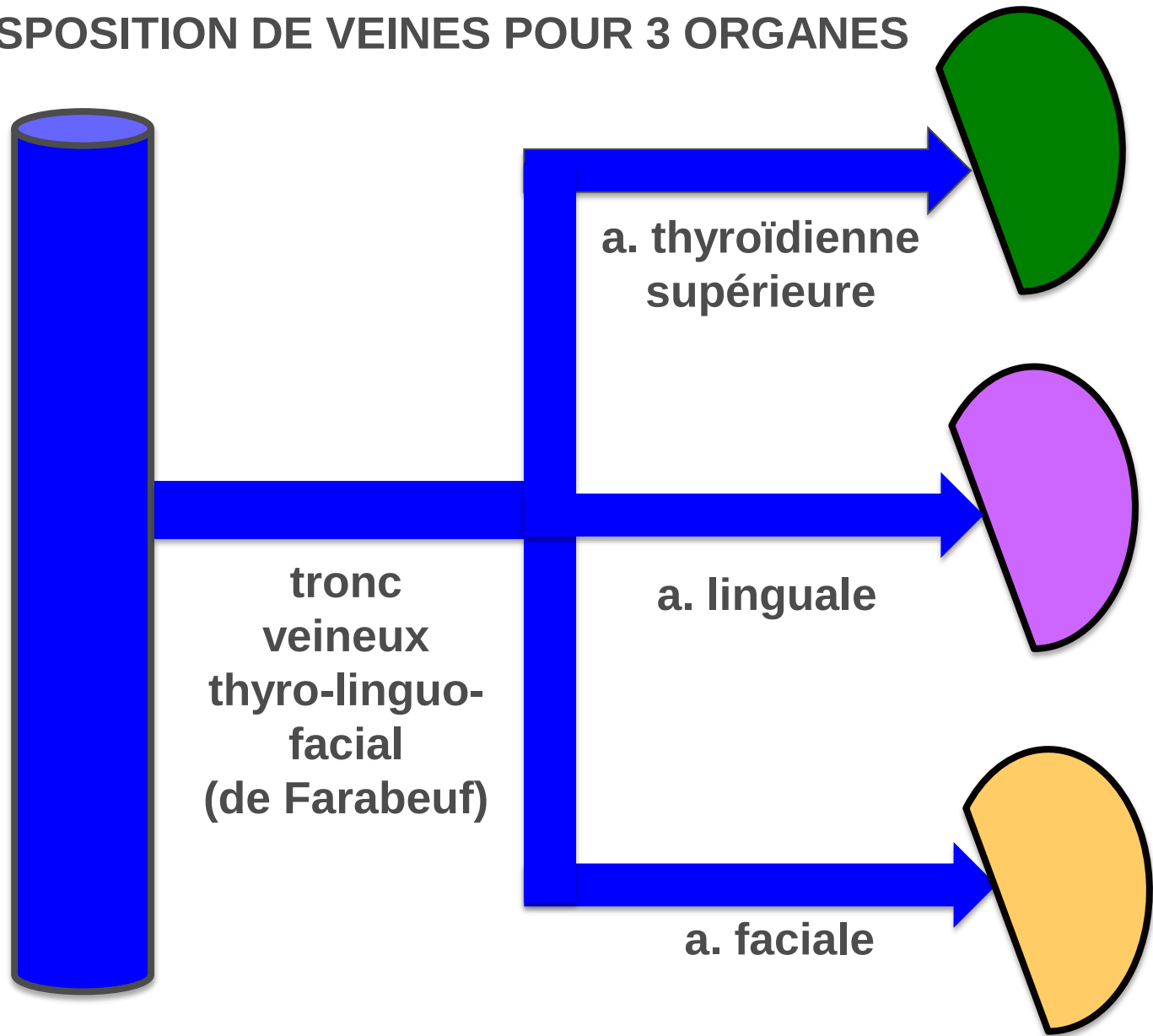
DISPOSITION D'ARTÈRES POUR 3 ORGANES



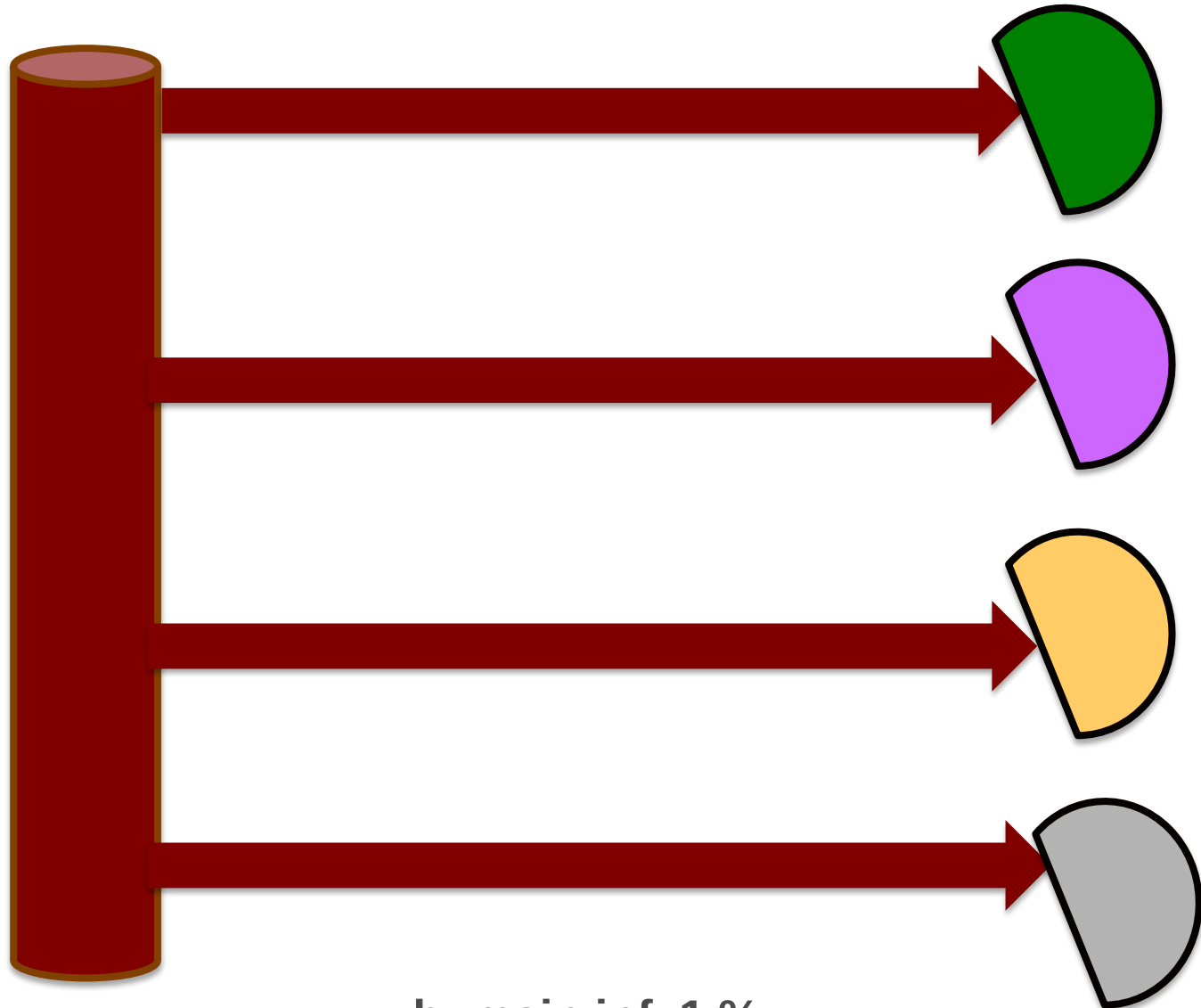
DISPOSITION D'ARTÈRES POUR 3 ORGANES



DISPOSITION DE VEINES POUR 3 ORGANES

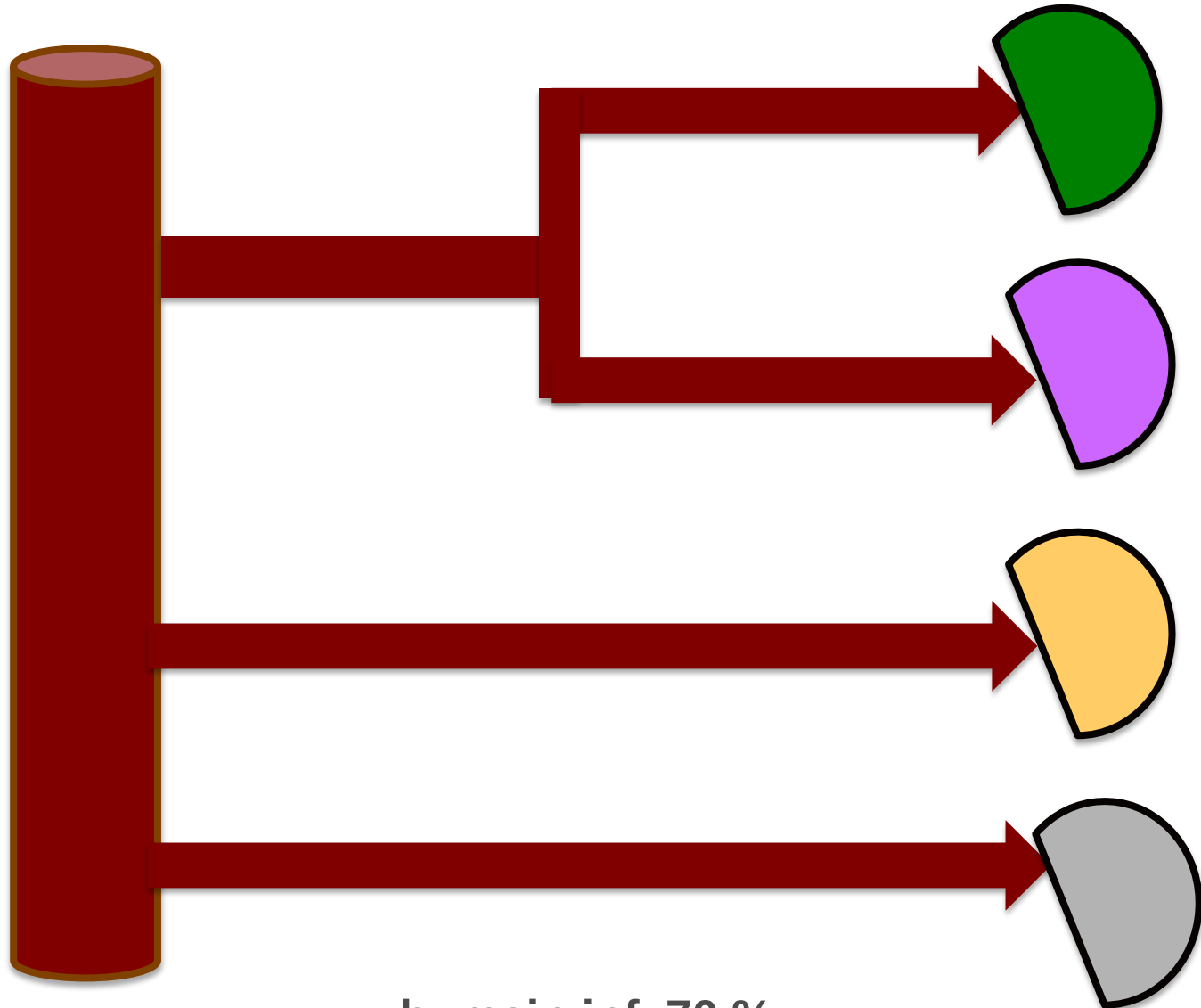


DISPOSITION D'ARTÈRES POUR 4 ORGANES / RÉGIONS



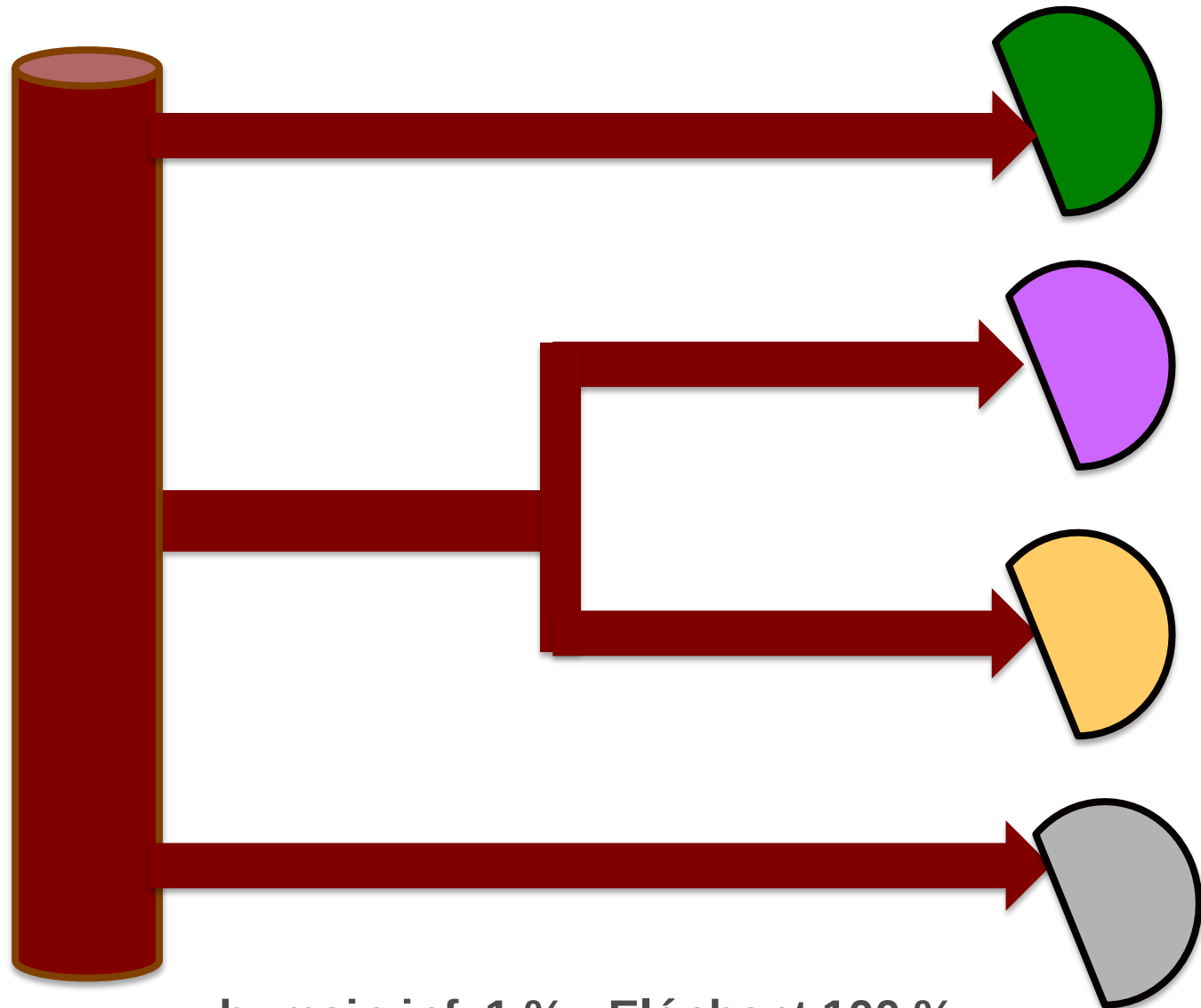
humain inf. 1 %

DISPOSITION D'ARTÈRES POUR 4 ORGANES / RÉGIONS



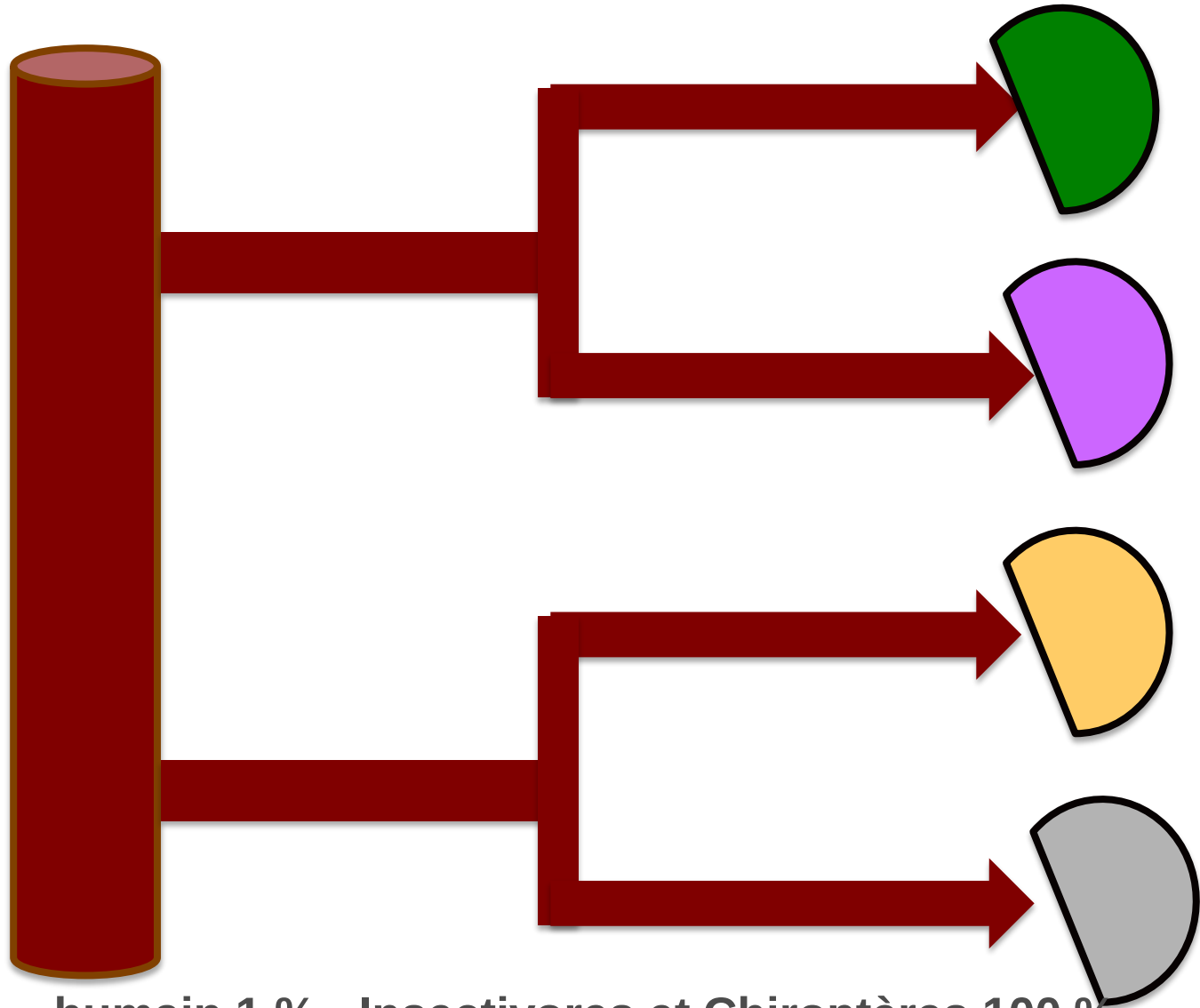
humain inf. 70 %

DISPOSITION D'ARTÈRES POUR 4 ORGANES / RÉGIONS



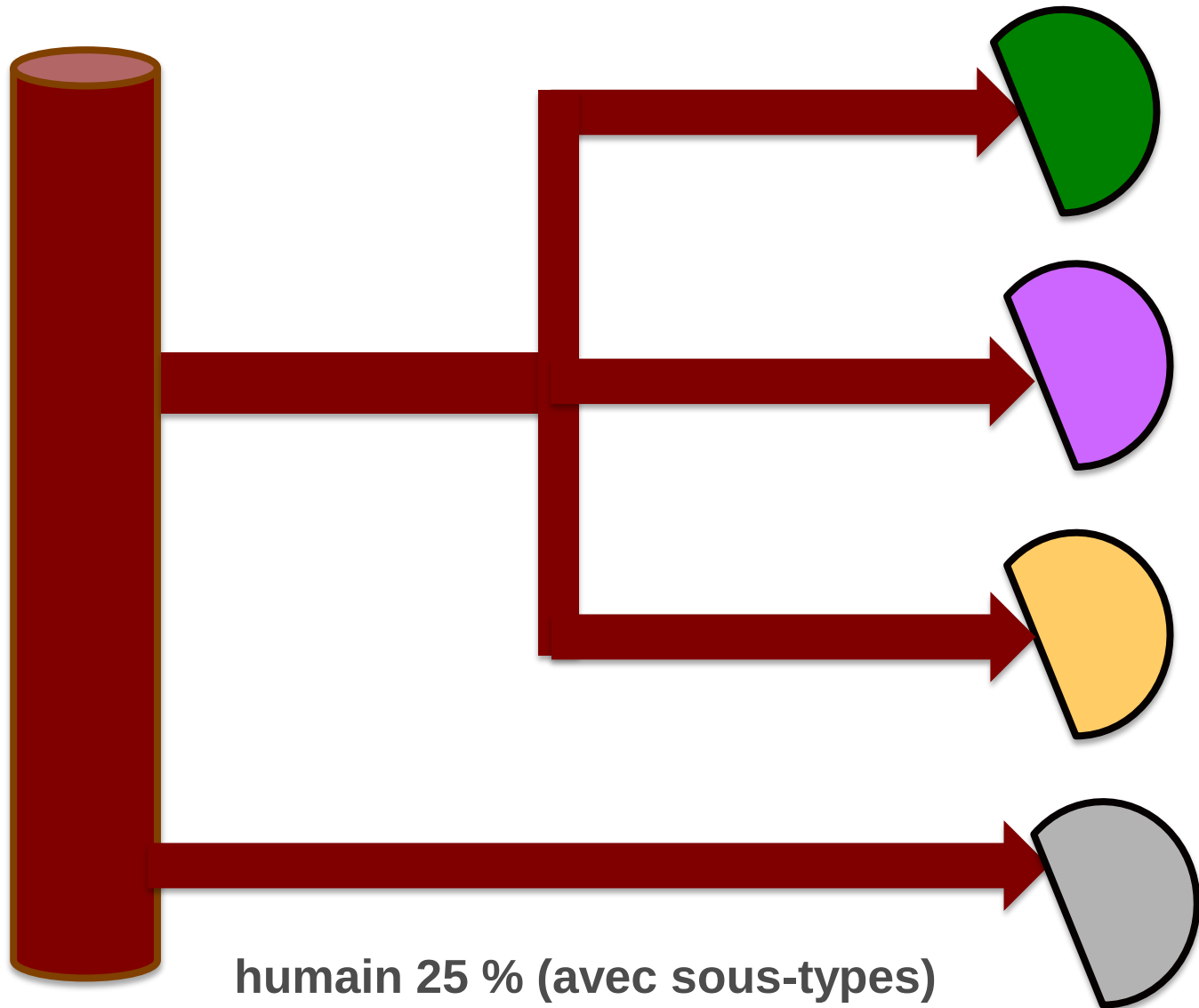
humain inf. 1 % - Eléphant 100 %

DISPOSITION D'ARTÈRES POUR 4 ORGANES / RÉGIONS



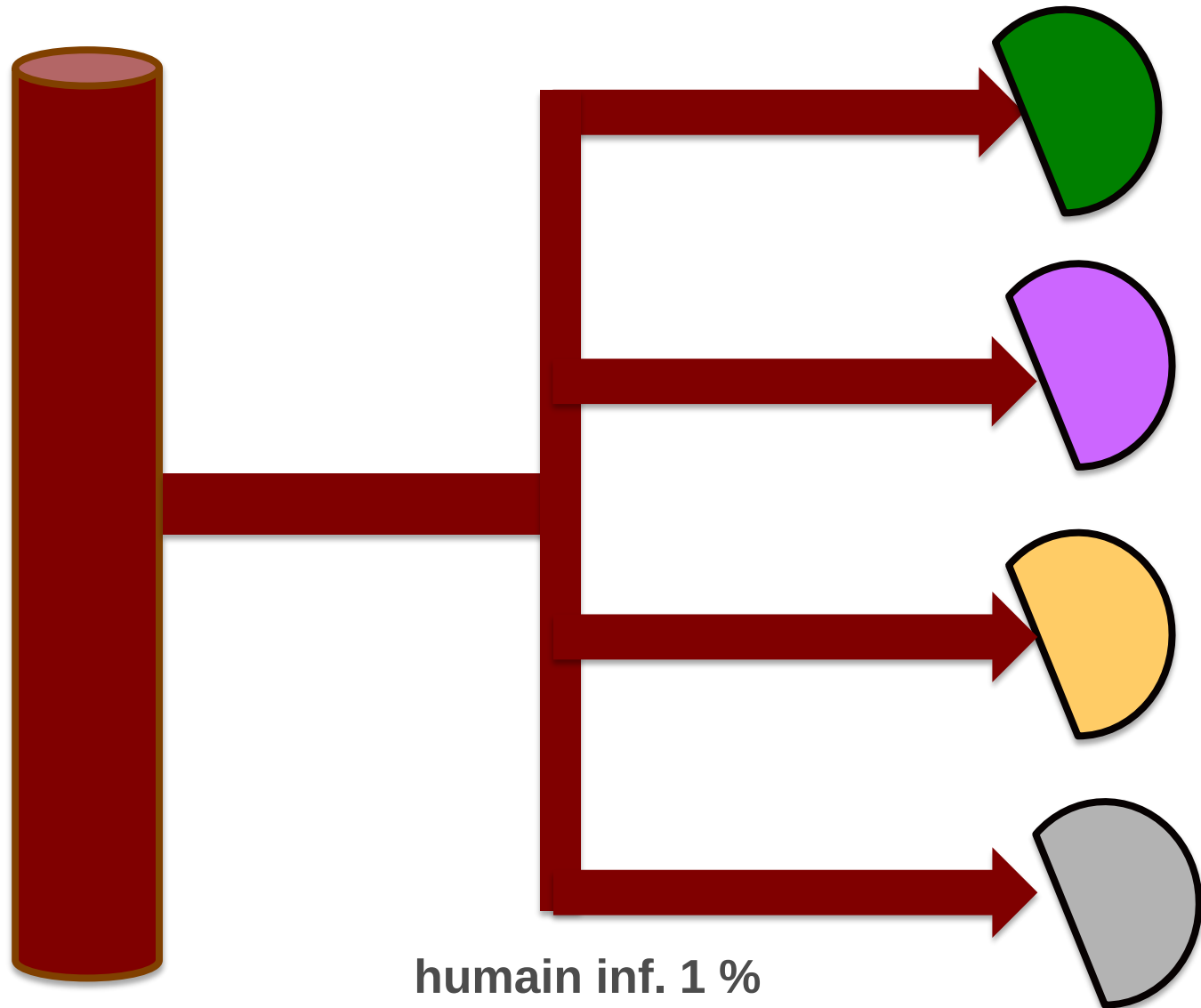
humain 1 % - Insectivores et Chiroptères 100 %

DISPOSITION D'ARTÈRES POUR 4 ORGANES / RÉGIONS



humain 25 % (avec sous-types)
Porc – Chien – Chat – Lapin 100 %

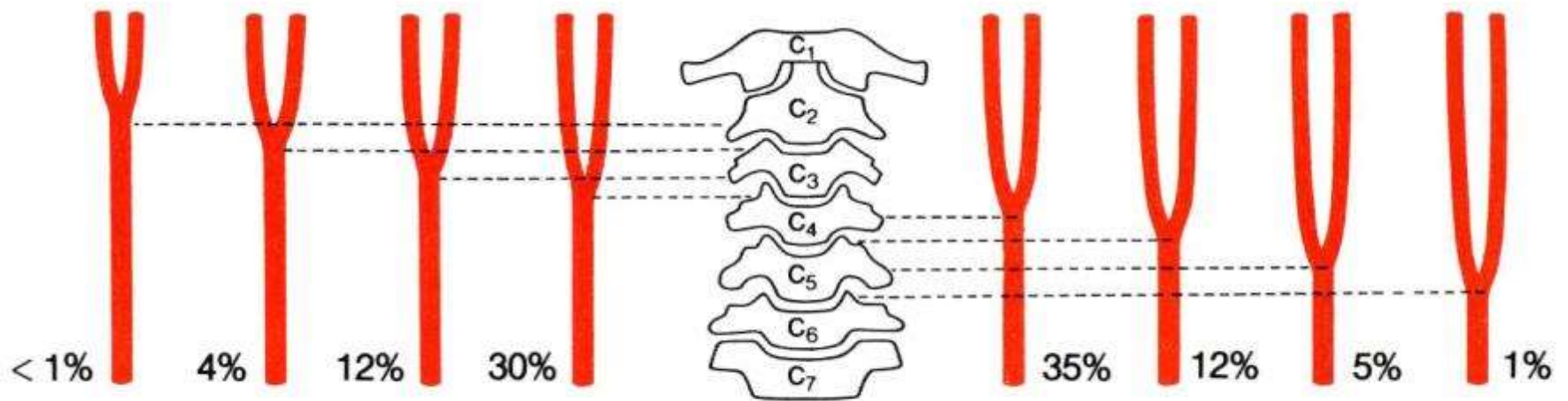
DISPOSITION D'ARTÈRES POUR 4 ORGANES / RÉGIONS



humain inf. 1 %
Boeuf – Mouton – Chèvre - Cheval 100 %

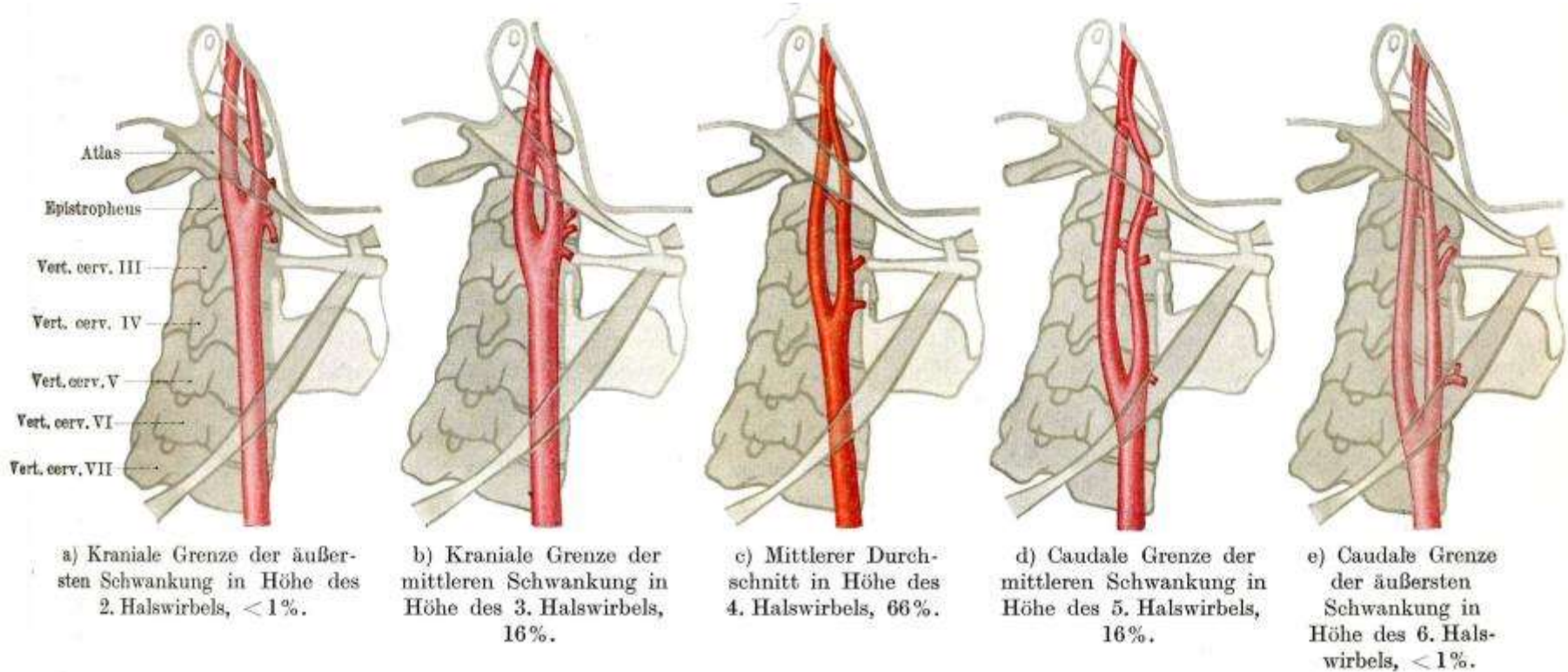
VARIABILITÉ TOPOGRAPHIQUE

ex.: niveau de bifurcation
de l'artère carotide commune



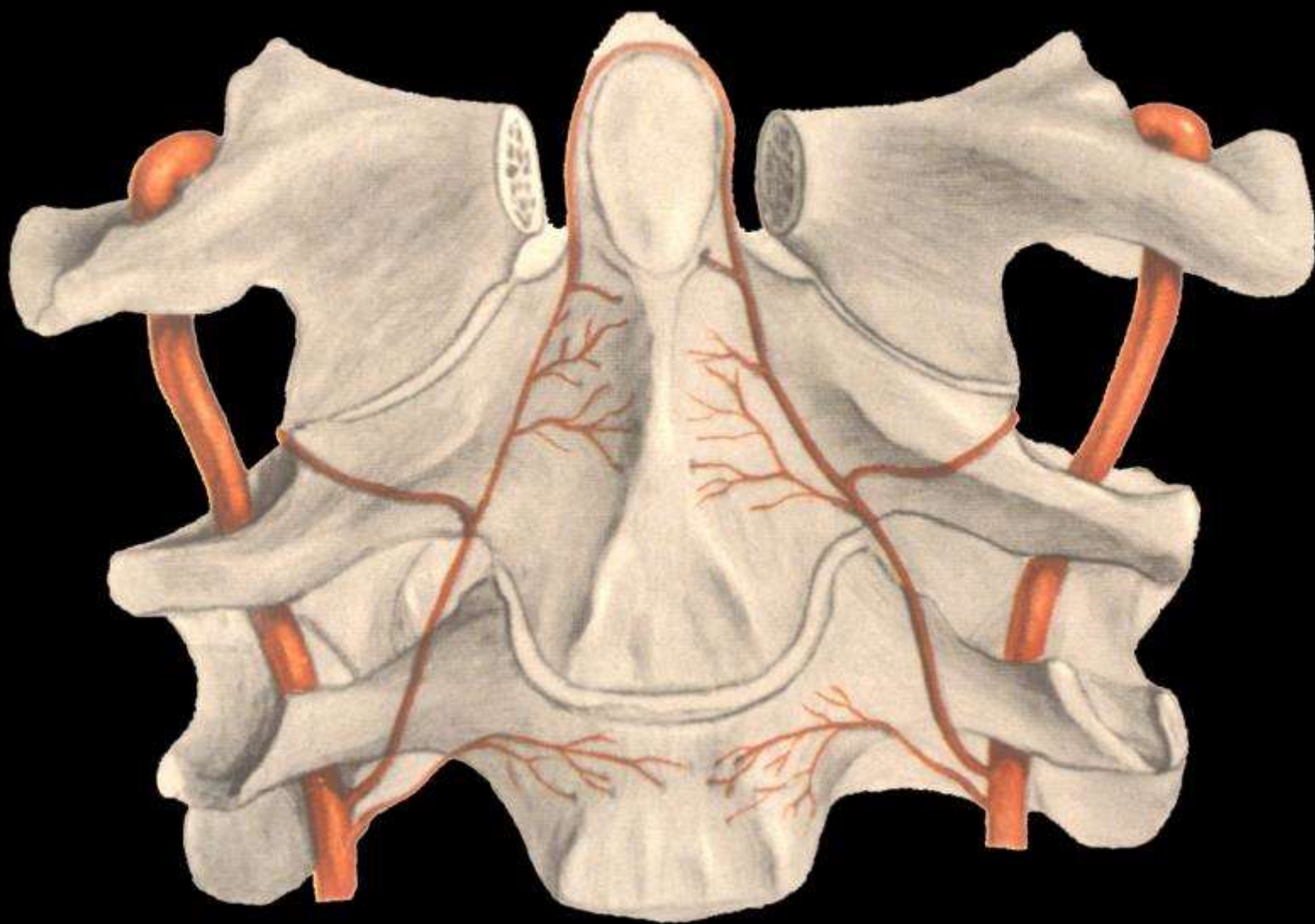
VARIABILITÉ TOPOGRAPHIQUE

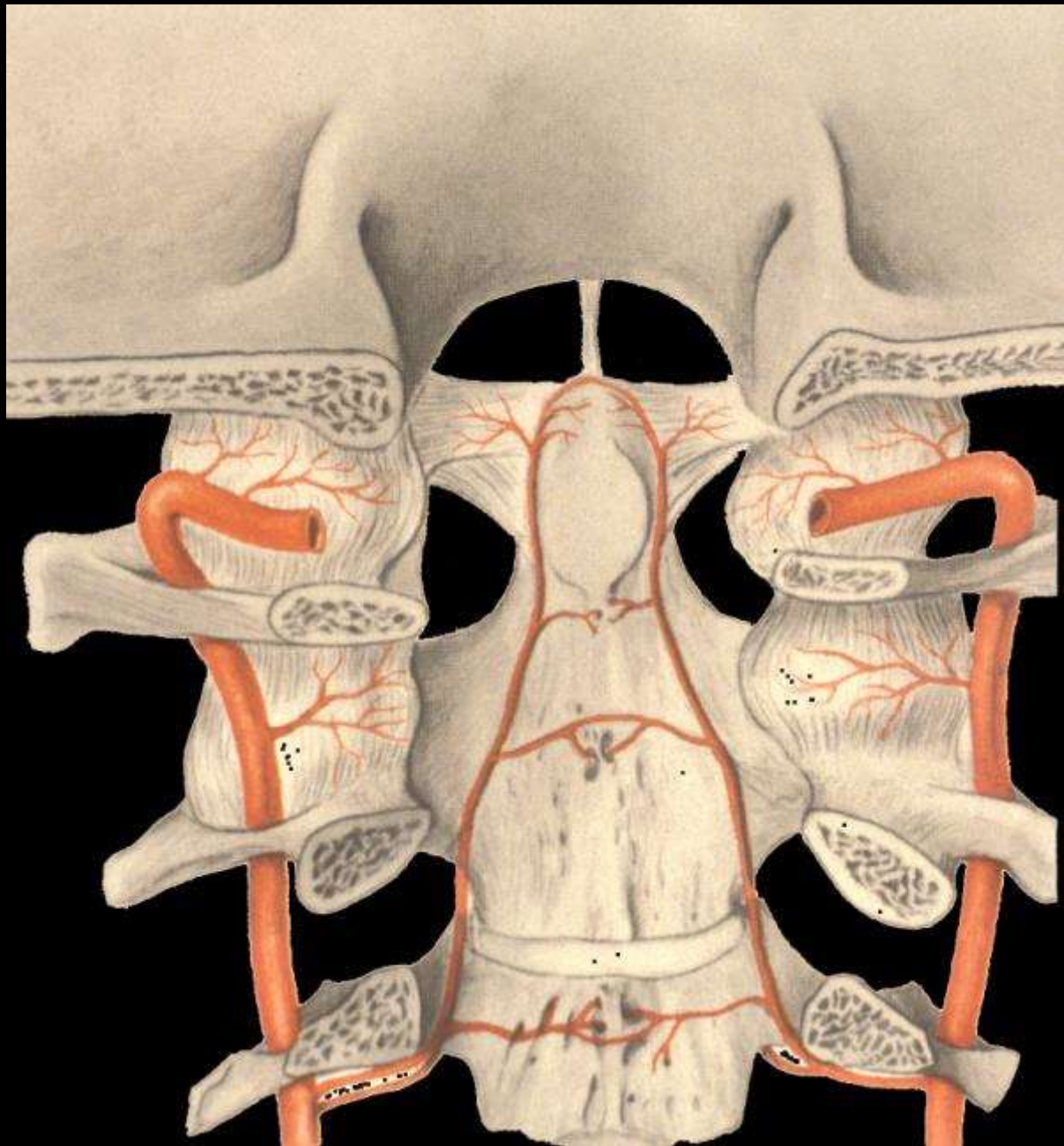
ex.: niveau de bifurcation
de l'artère carotide commune





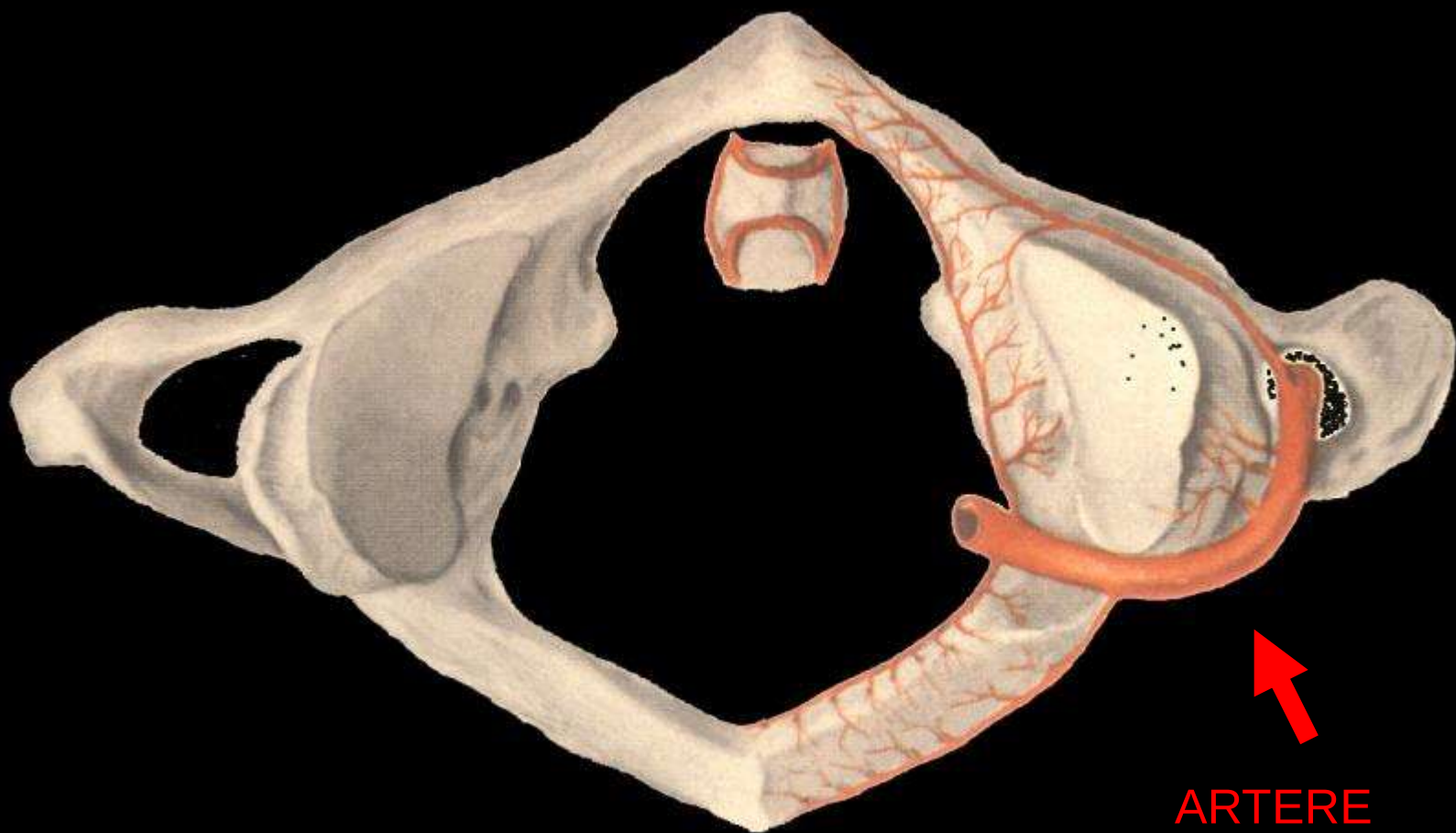
1^{ère} VERTÈBRE CERVICALE = ATLAS = C1







FORAMEN TRANSVERSAIRE - ATLAS HUMAIN (C1)



ARTERE
VERTEBRALE



ATLAS (C1) : PONTICULE POSTÉRIEUR = FORAMEN ARCUALE



ATLAS (C1) : PONTICULE POSTÉRIEUR = FORAMEN ARCUALE



ATLAS (C1) : PONTICULE POSTÉRIEUR = FORAMEN ARCUALE



ATLAS (C1) : PONTICULE POSTÉRIEUR = FORAMEN ARCUALE



ATLAS (C1) : PONTICULE POSTÉRIEUR = FORAMEN ARCUALE

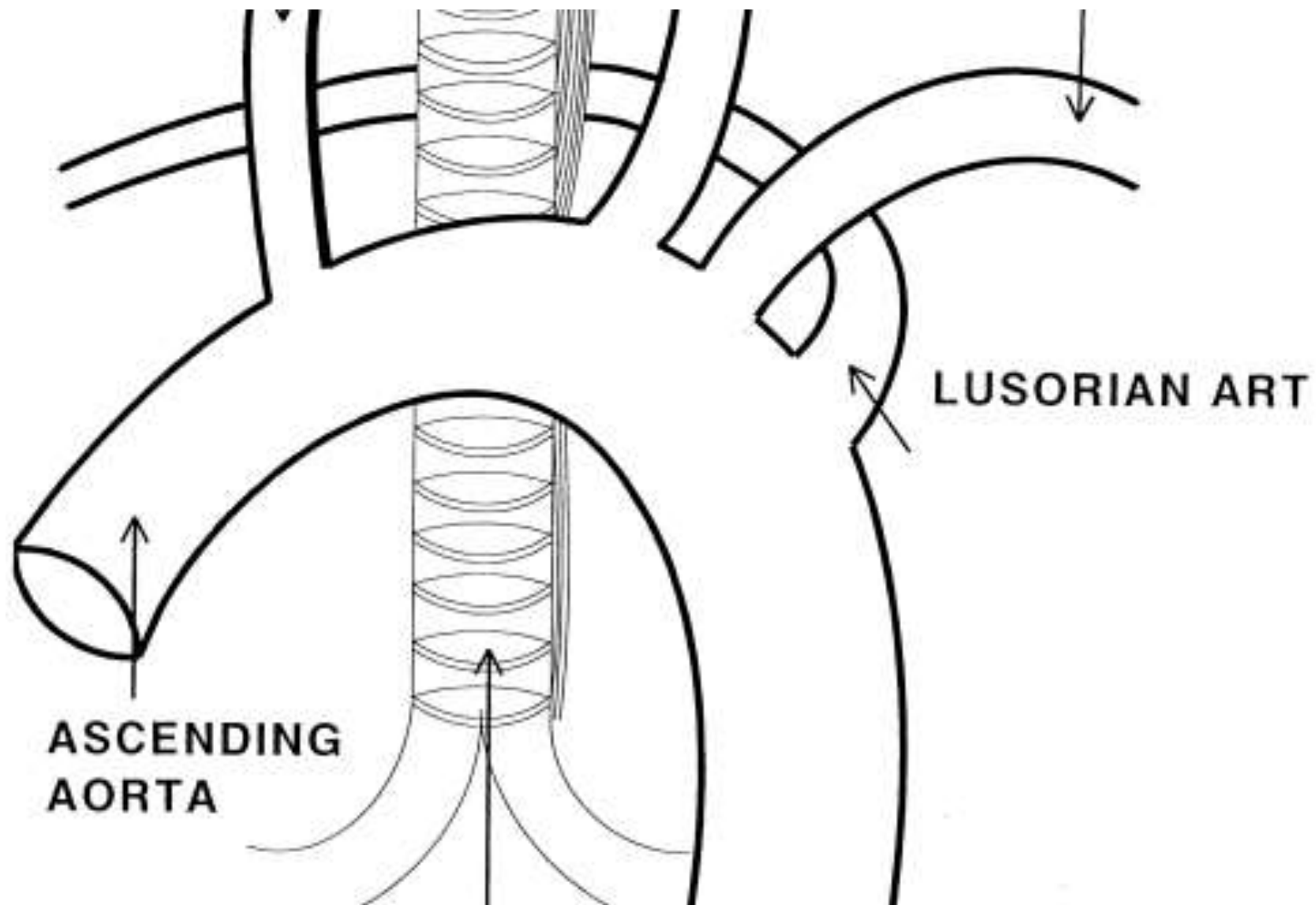


DÉHISCENCE ANTÉRIEURE DU FORAMEN TRANSVERSAIRE (C1)

5. Exemples de variabilité artérielle

"Arteria lusoria"









EXEMPLES DE VARIABILITE ARTERIELLE

1°) AORTE

2°) COU et TÊTE

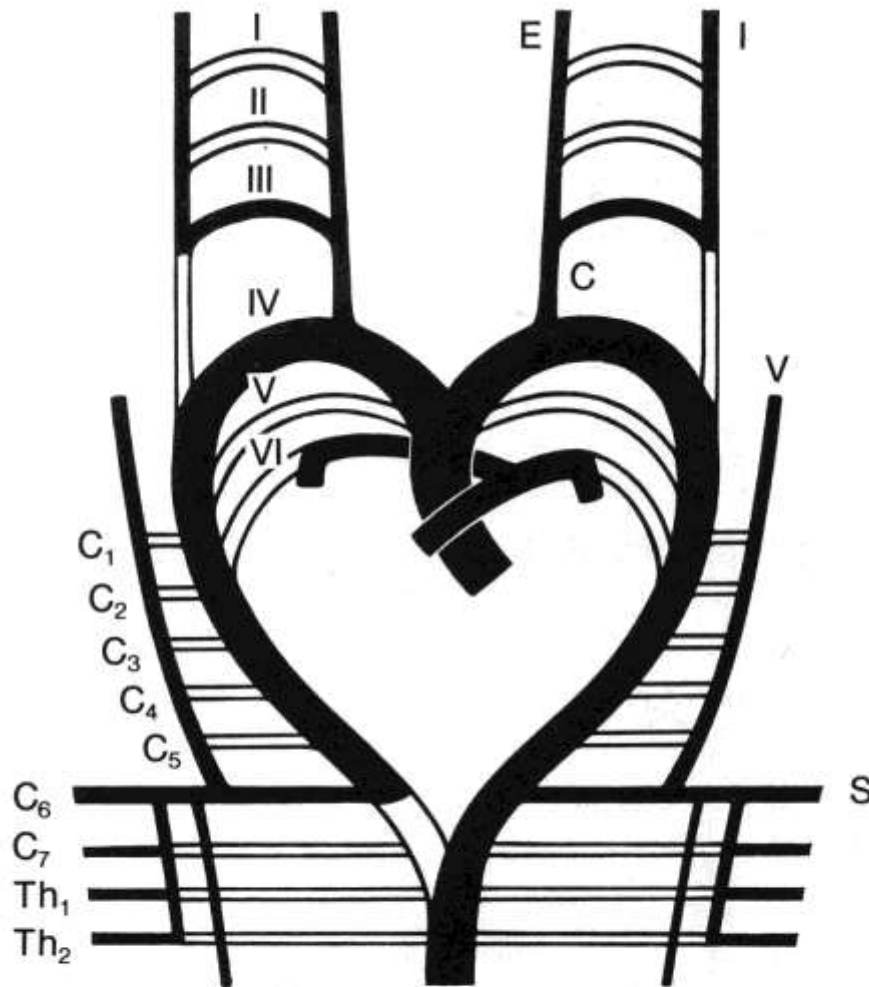
3°) SYSTEME NERVEUX CENTRAL

4°) VISCERES

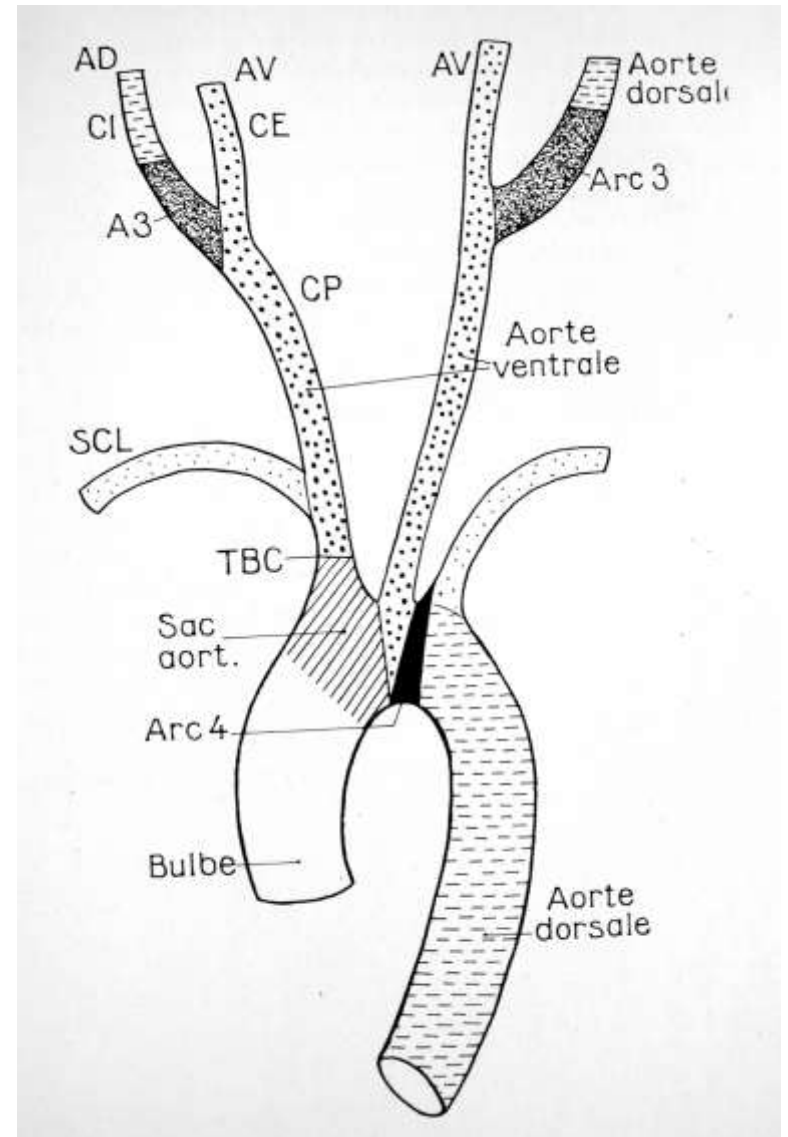
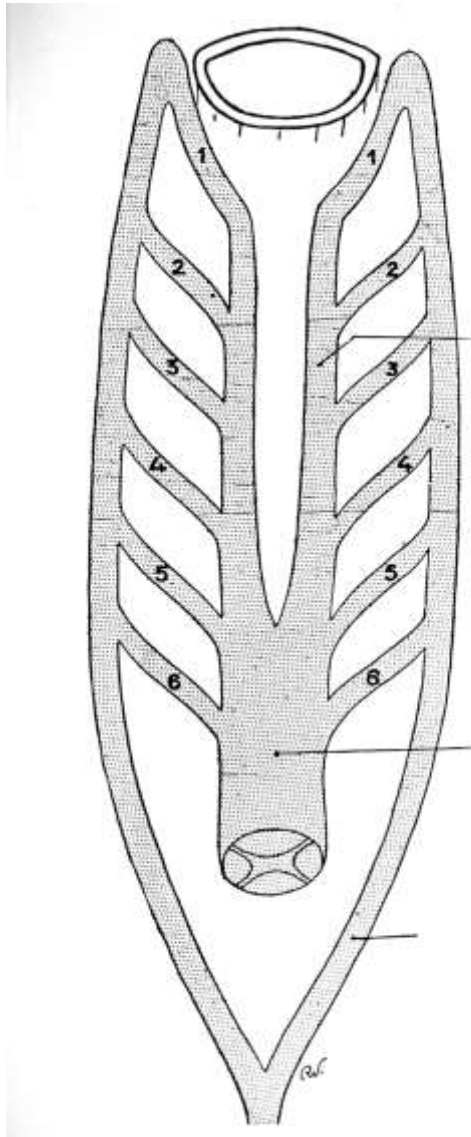
5°) MEMBRES

ARCS AORTIQUES

(Embryologie)



C = common carotid artery
E = external carotid artery
I = internal carotid artery
S = subclavian artery
V = vertebral artery





a.



b.



c.



**ARC AORTIQUE
DROIT**

ARC AORTIQUE DOUBLE



ARC AORTIQUE CIRCONFLEXE



a.



b.



c.



d.

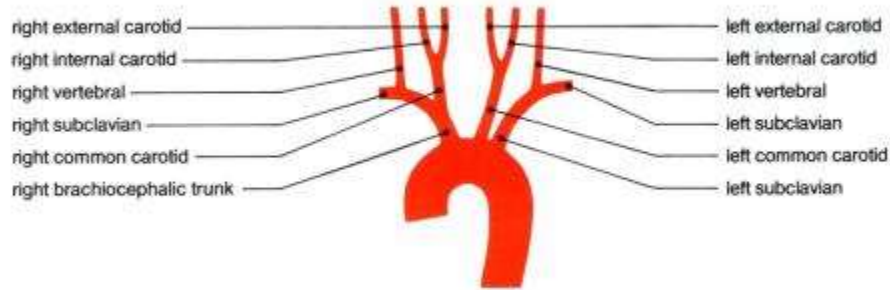


e.



f.

"Normal" situation as given in textbooks ~ 70%



~ 13%

a.



< 0,1%

d.

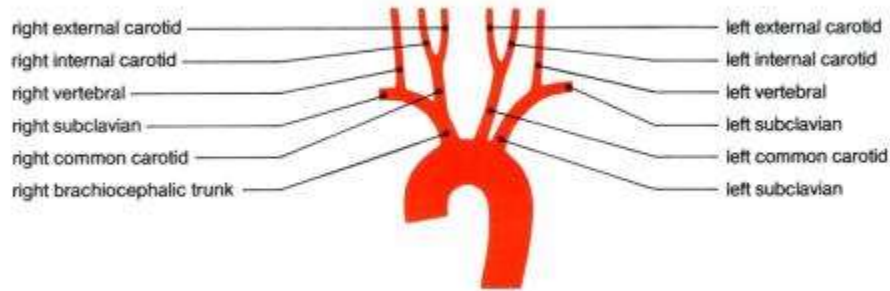


< 0,1%

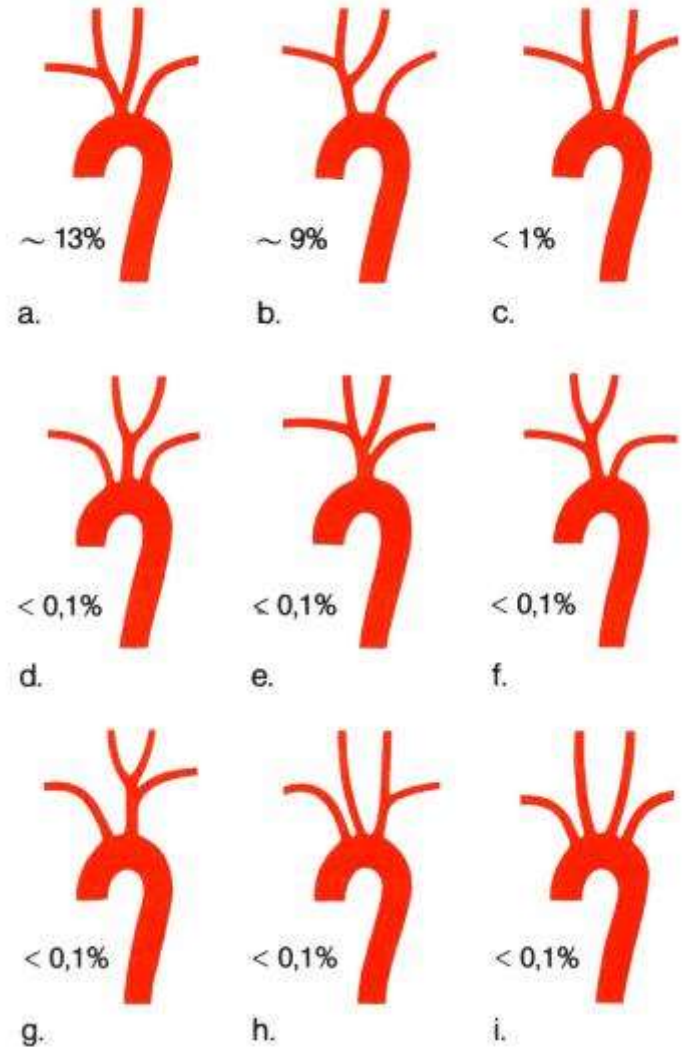
g.

VARIATIONS DES TRONCS SUPRA-AORTIQUES

"Normal" situation as given in textbooks ~ 70%



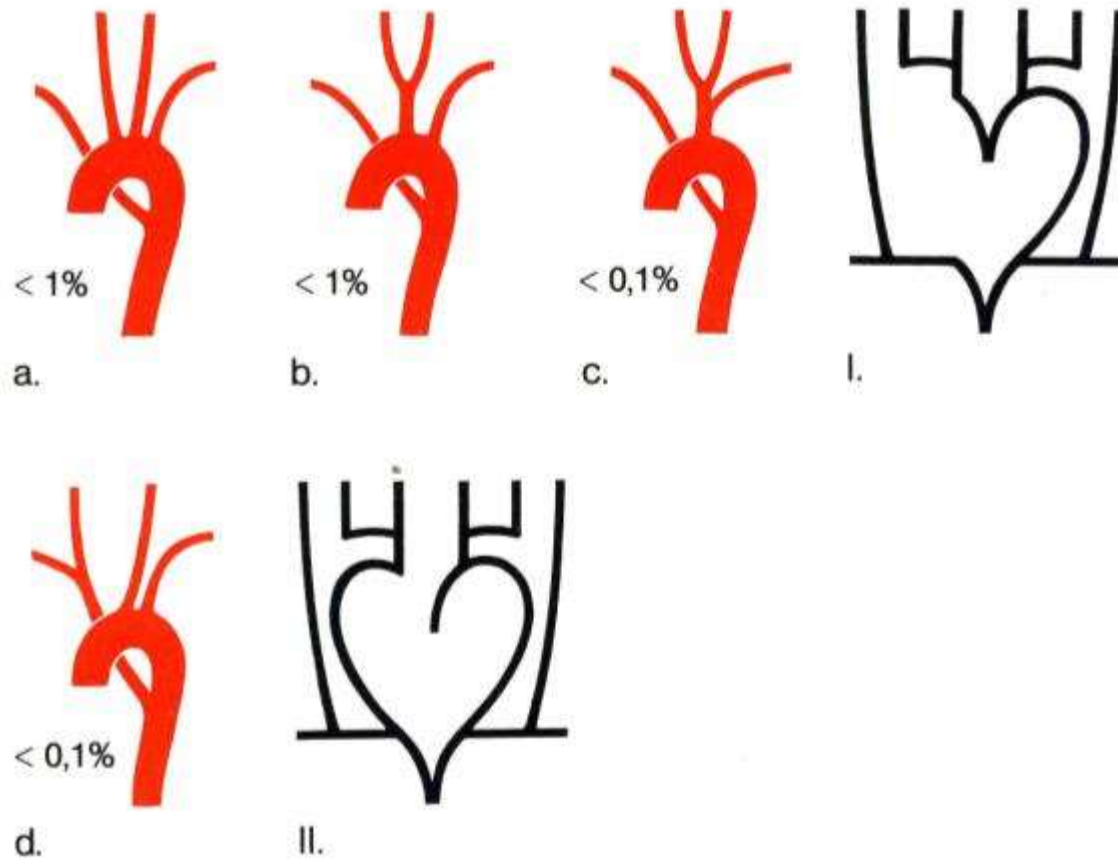
Anomalies of the trunk ~ 23%



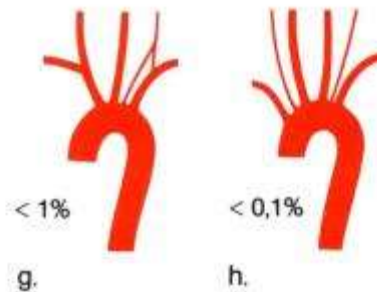
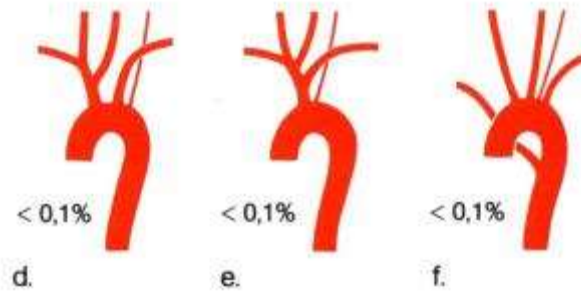
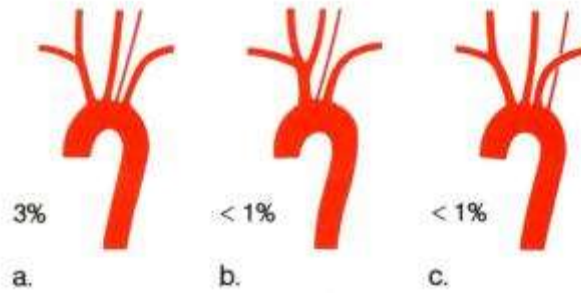
VARIATIONS DES TRONCS SUPRA-AORTIQUES

ORIGINE AORTIQUE GAUCHE DE L'ARTERE SUBCLAVIERE DROITE = « ARTERIA LUSORIA »

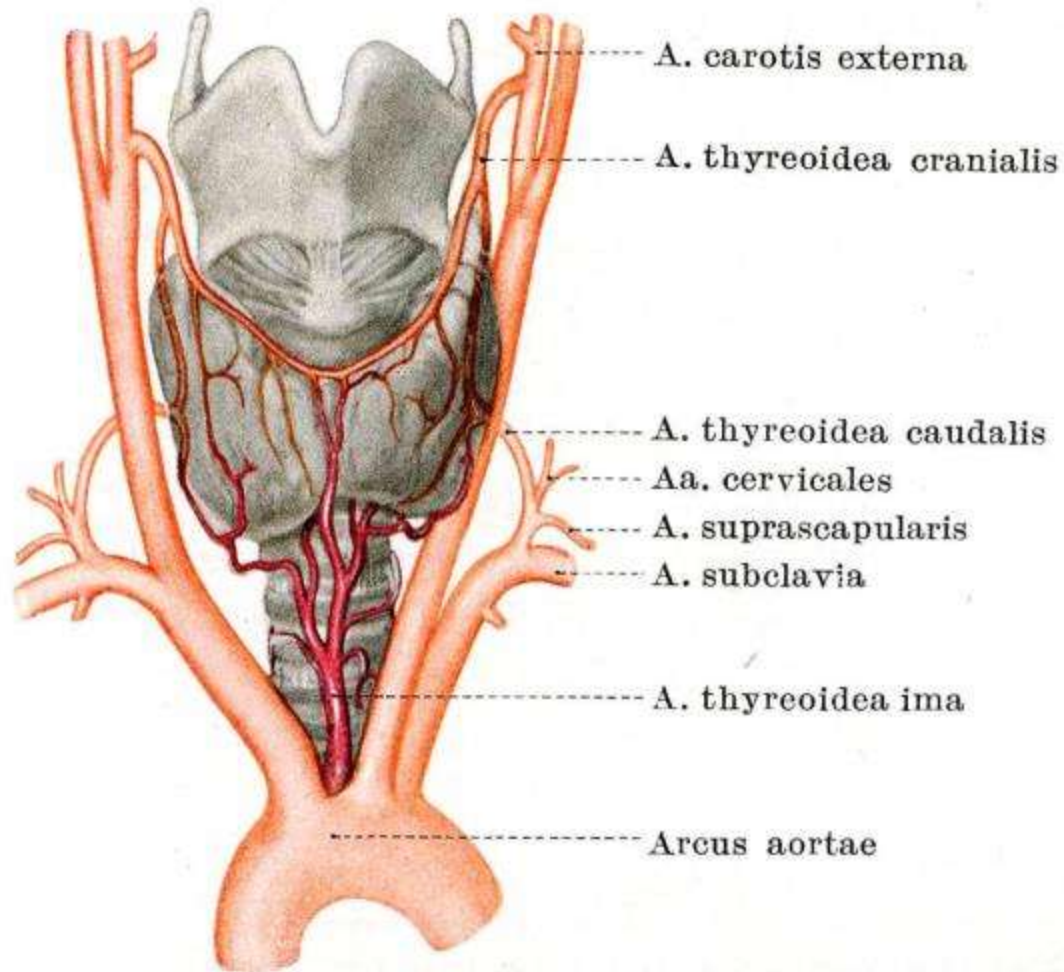
Right subclavian artery as the last branch of the aortic arch



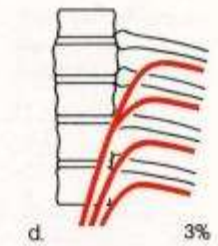
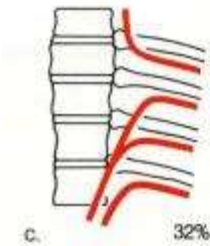
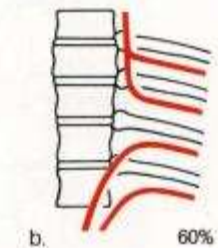
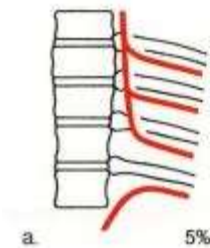
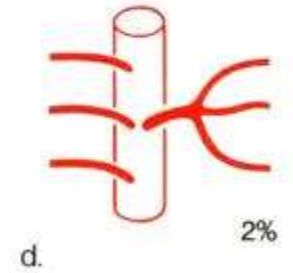
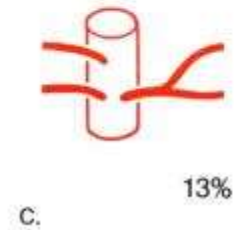
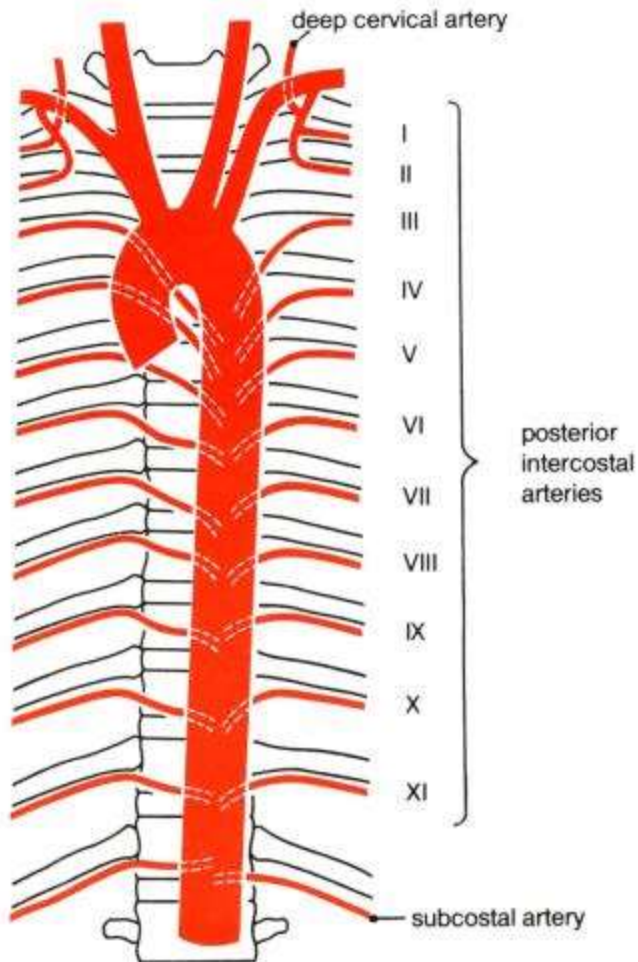
ORIGINE AORTIQUE DE L'ARTERE VERTEBRALE



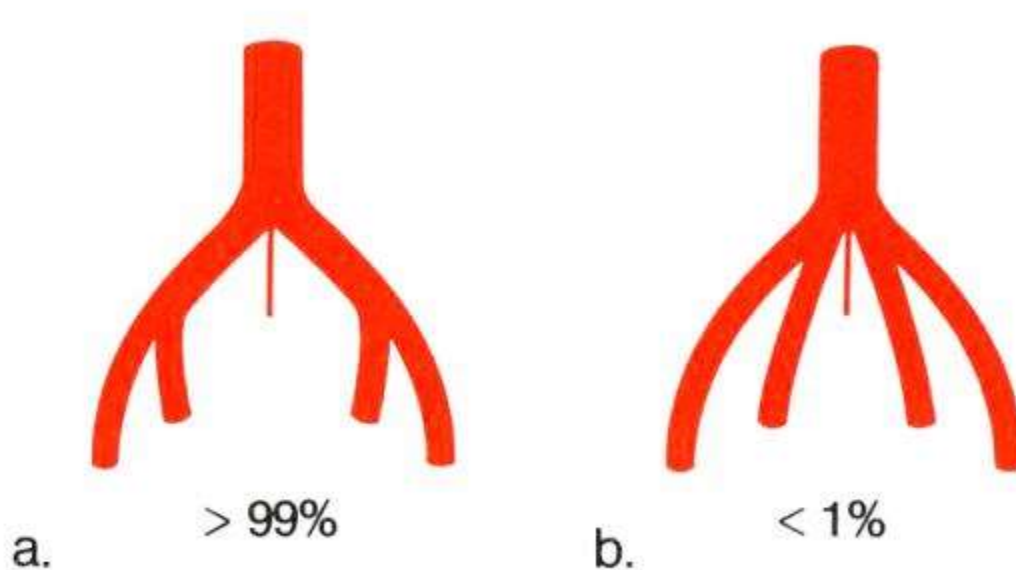
ARTERE THYROIDIENNE IMA



VARIATIONS DES ARTERES INTERCOSTALES POSTERIEURES



VARIATIONS DE LA TERMINAISON DE L' AORTE ABDOMINALE



EXEMPLES DE VARIABILITE ARTERIELLE

1°) AORTE

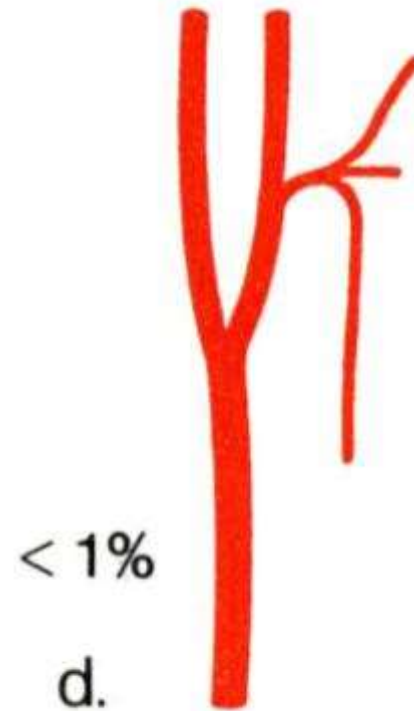
2°) COU et TÊTE

3°) SYSTEME NERVEUX CENTRAL

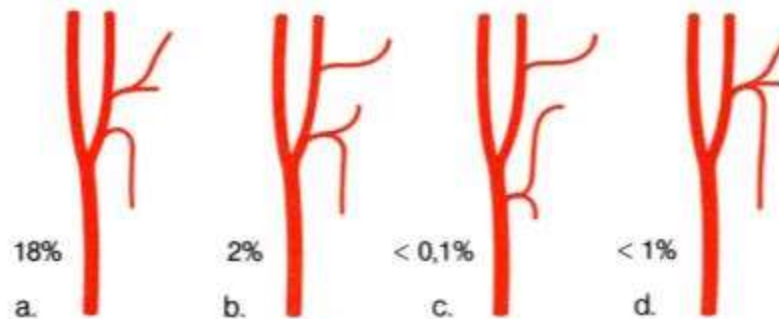
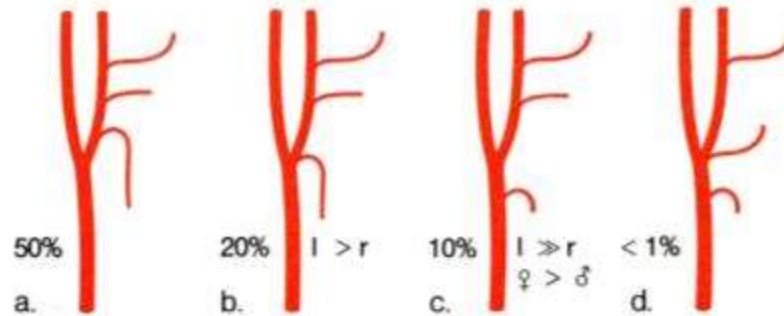
4°) VISCERES

5°) MEMBRES

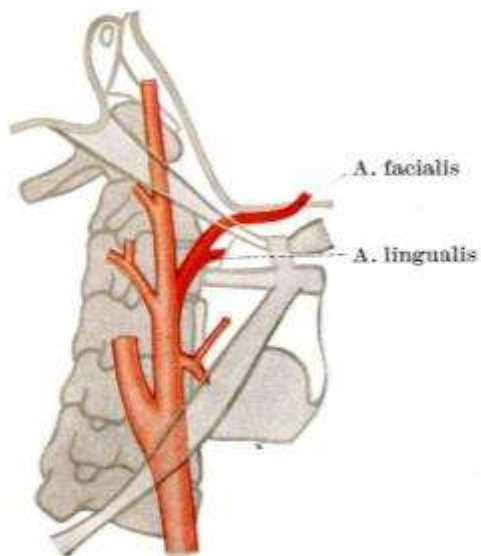
VARIATIONS DES ARTERES THYROIDIENNE, LINGUALE ET FACIALE



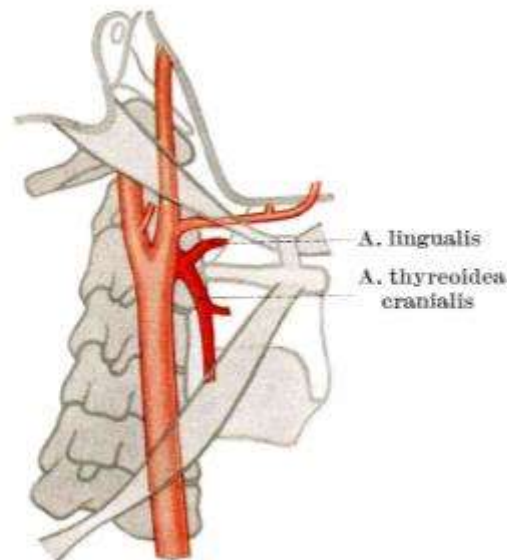
VARIATIONS DES ARTERES THYROIDIENNE, LINGUALE ET FACIALE



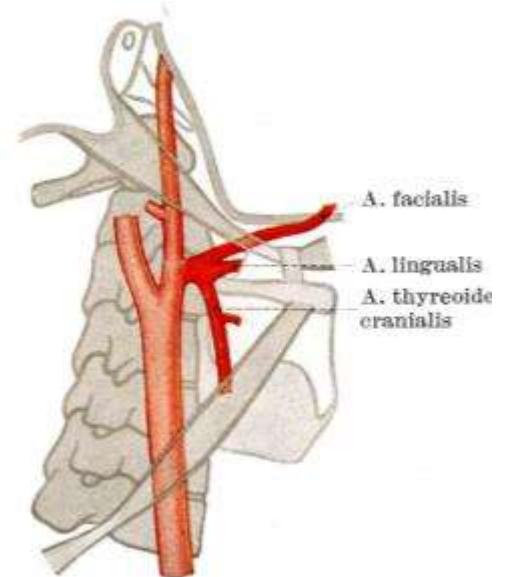
VARIATIONS DES ARTERES THYROIDIENNE, LINGUALE ET FACIALE



a) Truncus linguo-facialis, 18,7%¹⁴.

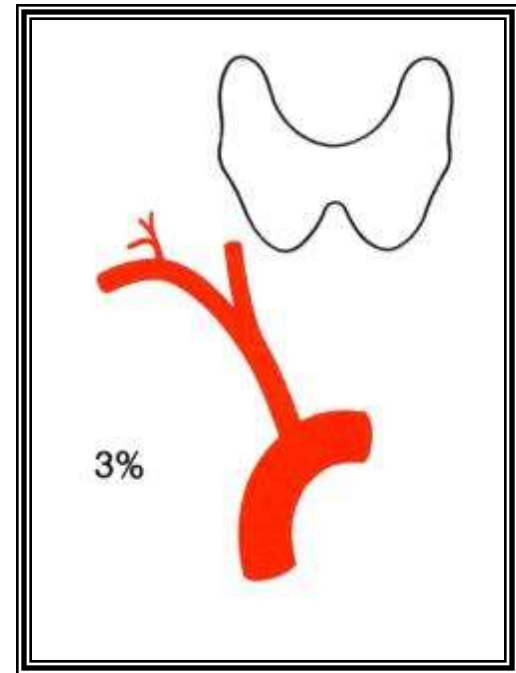
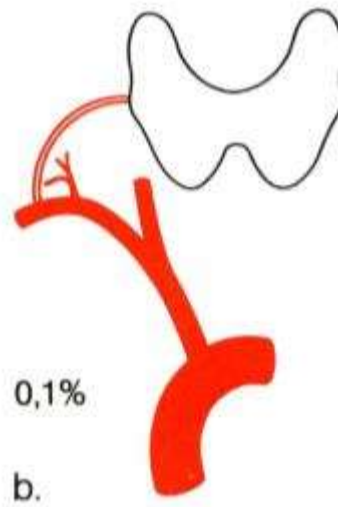
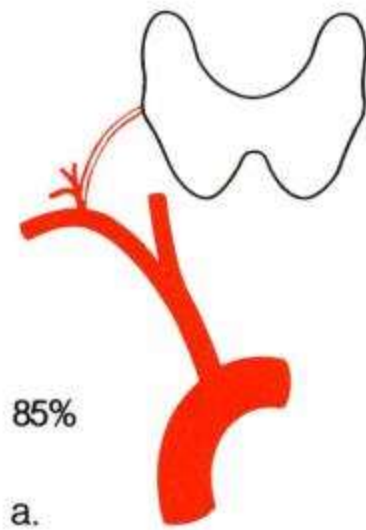


b) Truncus thyreo-lingualis, 2%¹⁵.

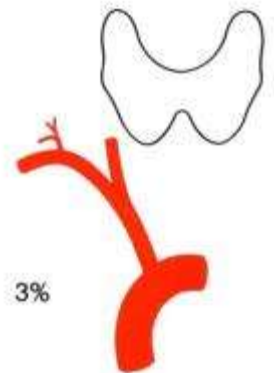
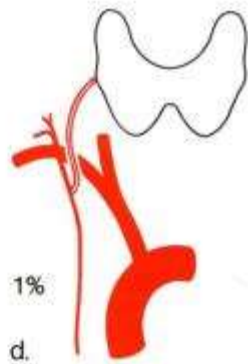
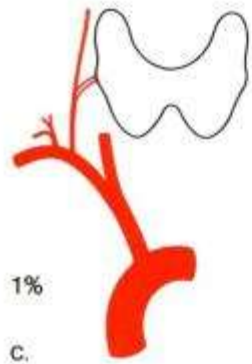
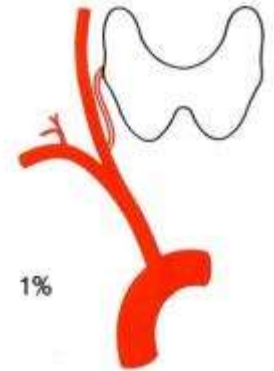
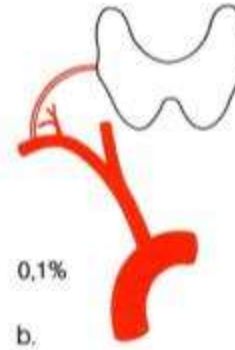
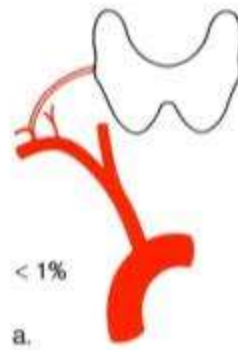
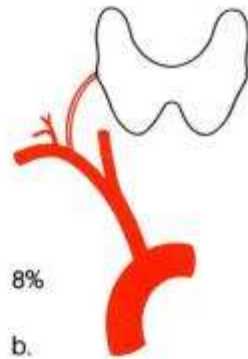
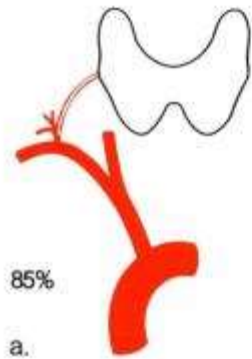


c) Truncus thyreo-linguo-facialis, 0,3%¹⁶.

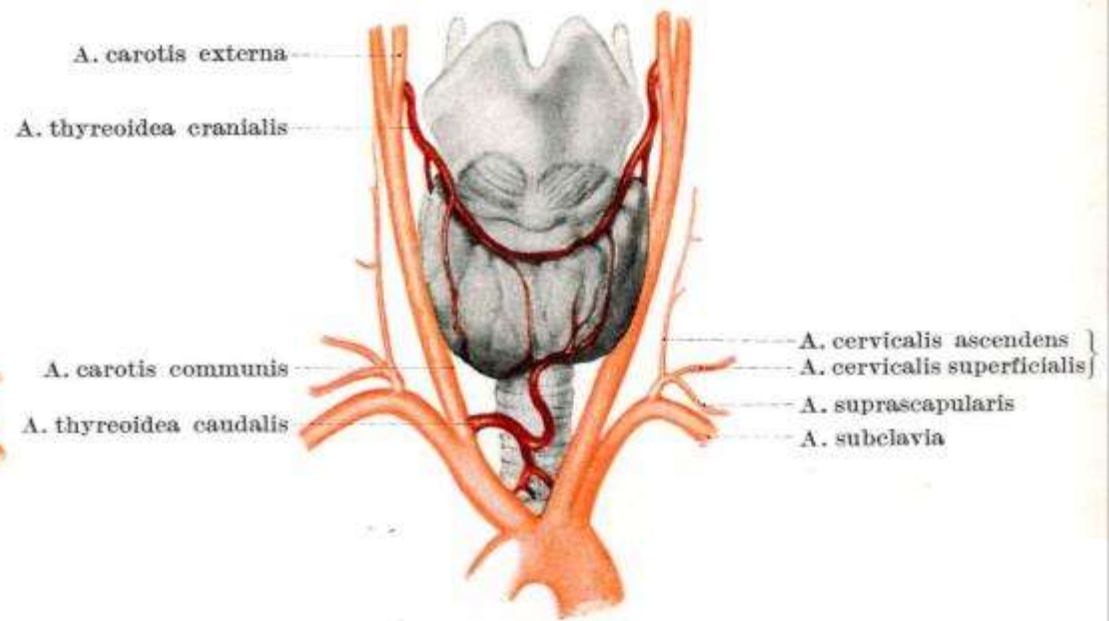
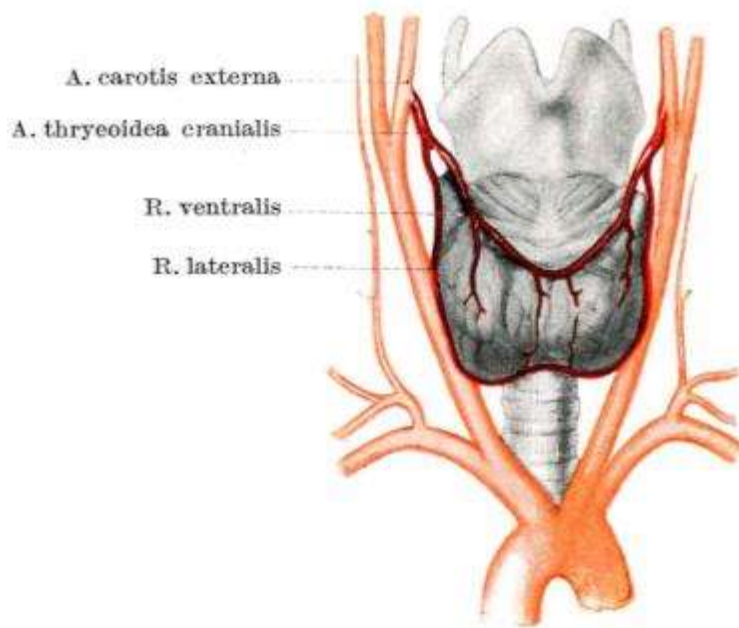
VARIATIONS D'ORIGINE DE L'ARTERE THYROIDIENNE INFERIEURE



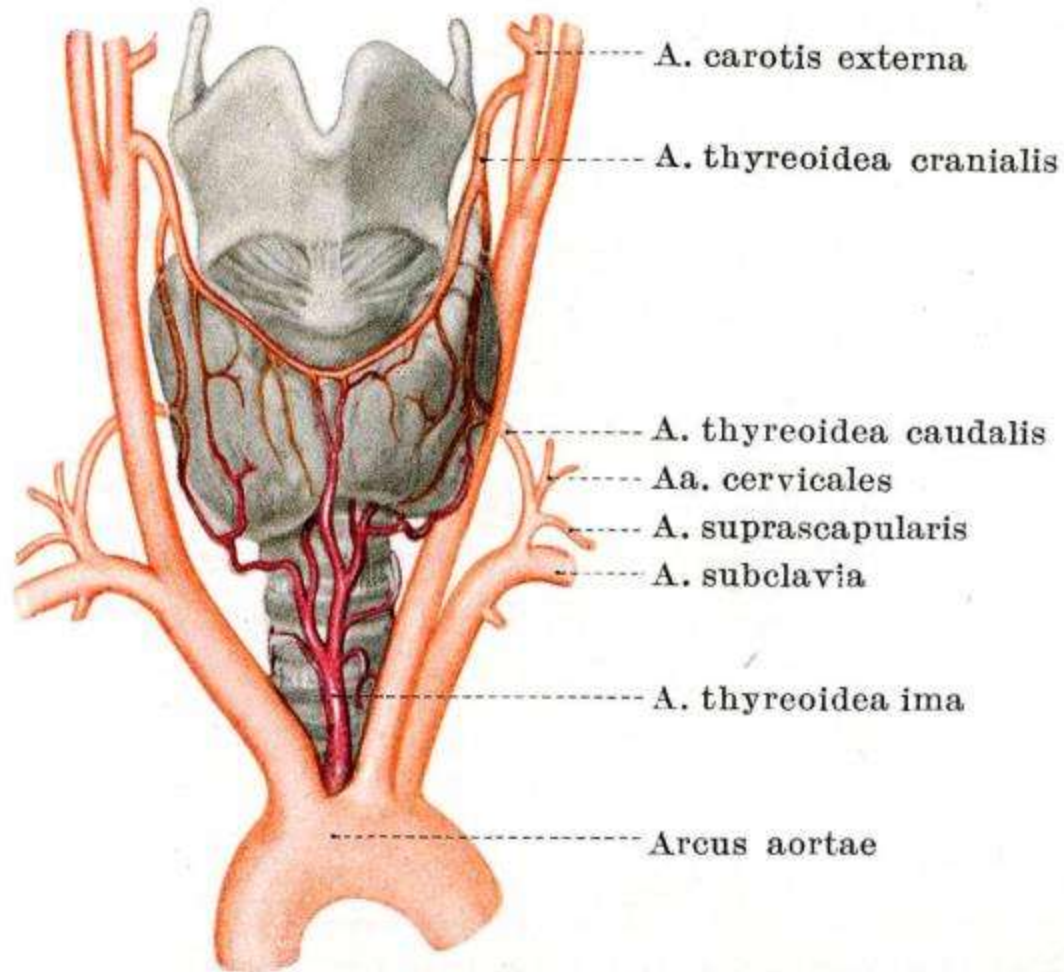
VARIATIONS D'ORIGINE DE L'ARTERE THYROIDIENNE INFERIEURE



ABSENCE DE L'ARTERE THYROIDIENNE INFERIEURE



ARTERE THYROIDIENNE IMA



EXEMPLES DE VARIABILITE ARTERIELLE

1°) AORTE

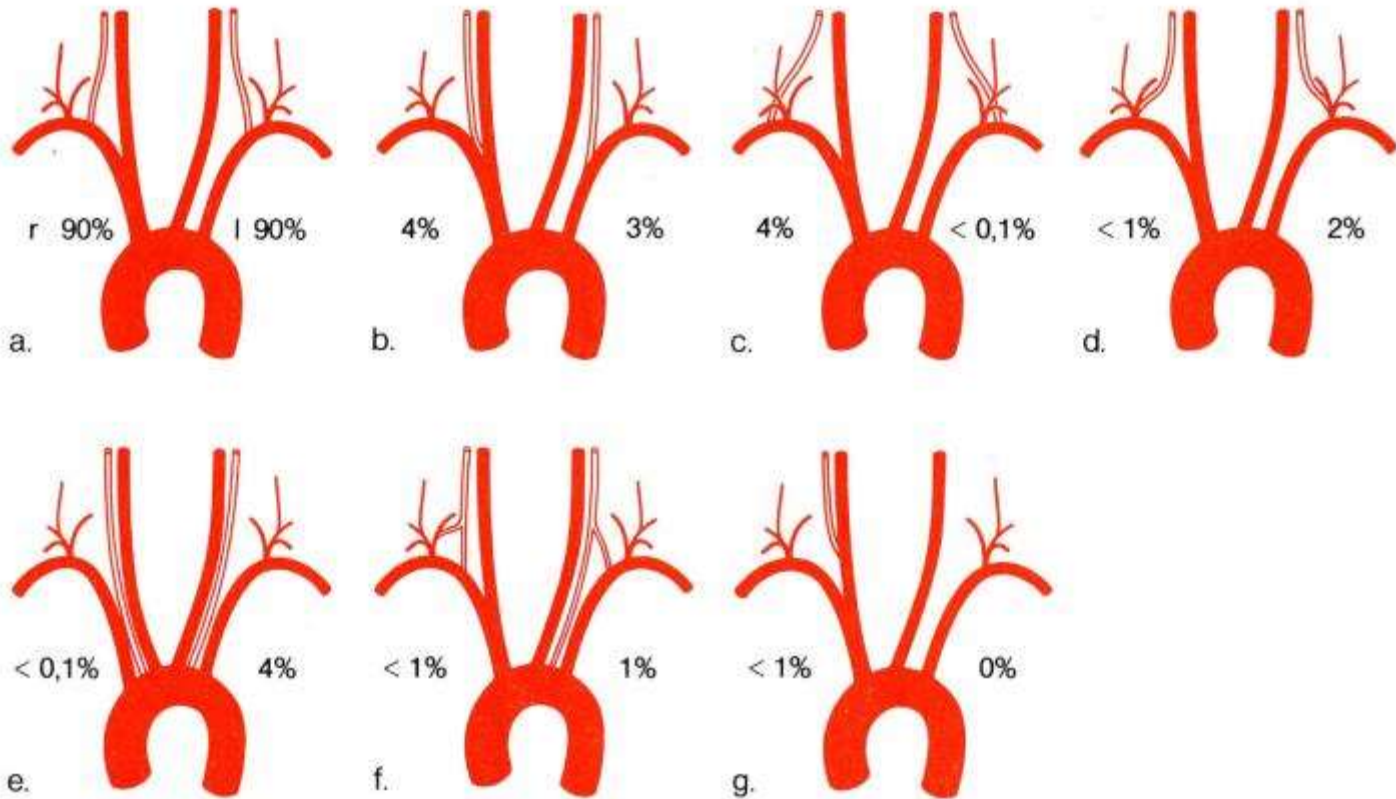
2°) COU et TÊTE

3°) SYSTEME NERVEUX CENTRAL

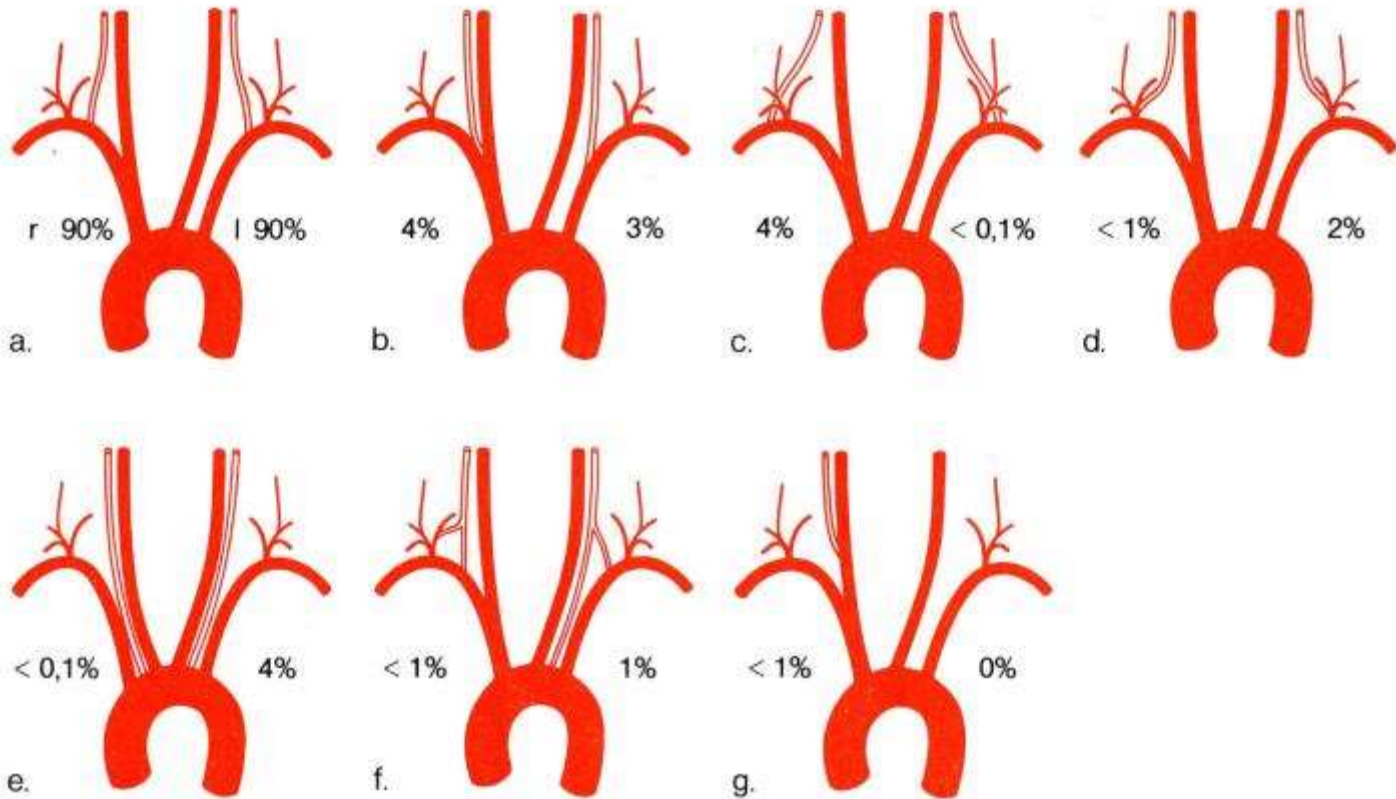
4°) VISCERES

5°) MEMBRES

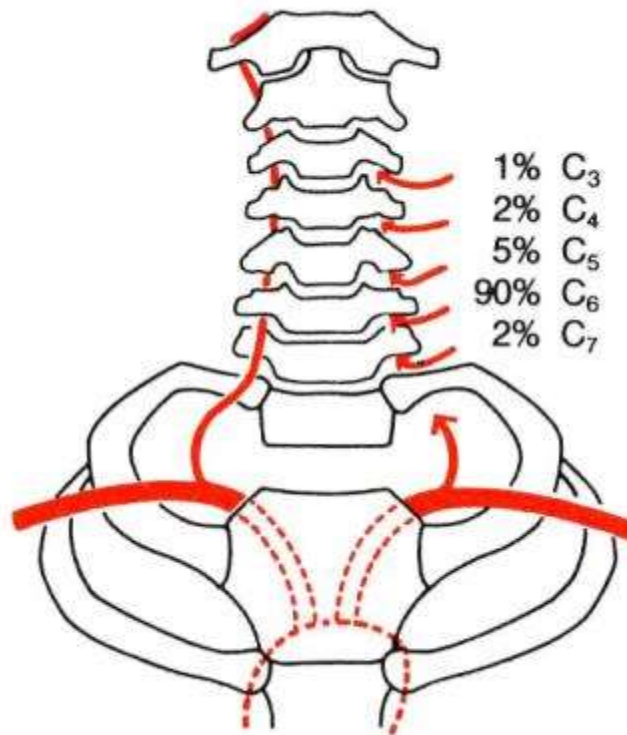
VARIATIONS D'ORIGINE DE L'ARTERE VERTEBRALE



VARIATIONS D'ORIGINE DE L'ARTERE VERTEBRALE

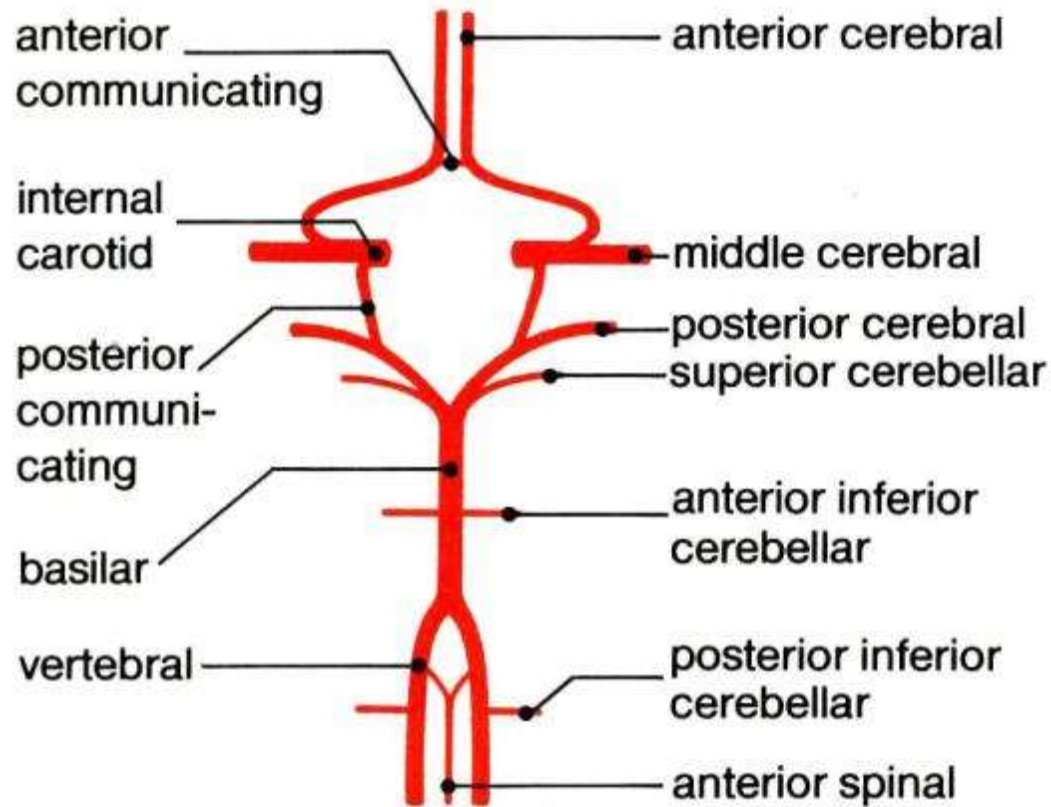


VARIATIONS D'ENTREE DE L'ARTERE VERTEBRALE DANS LA COLONNE VERTEBRALE

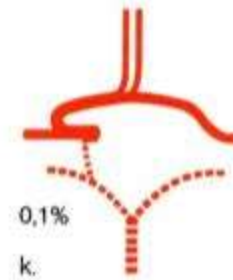
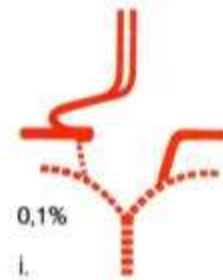
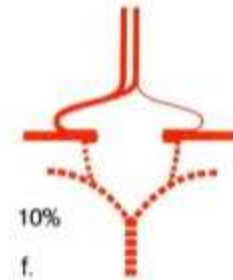
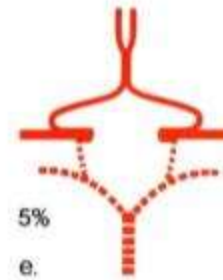
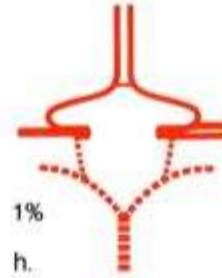
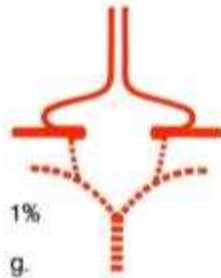
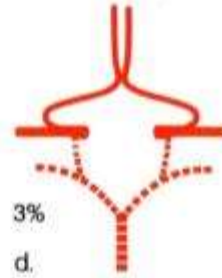
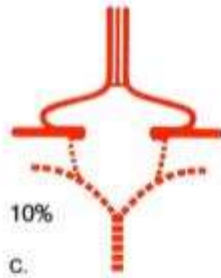
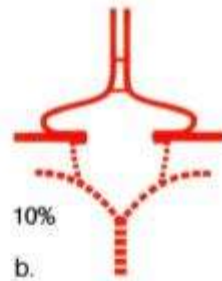
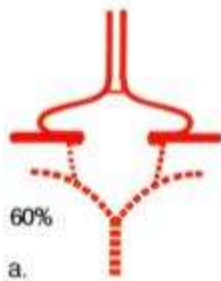


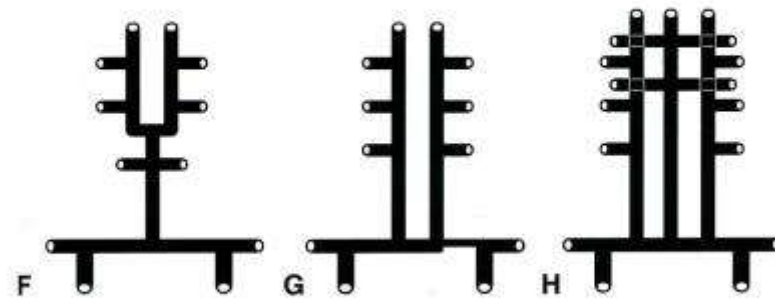
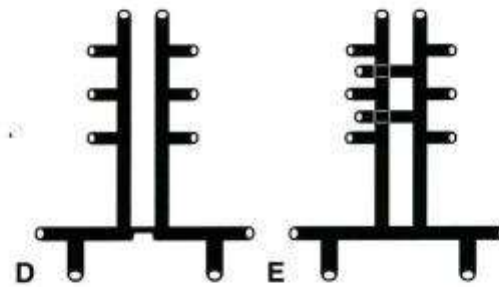
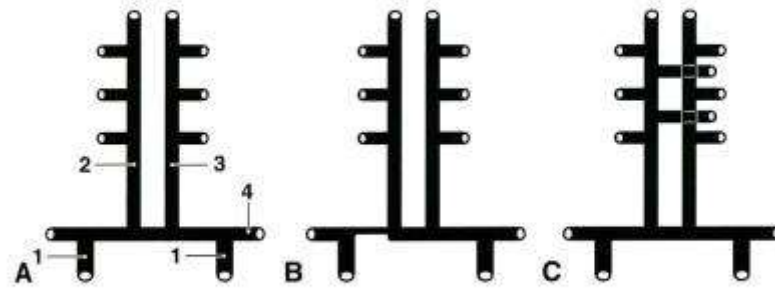
VARIATIONS DU CERCLE ARTERIEL DE LA BASE

Description « classique »



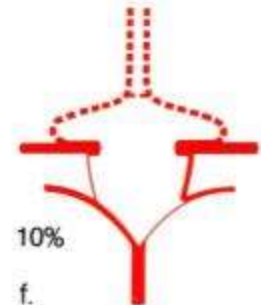
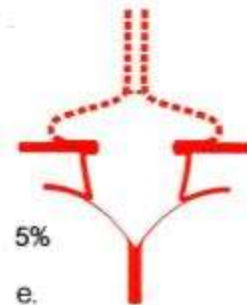
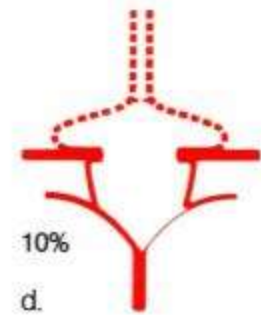
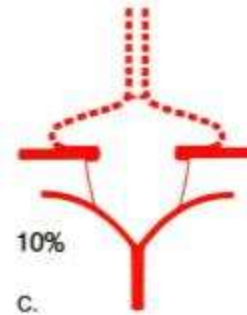
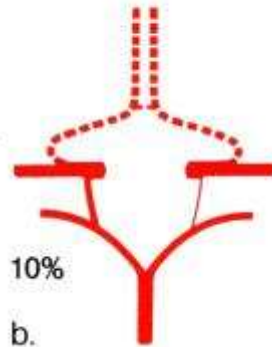
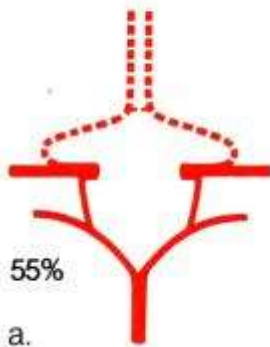
VARIATIONS DU CERCLE ARTERIEL DE LA BASE (Partie antérieure)



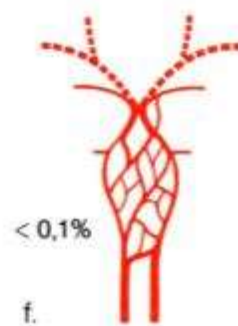
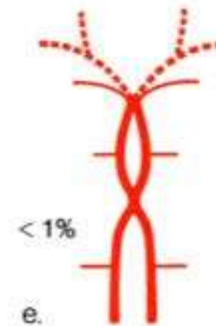
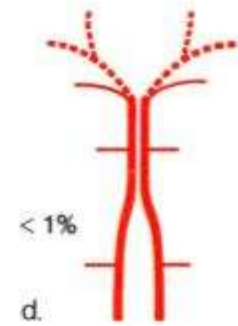
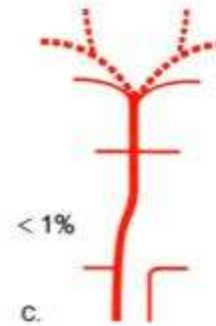
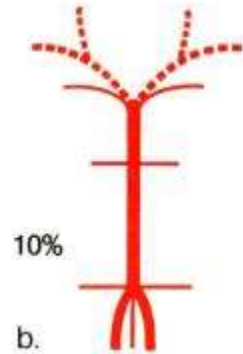
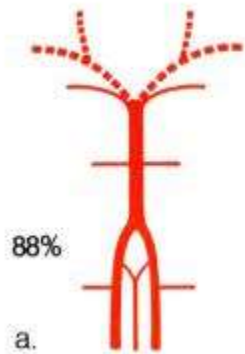


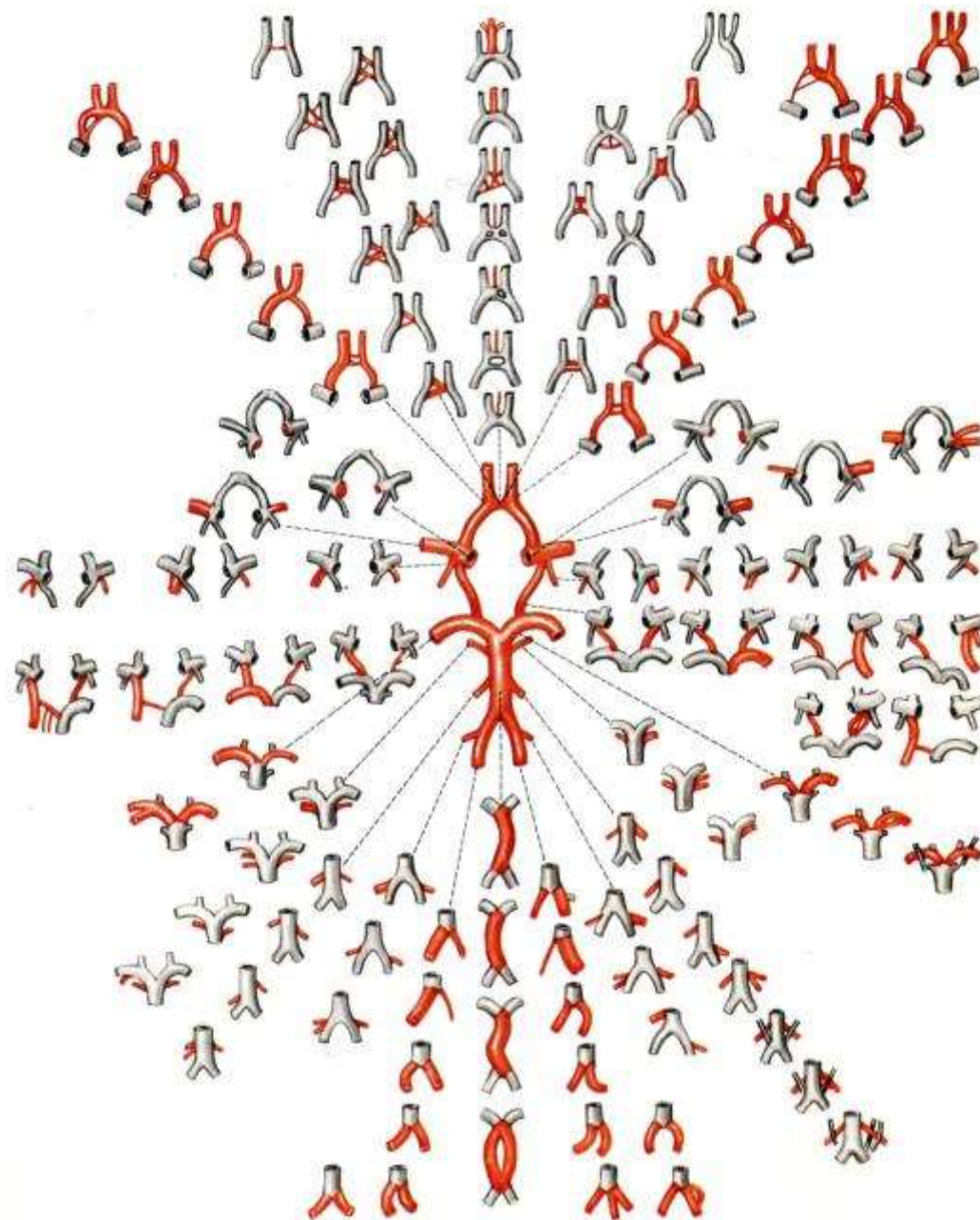
VARIATIONS DU CERCLE ARTERIEL DE LA BASE (Partie postérieure)

Posterior part of the cerebral circle



VARIATIONS DU CERCLE ARTERIEL DE LA BASE (Artère basilaire)

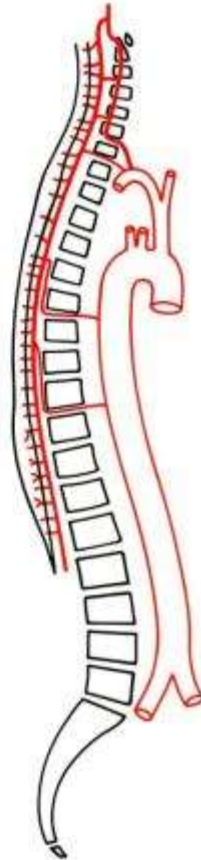
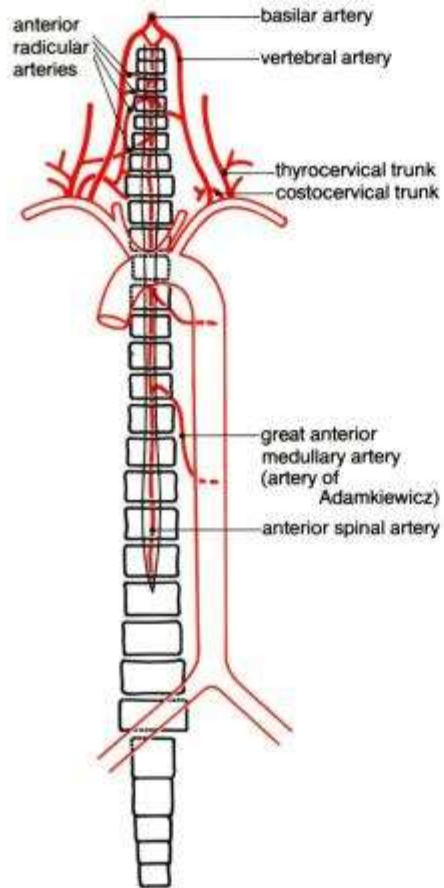




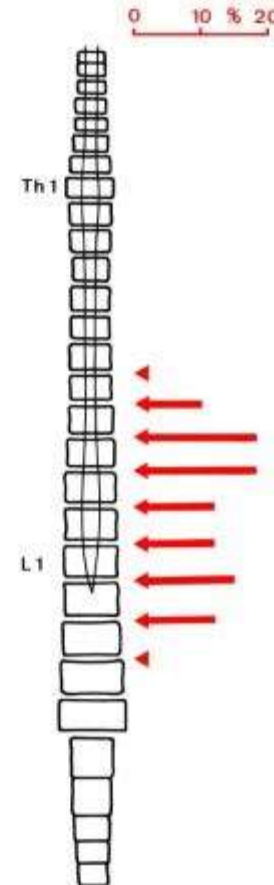
VARIATIONS

D' ORIGINE DE L' ARTERE D' ADAMKIEWICZ

1a and 1b. Typical origin of the anterior radicular arteries



Variable origin of the great anterior medullary artery (artery of Adamkiewicz)



EXEMPLES DE VARIABILITE ARTERIELLE

1°) AORTE

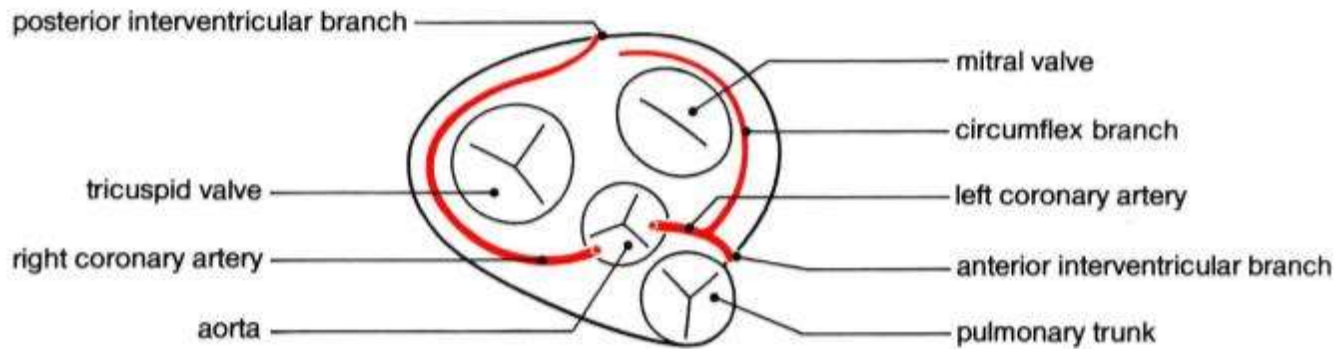
2°) COU et TÊTE

3°) SYSTEME NERVEUX CENTRAL

4°) VISCERES

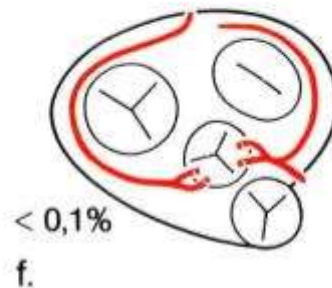
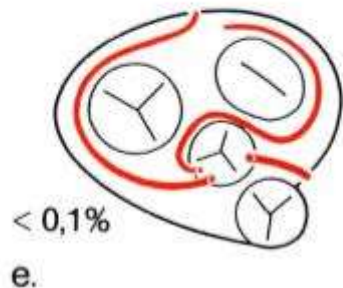
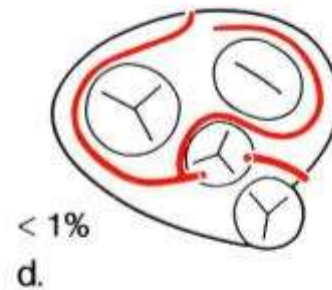
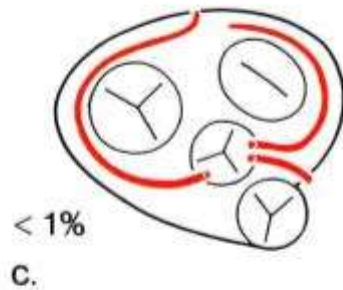
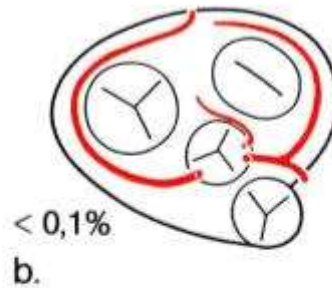
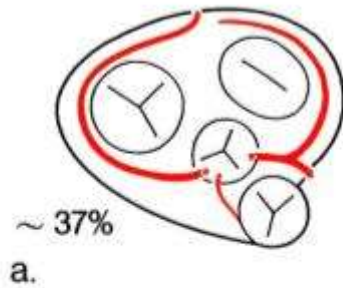
5°) MEMBRES

VARIATIONS DES ARTERES CORONAIRES



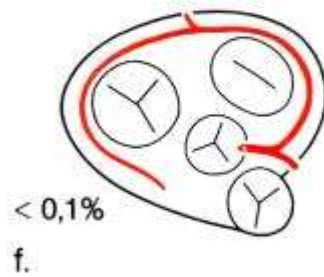
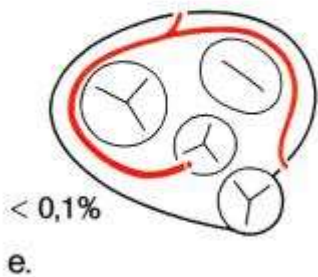
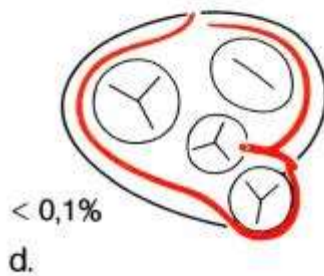
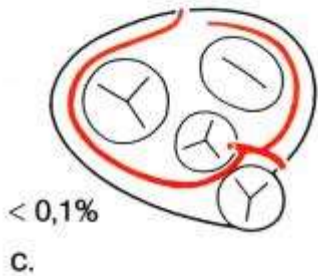
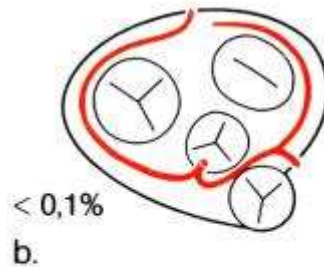
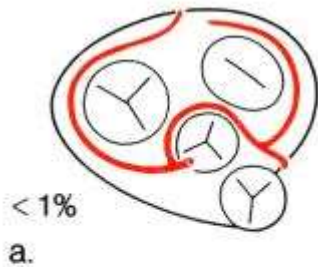
**Description « classique »
(60%)**

VARIATIONS DES ARTERES CORONAIRES



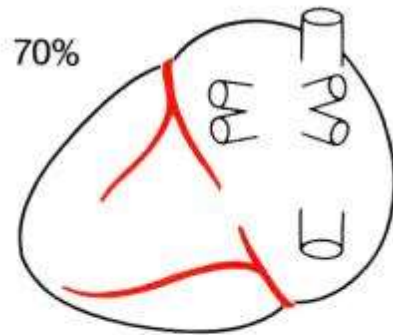
**artères accessoires
et anomalies d'origine
(38%)**

VARIATIONS DES ARTERES CORONAIRES

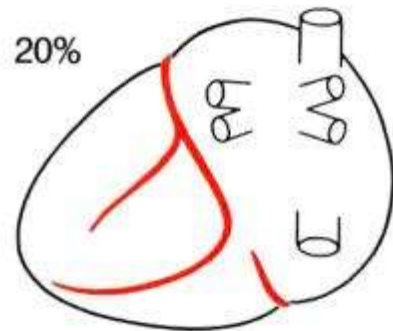


**artère coronaire unique
(< 1%)**

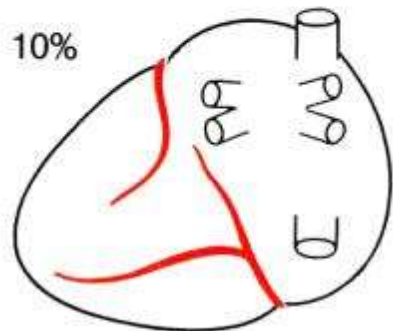
VARIATIONS DES ARTERES CORONAIRES



a.



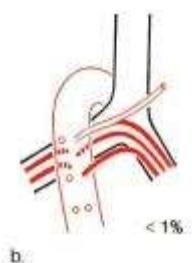
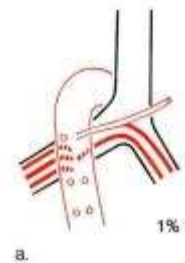
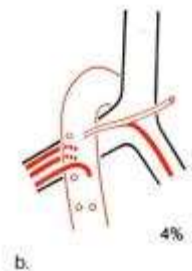
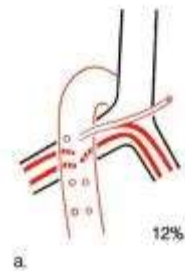
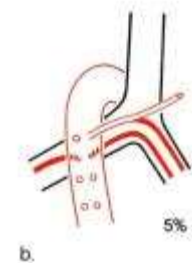
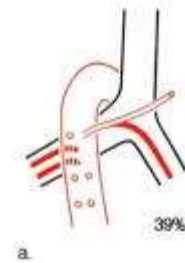
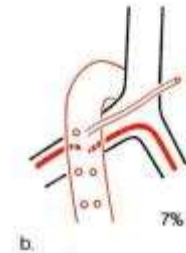
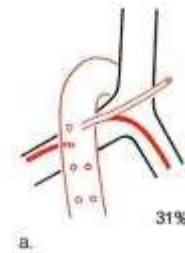
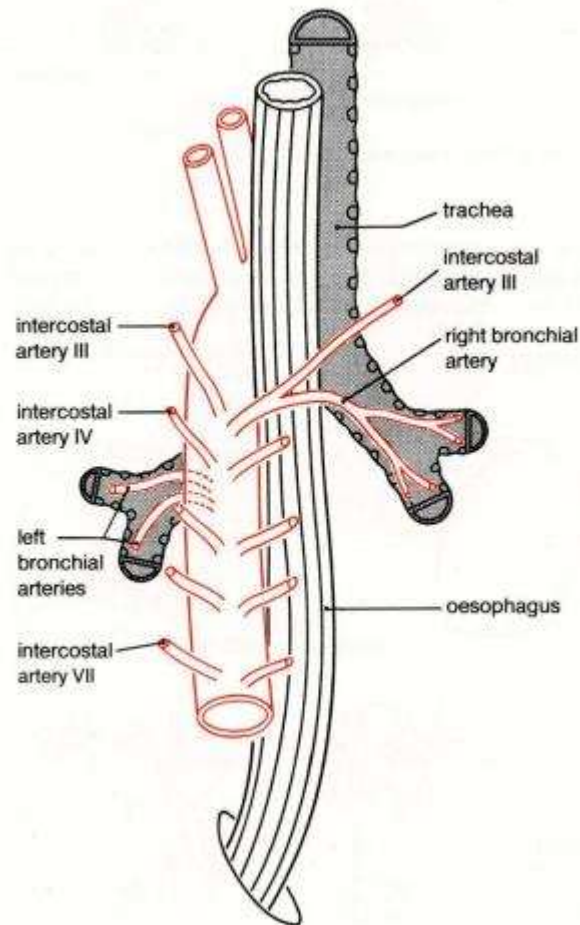
b.



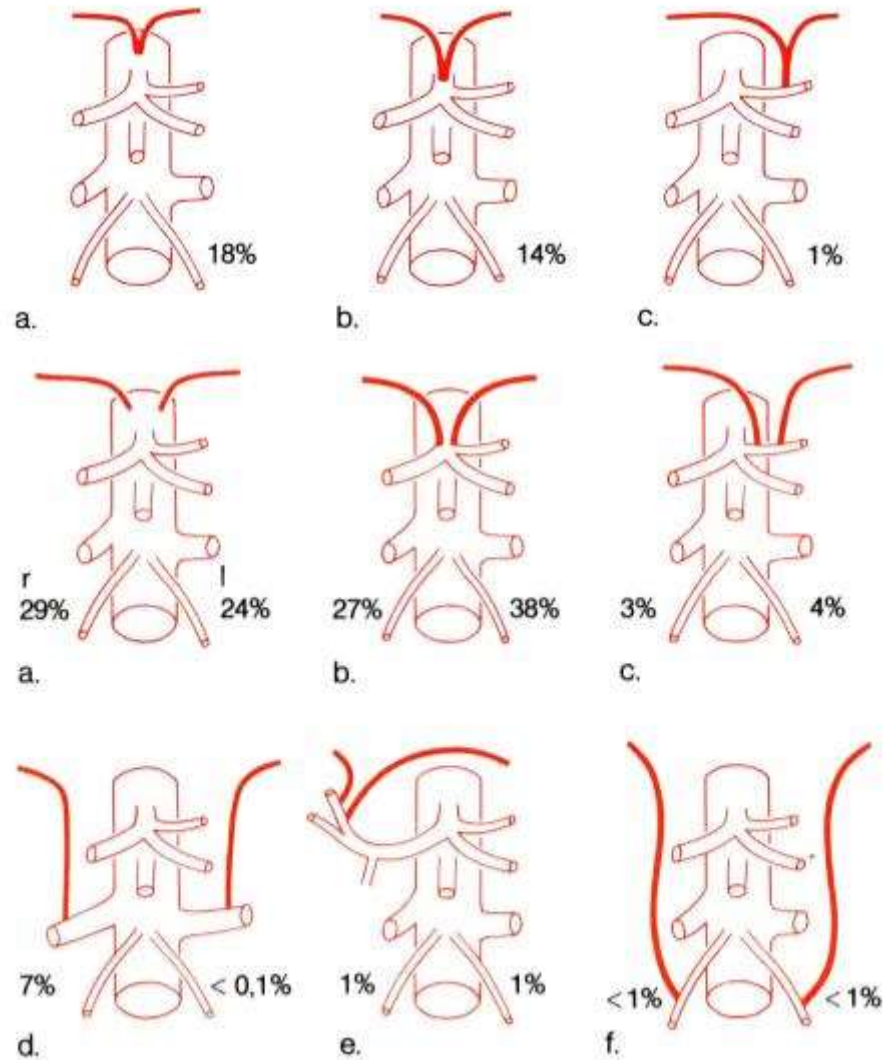
c.

**variations de la branche
interventriculaire postérieure**

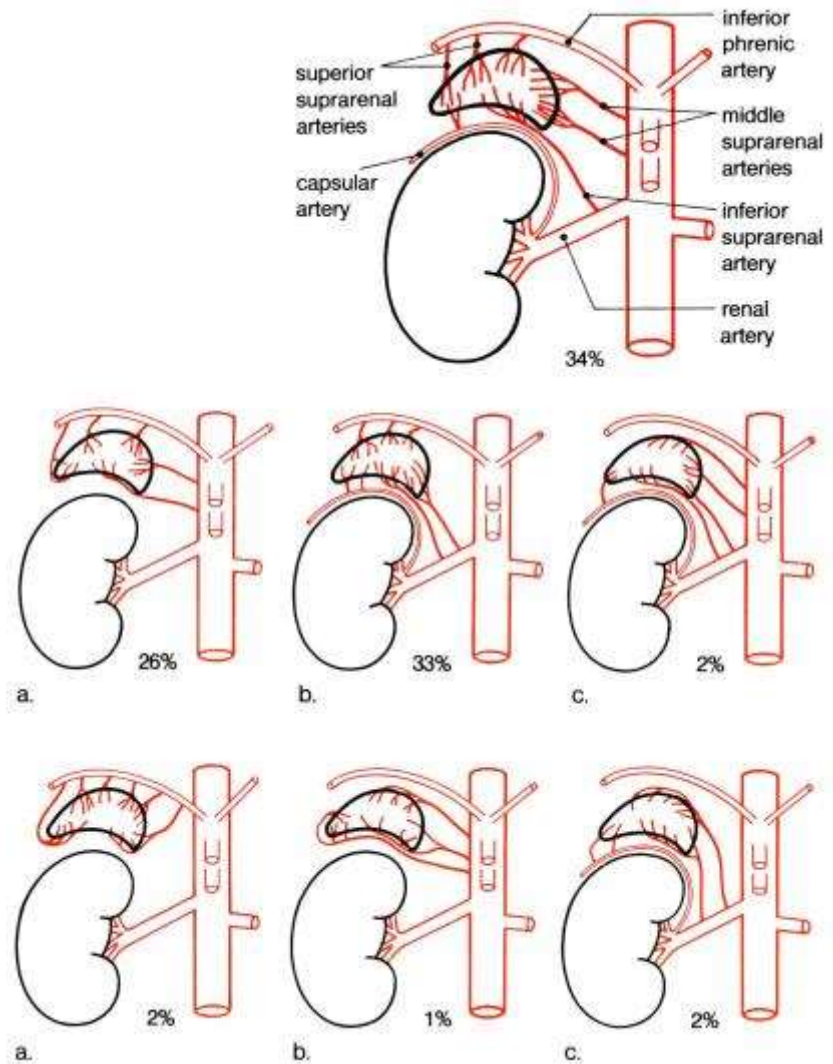
VARIATIONS DES ARTERES BRONCHIQUES



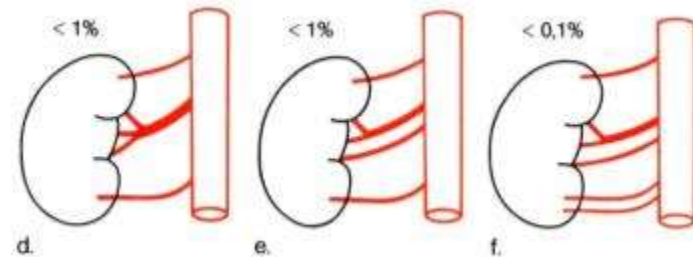
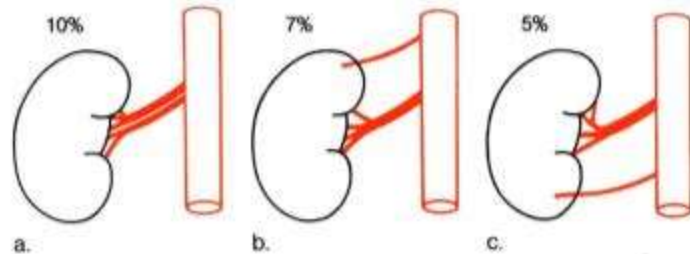
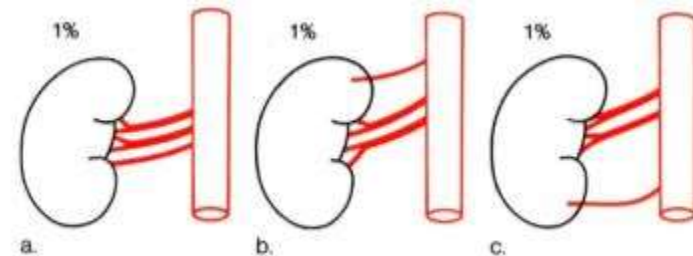
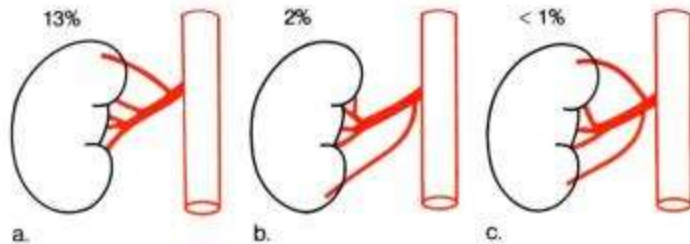
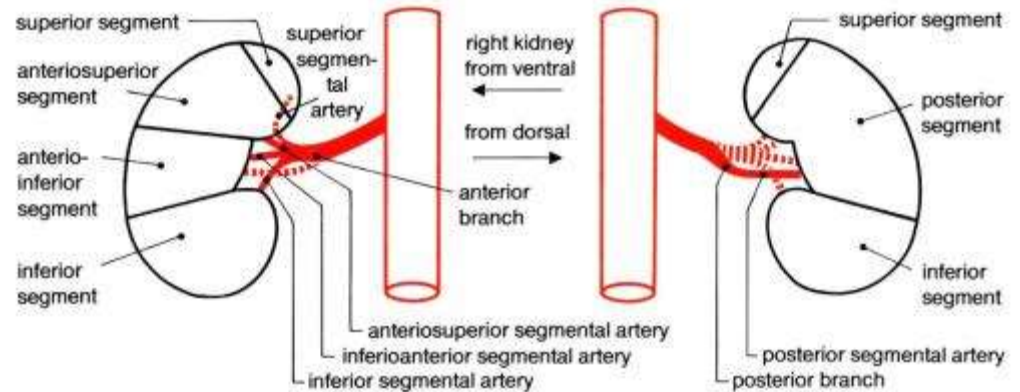
VARIATIONS DES ARTERES PHRENIQUES INFERIEURES



VARIATIONS DES ARTERES SUPRARENALES



VARIATIONS DES ARTERES RENALES



VARIATIONS DES ARTERES RENALES

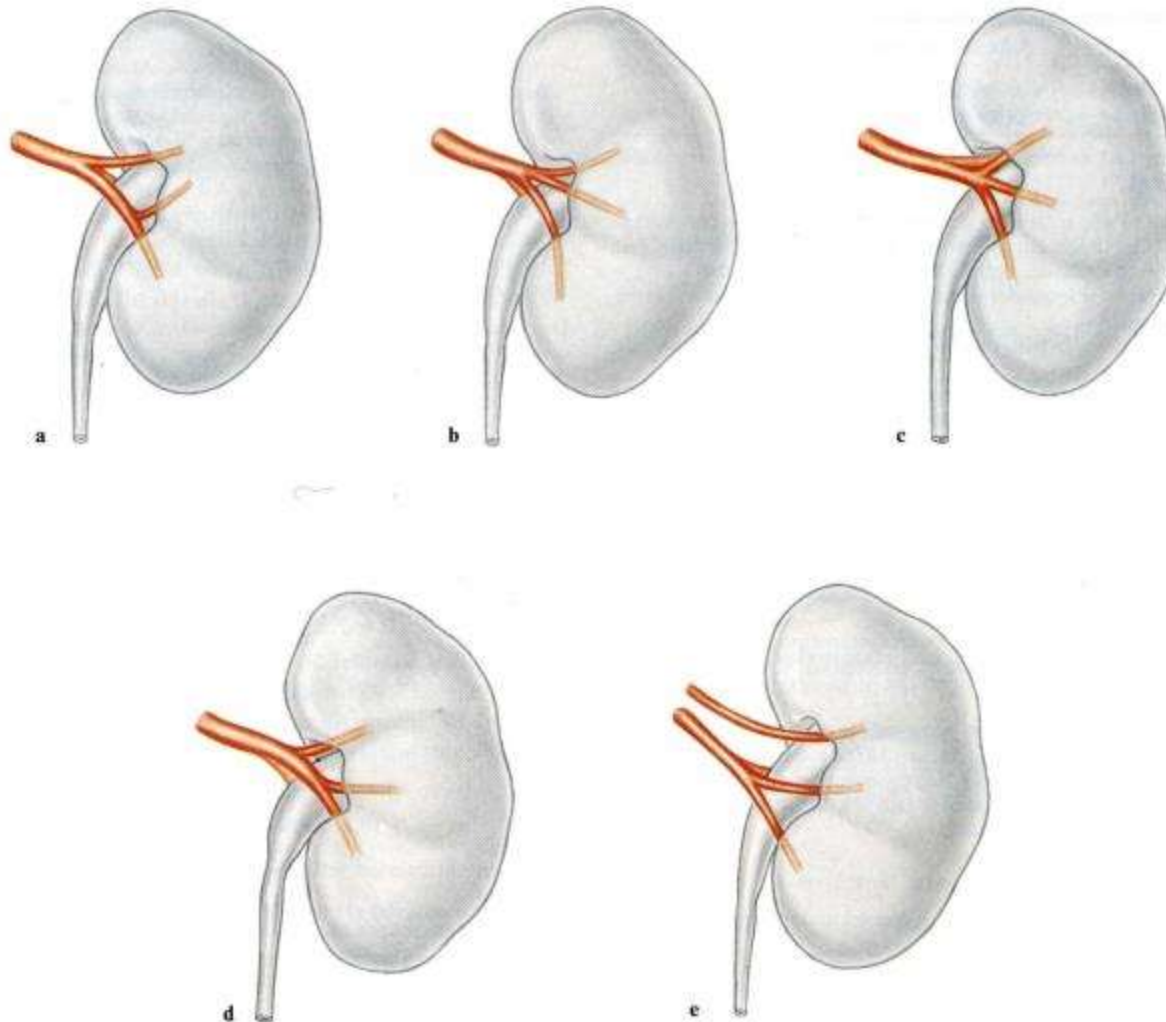


Abb. 85 a-e. Aufzweigung der vorderen Nierenarterien

VARIATIONS DES ARTERES RENALES

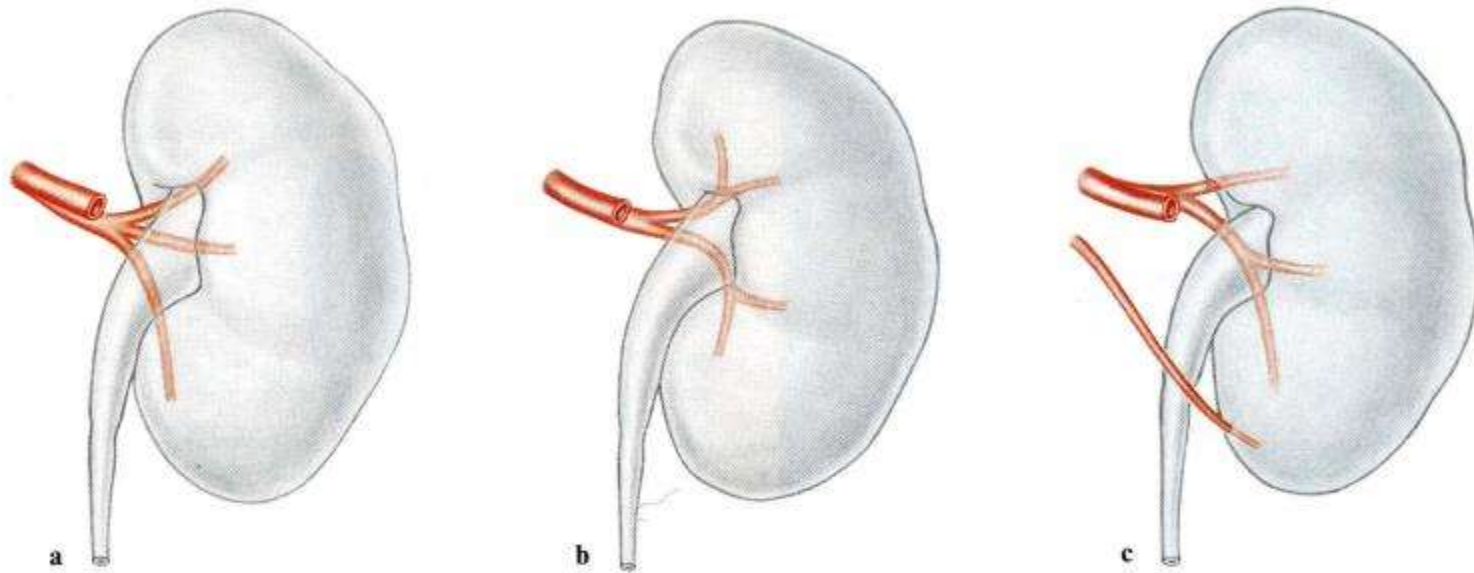
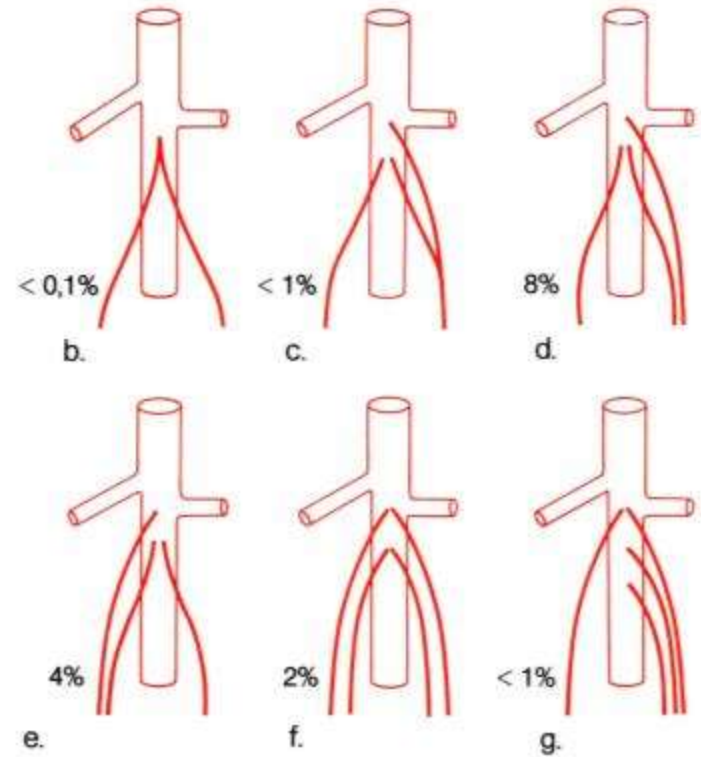
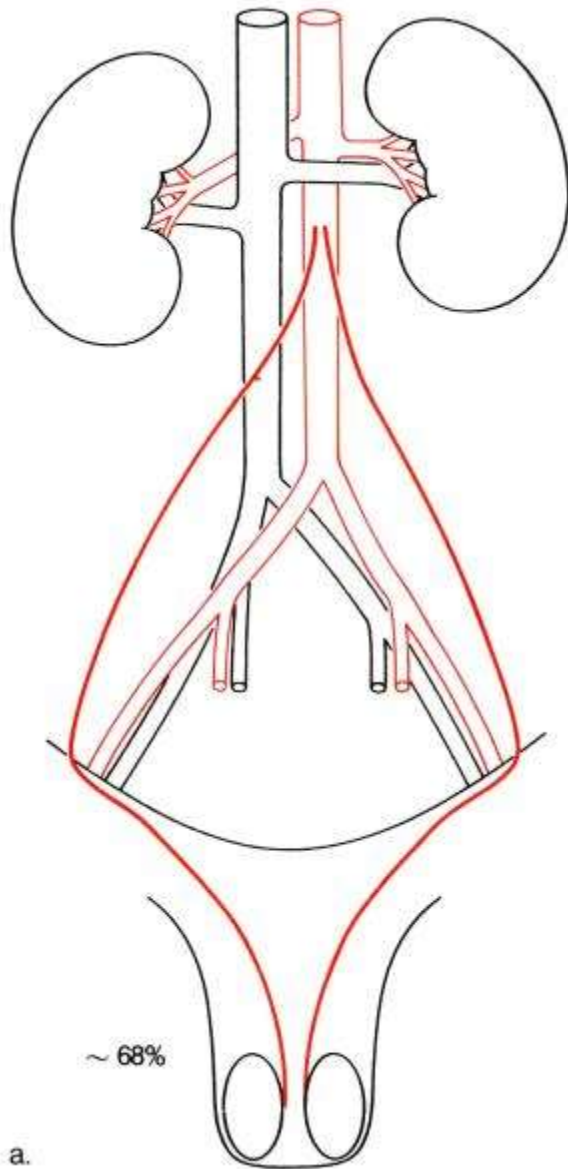
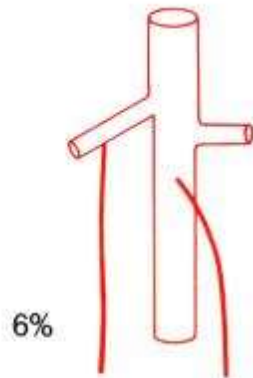


Abb. 86 a–c. Aufzweigung der hinteren Nierenarterie
a Kruziale Aufzweigung (10%); **b** bifurkale Aufzweigung (30%); **c** magistrale Aufzweigung (50%)

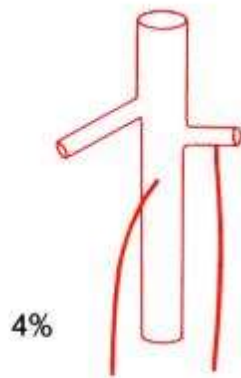
VARIATIONS DES ARTERES TESTICULAIRES



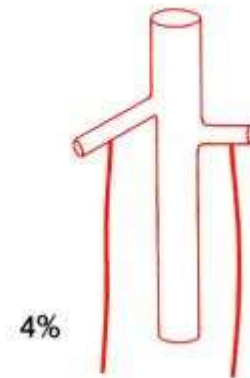
VARIATIONS DES ARTERES TESTICULAIRES



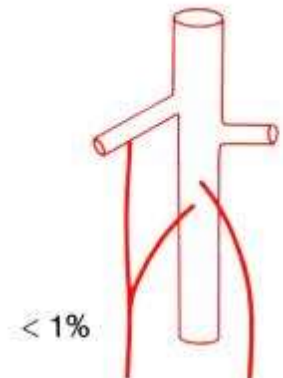
a.



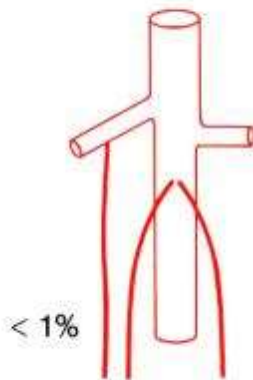
b.



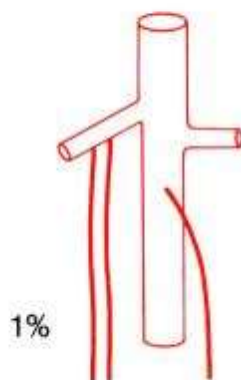
c.



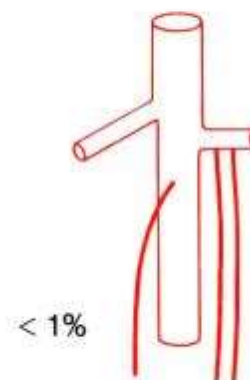
d.



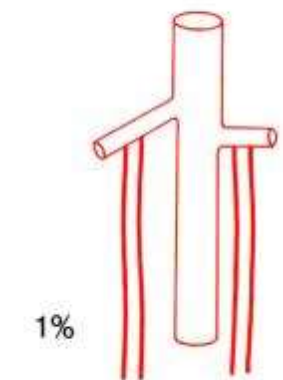
e.



f.

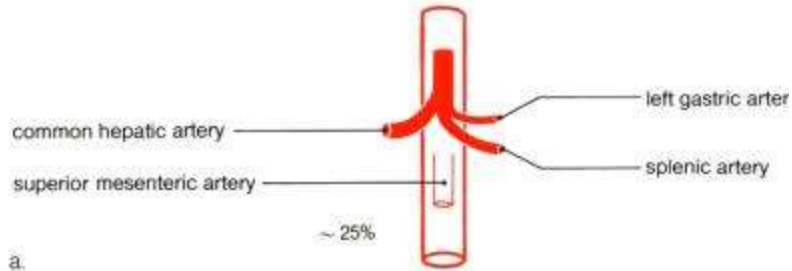


g.



h.

VARIATIONS DU TRONC COELIAQUE



a.



a.



b.



a.



b.



b.



c.



1%



d.



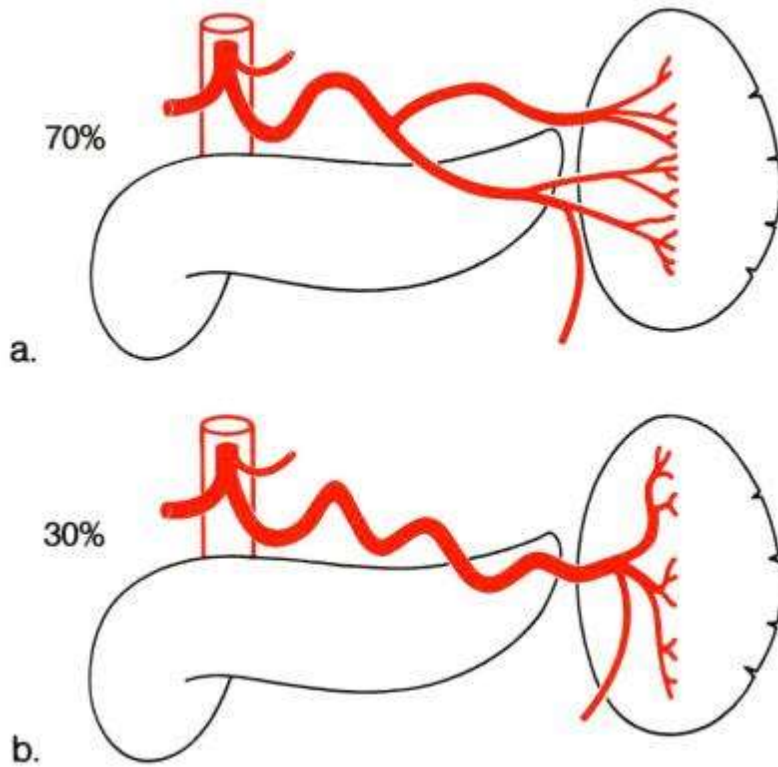
c.



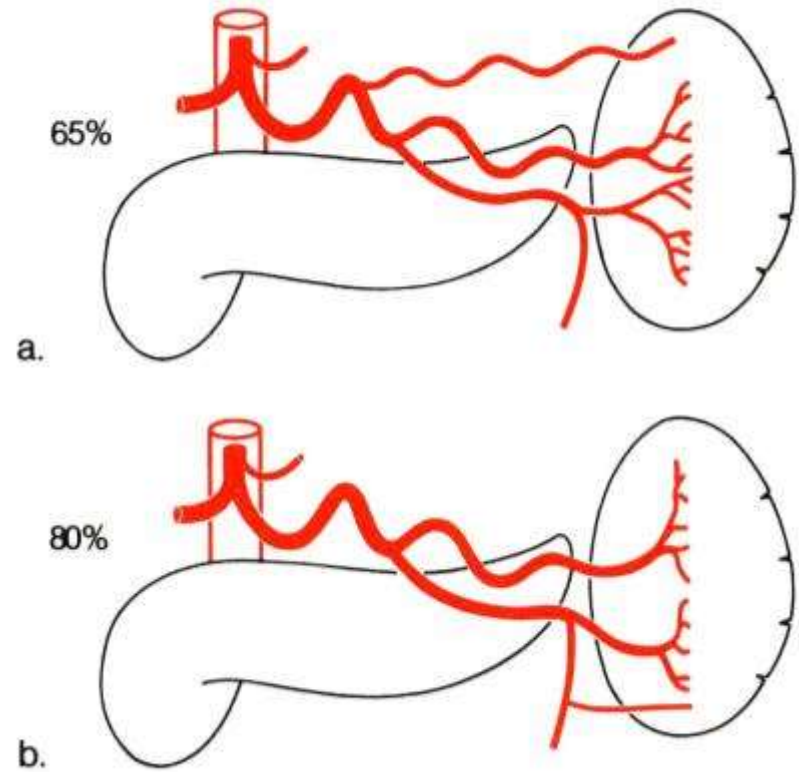
d.

VARIATIONS DE L'ARTERE SPLENIQUE

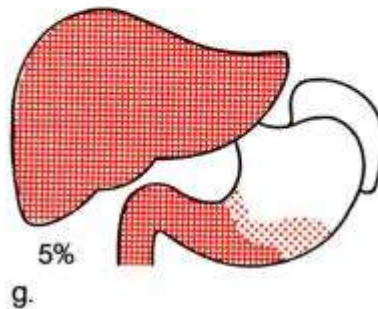
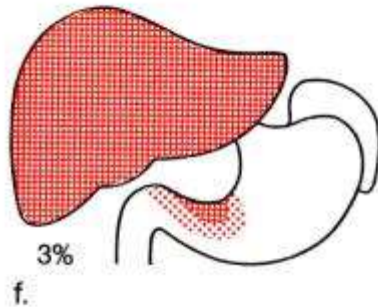
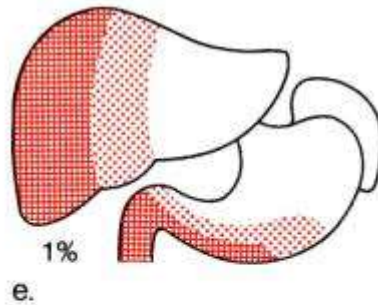
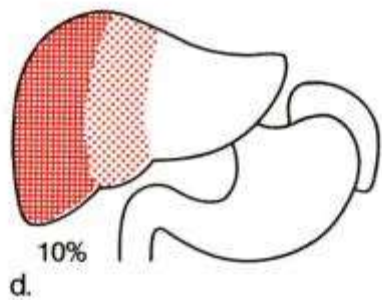
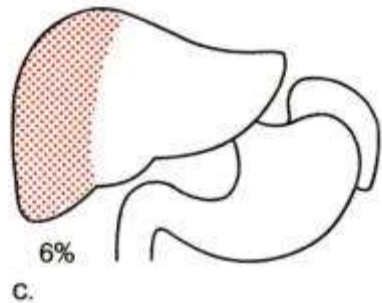
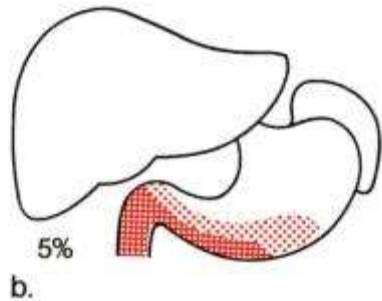
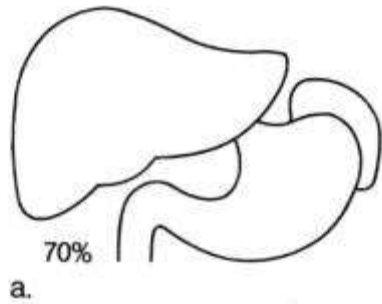
1. Type of branching



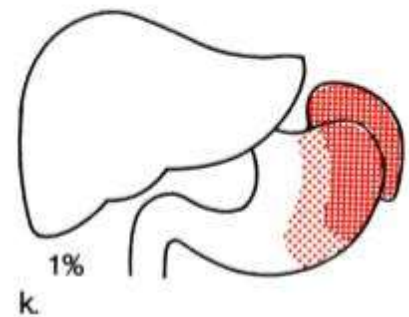
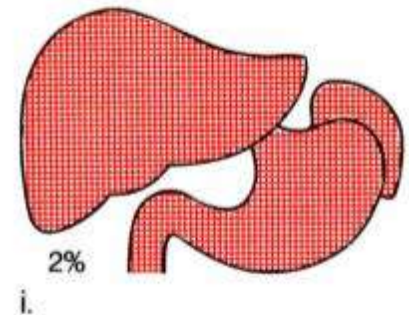
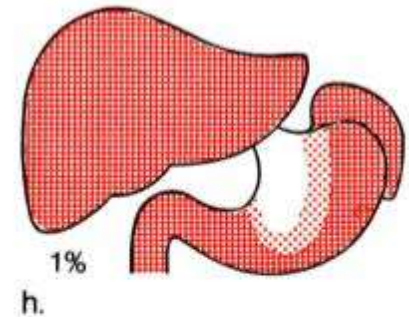
2. Polar arteries

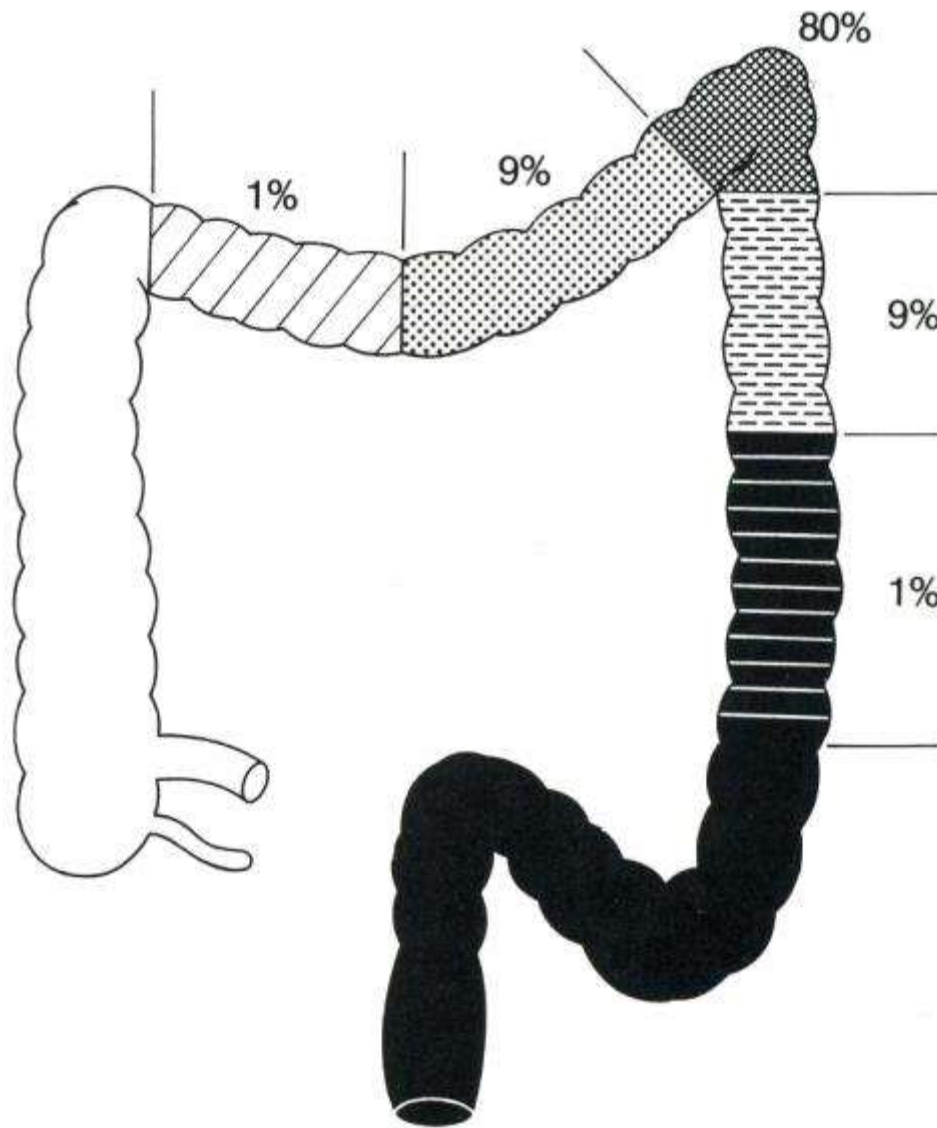


VARIATIONS DE TERRITOIRE



-  primarily supplied by the superior mesenteric artery
-  partly supplied by the superior mesenteric artery, partly by branches of the celiac trunk
-  primarily supplied by branches of the celiac trunk





VARIATIONS DE TERRITOIRE

EXEMPLES DE VARIABILITE ARTERIELLE

1°) AORTE

2°) COU et TÊTE

3°) SYSTEME NERVEUX CENTRAL

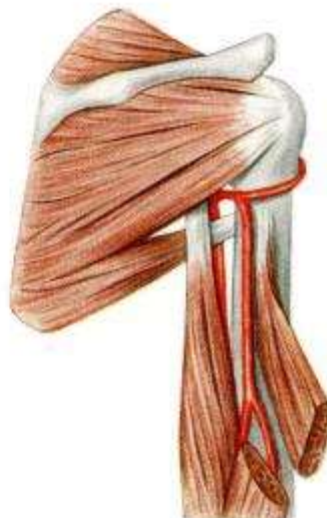
4°) VISCERES

5°) MEMBRES

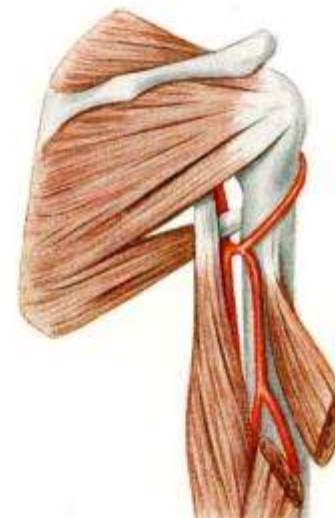
VARIATIONS DES ARTERES CIRCONFLEXE HUMERALE POSTERIEURE ET PROFONDE DU BRAS



a) Normal, 77 %
getrennter Ursprung.



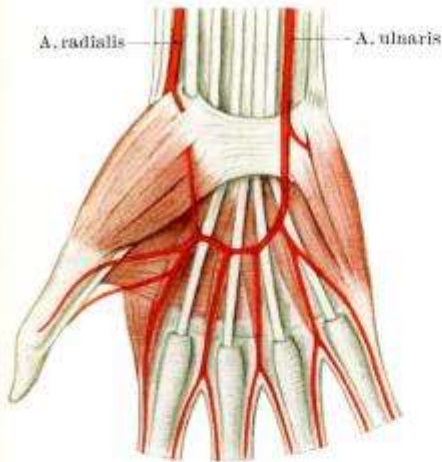
b) Sonderfall, 7 %
A. profunda brachii ganz
oder teilweise aus A. cir-
cumflexa humeri dorsalis.



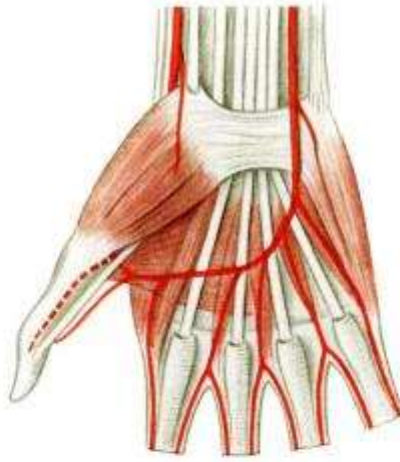
c) Sonderfall, 16 %
A. circumflexa humeri dor-
salis aus A. profunda
brachii.

VARIATIONS DE L'ARCADE PALMAIRE SUPERFICIELLE

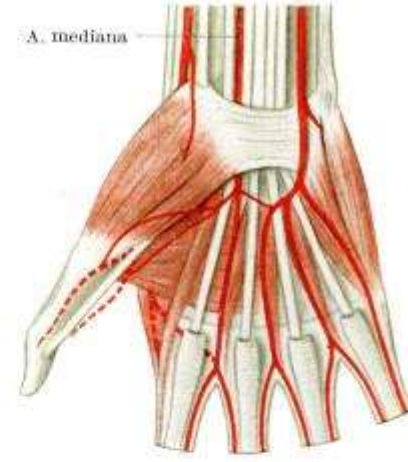
Mit vollständigem Arcus volaris superficialis.



a) Typus radio-ulnaris 27%¹.

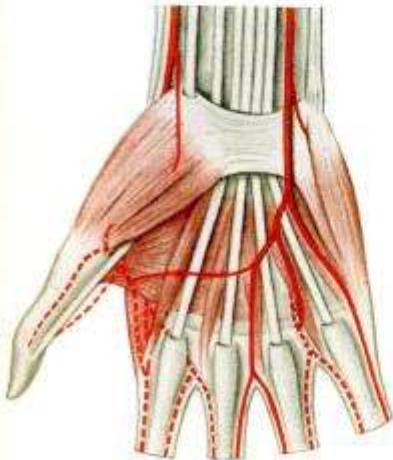


b) Typus ulnaris mit vollständigem Arcus volaris superficialis 27%².

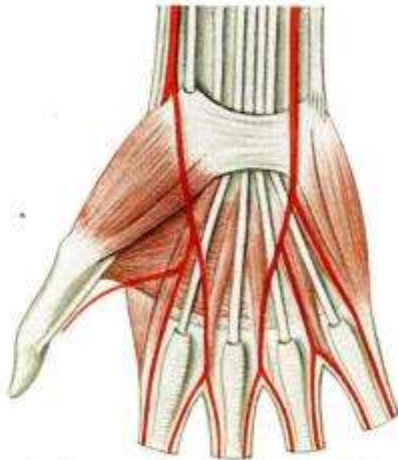


c) Typus mediano-ulnaris 3%³.

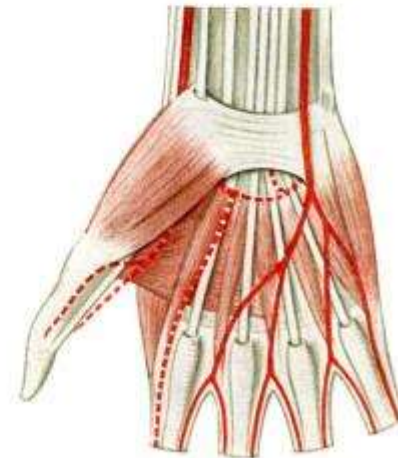
Mit unvollständigem oder fehlendem Arcus volaris superficialis.



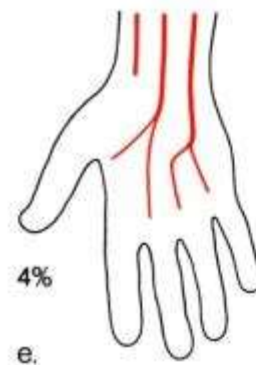
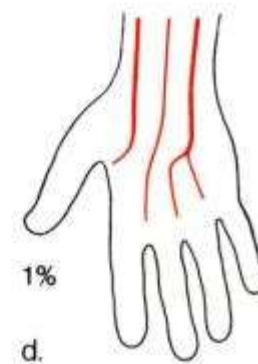
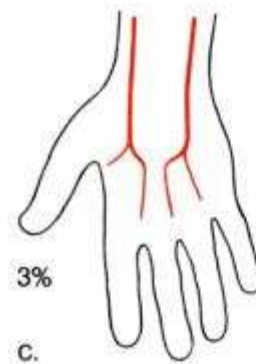
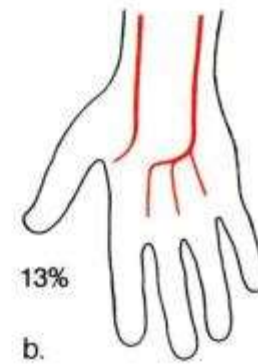
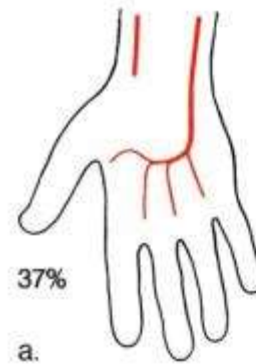
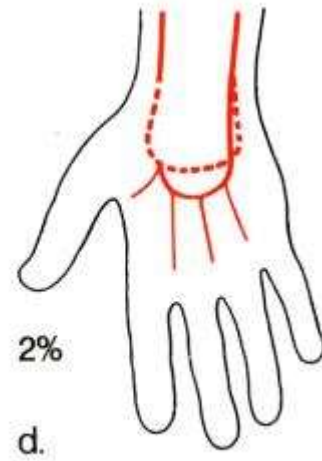
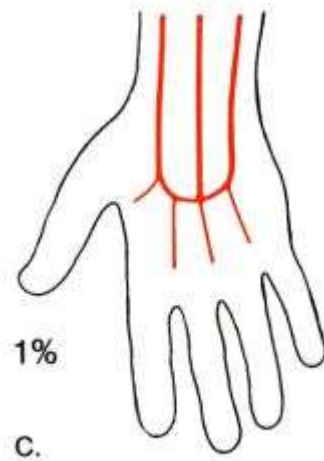
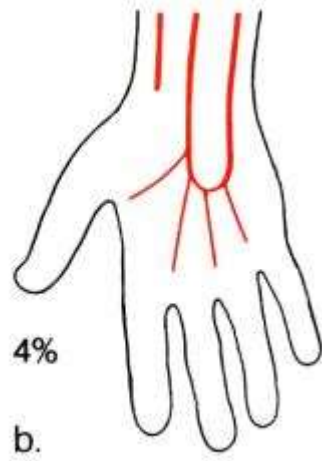
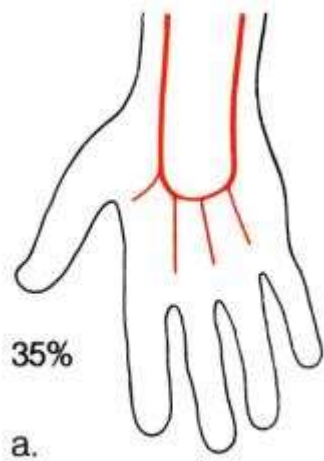
d) Typus ulnaris ohne typischen Arcus volaris superficialis 6%⁴.



e) Arcus volaris superficialis fehlt überhaupt, 4,5%⁵.

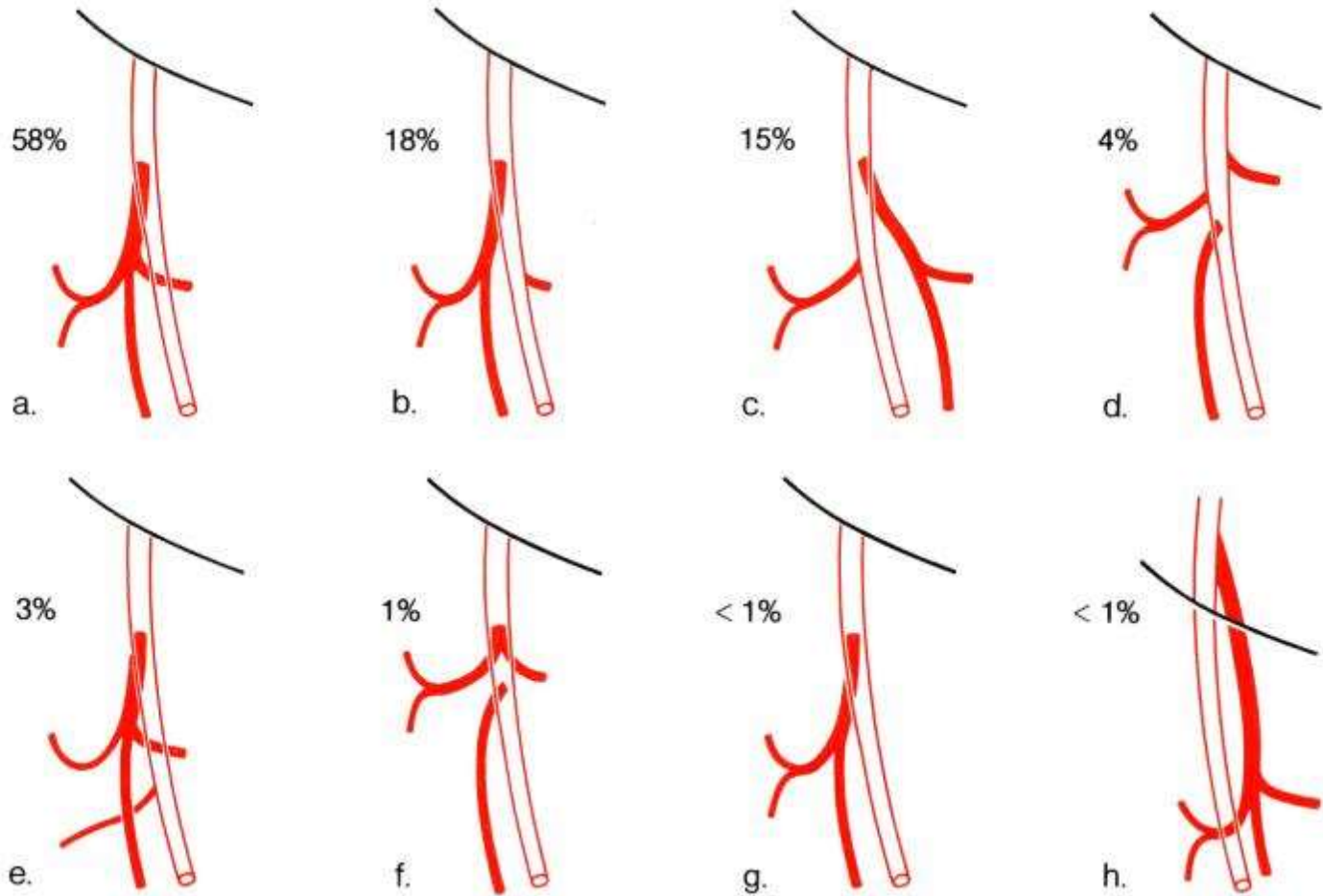


f) Arcus volaris superficialis fehlt. A. digitalis vol. I zweigt sich aus dem tiefen Hohlhandbogen ab, 12%⁶.



VARIATIONS DE L'ARTERE FEMORALE PROFONDE

Origin and branching pattern



VARIATIONS DE L'ARTERE POPLITEE



a) 90% Regelfall, A. tibialis anterior zweigt am Distalrand des M. popliteus ab



b) 4% Trifurkation, A. poplitea teilt sich am Distalrand des M. popliteus in: A. tibialis post., A. tibialis ant. und A. peronea



c) 1% Truncus peroneotibialis anterior, zweigt am Distalrand des M. popliteus ab



d) < 1% Inselbildung der A. poplitea dorsal des M. popliteus



e) 3% Hohe Teilung der A. poplitea



f) 1% Hohe Teilung der A. poplitea mit Truncus peroneotibialis ant.

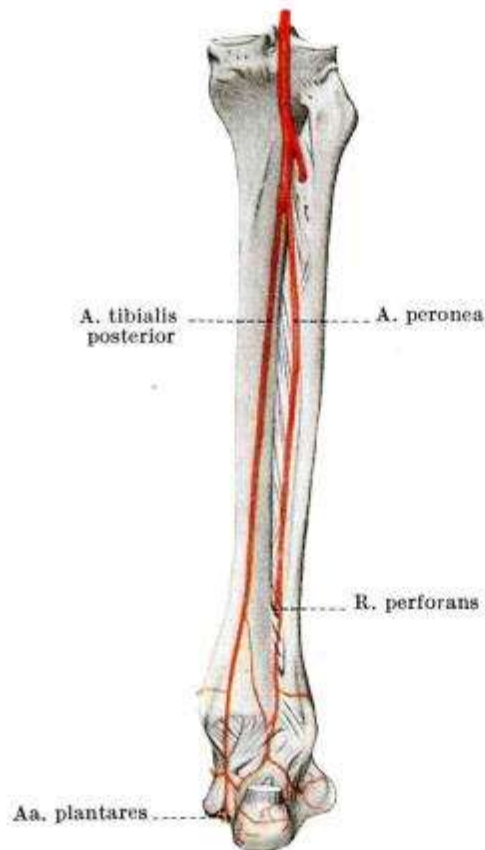


g) 1% Hohe Teilung der A. poplitea, A. tibialis anterior verläuft ventral des M. popliteus



h) < 1% Hohe Teilung der A. poplitea, Truncus interosseotibialis anterior

VARIATIONS DE L' ARTERE TIBIALE POSTERIEURE



a) Regelfall



b) A. tibialis posterior sehr schwach, A. peronea stark

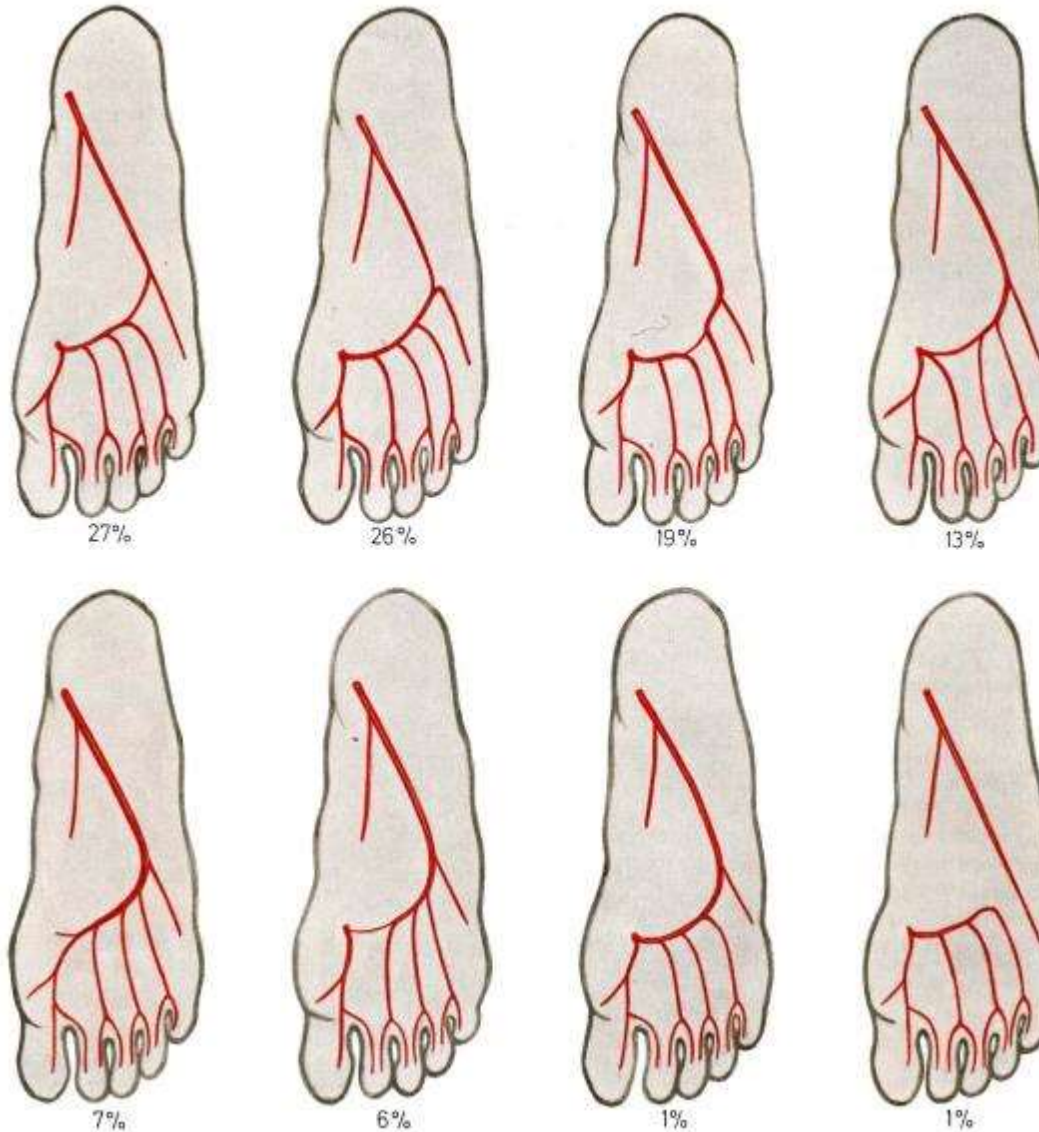


c) A. tibialis posterior fehlt, ist ersetzt am Unterschenkel durch die A. peronea

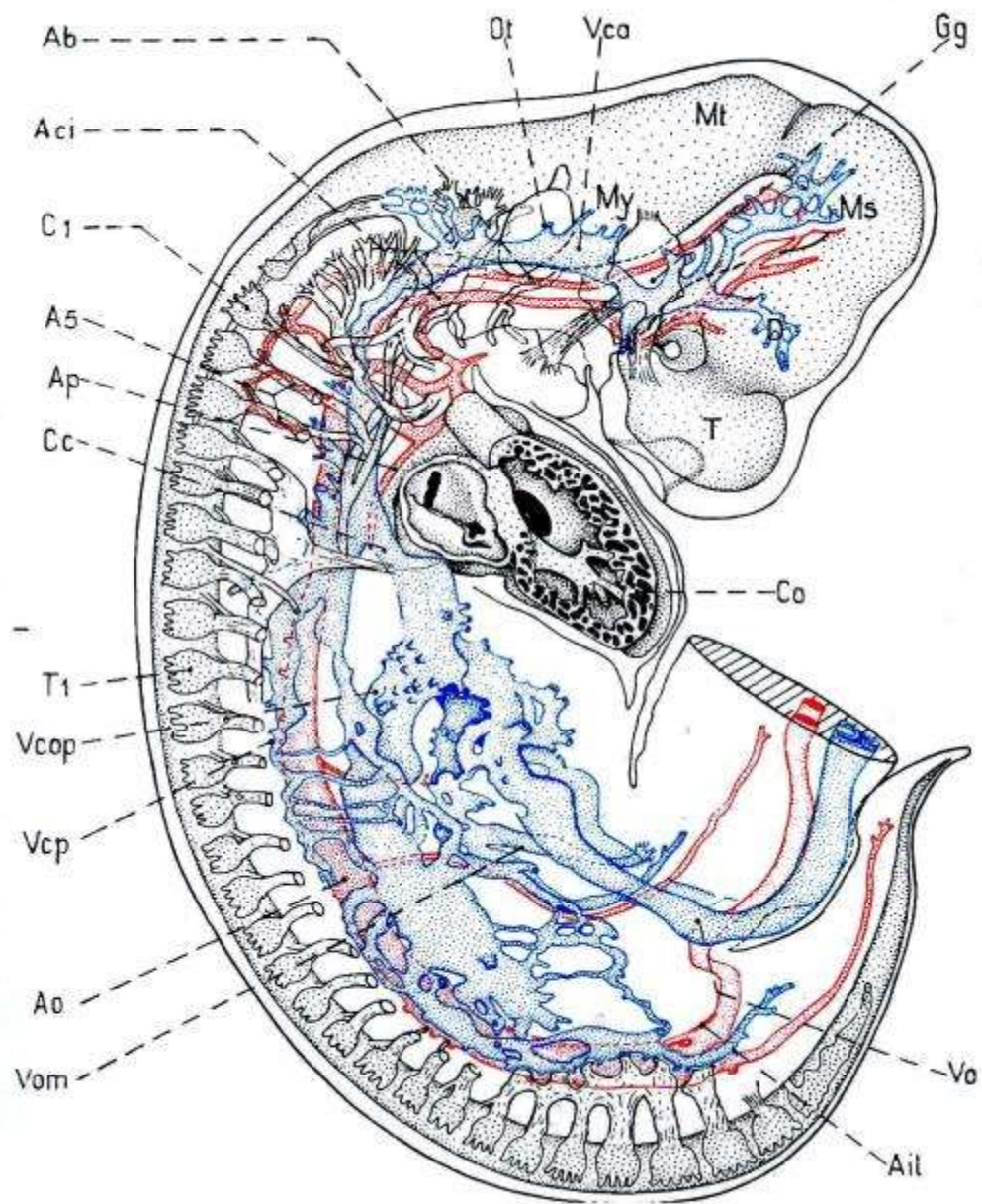


d) A. tibialis posterior fehlt, ist ersetzt am Unterschenkel und am Knöchel durch die A. peronea

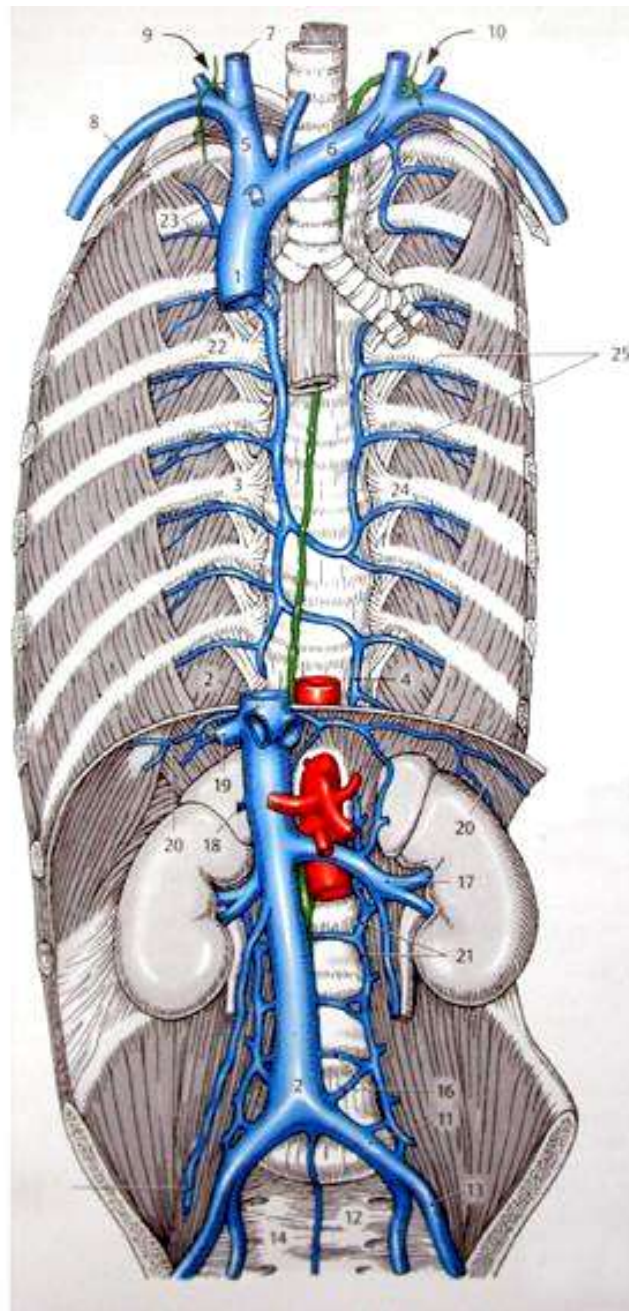
VARIATIONS DE L'ARCADE PLANTAIRE PROFONDE



6.
Exemples
de variabilité veineuse



Exemples de variabilité des VEINES CAVES



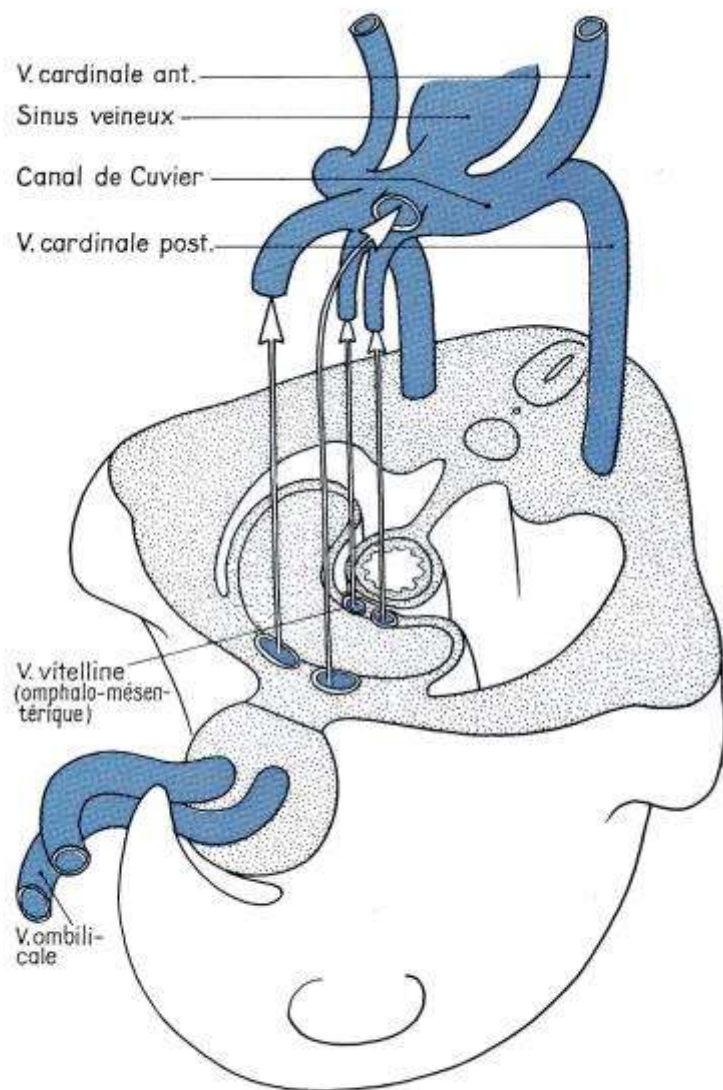


Fig. 1. — Les réseaux veineux à la 4^e semaine.

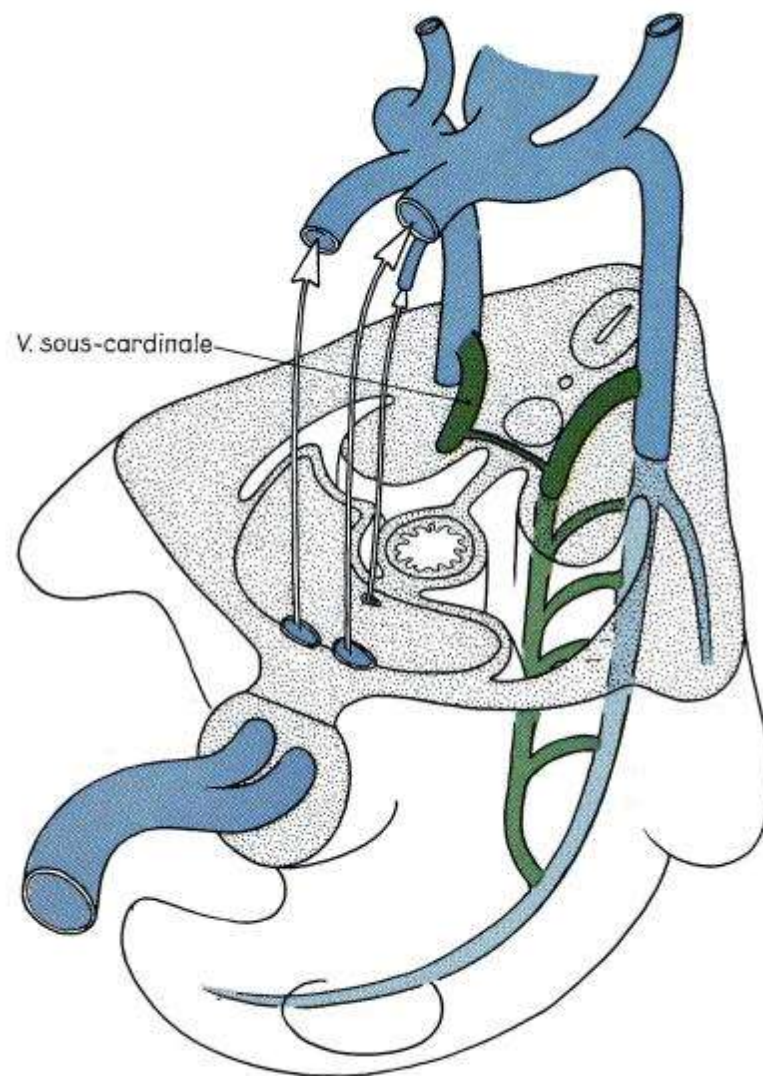


Fig. 2. — Les réseaux veineux à la 6^e semaine.

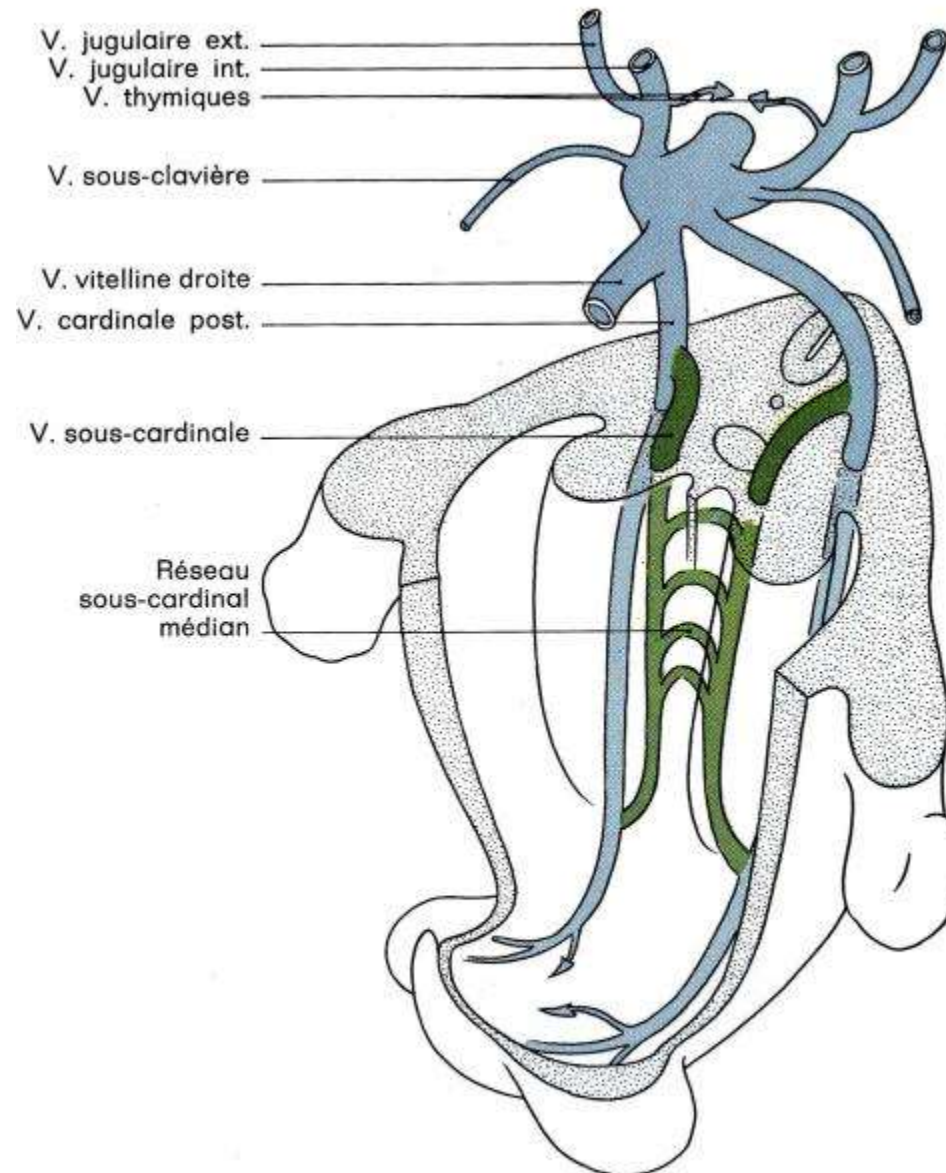
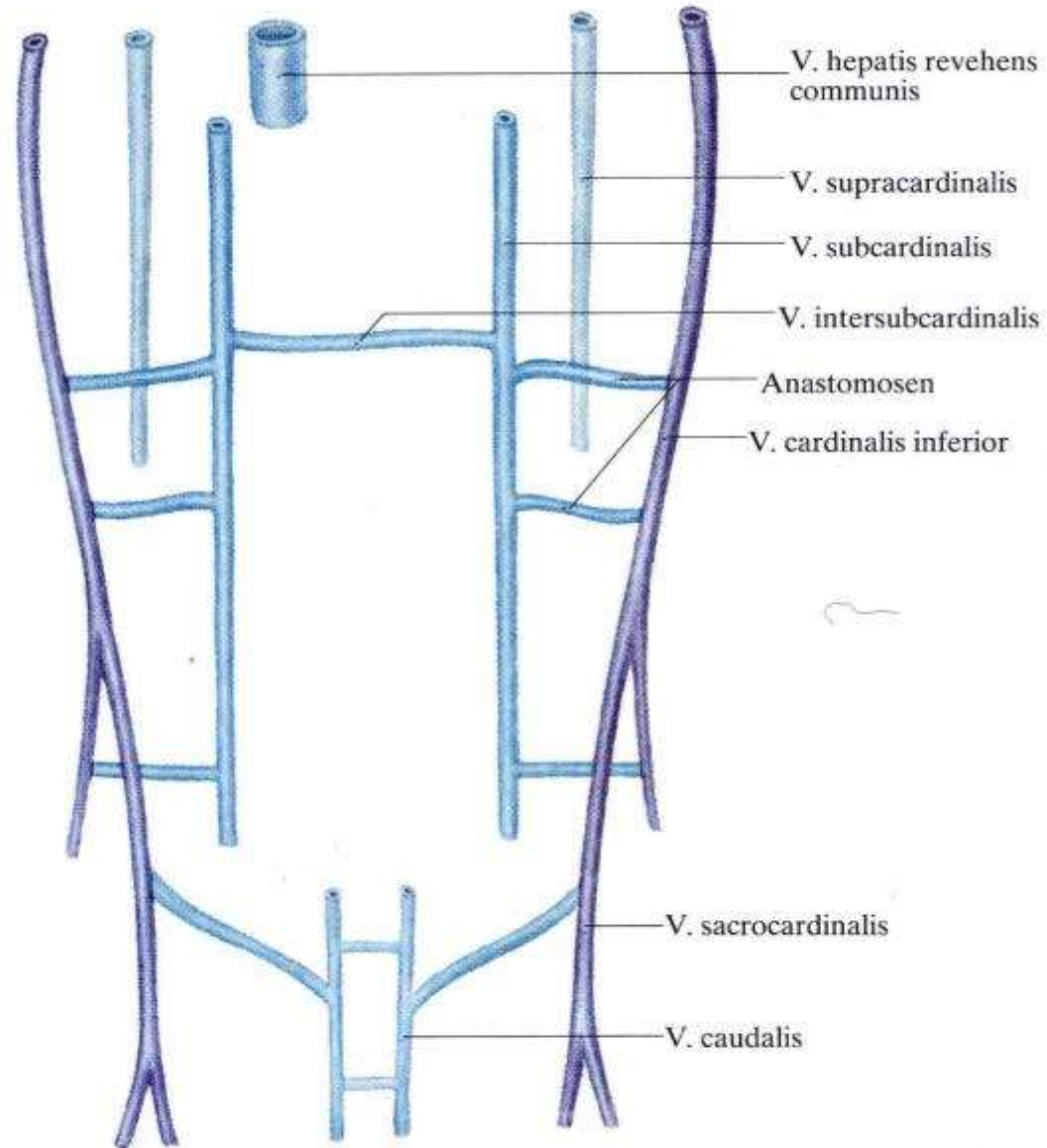
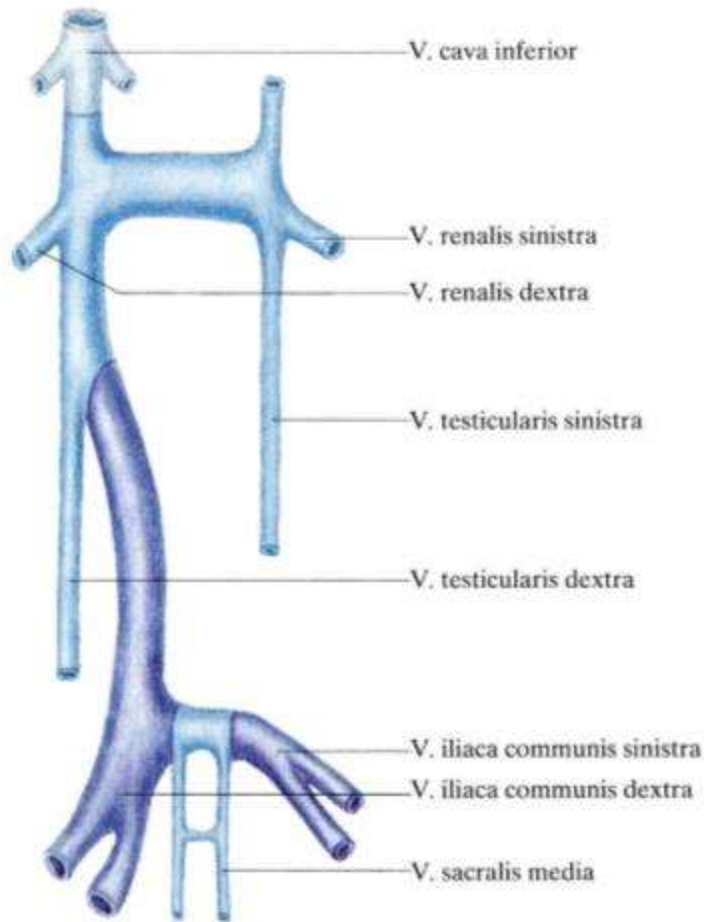
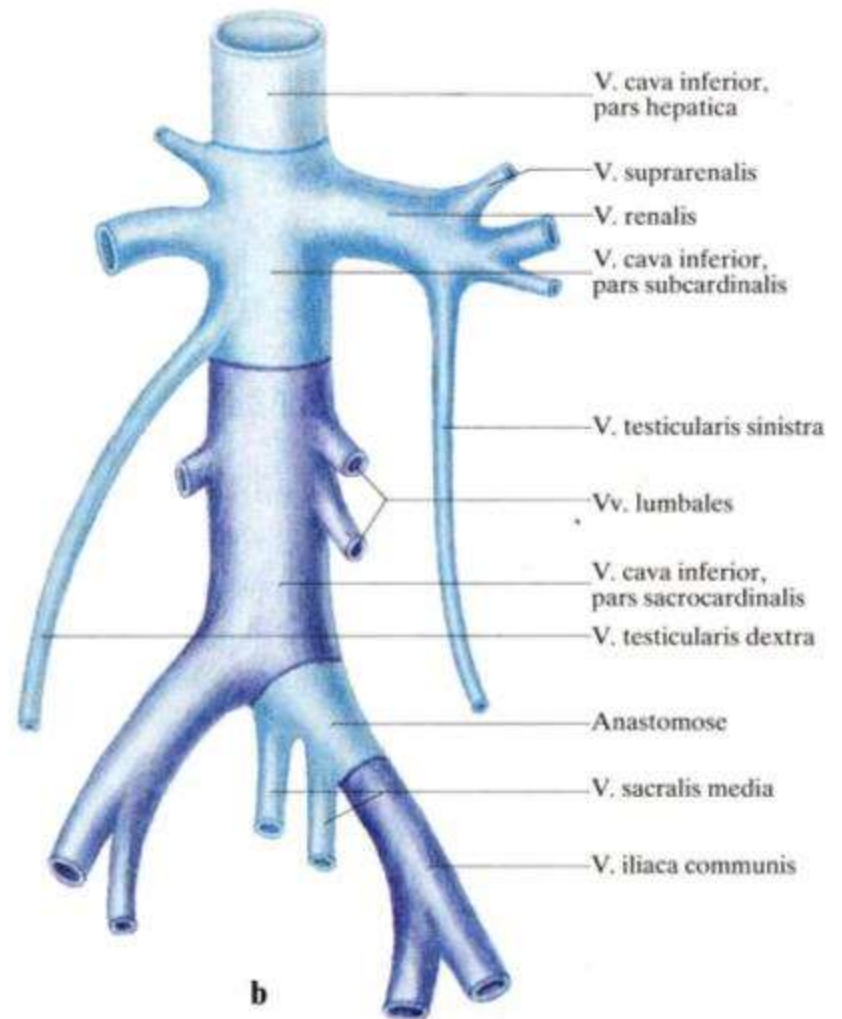


Fig. 3. — Les réseaux veineux à la 8^e semaine.

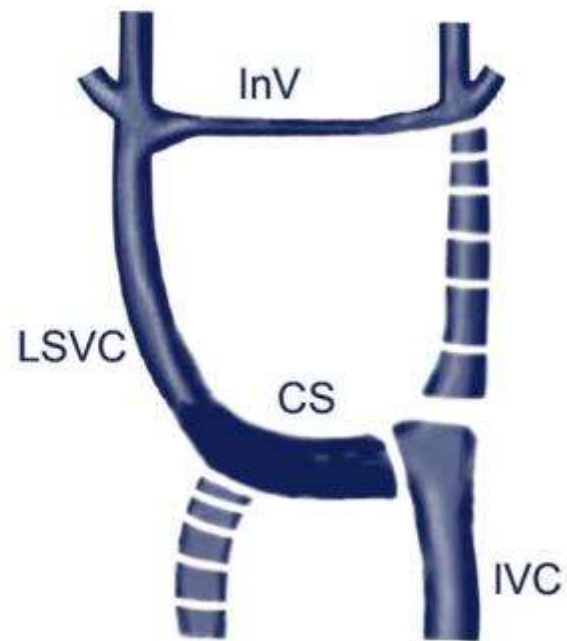
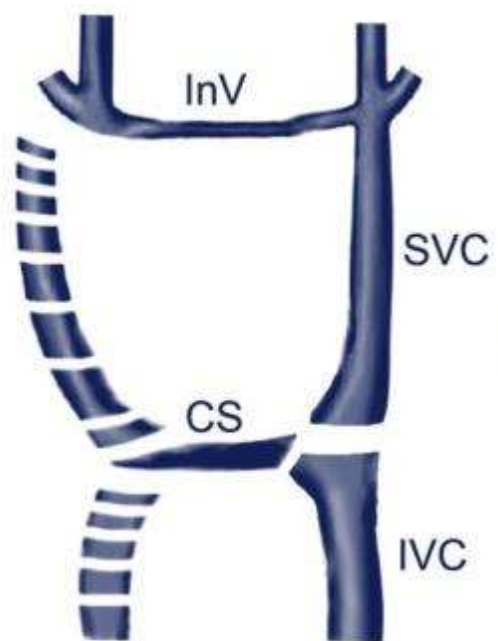
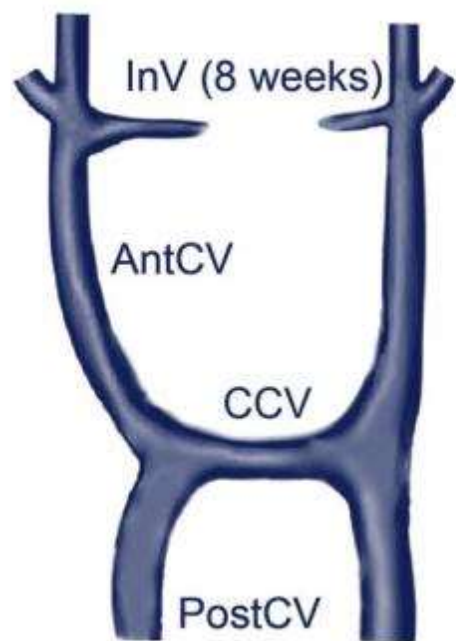


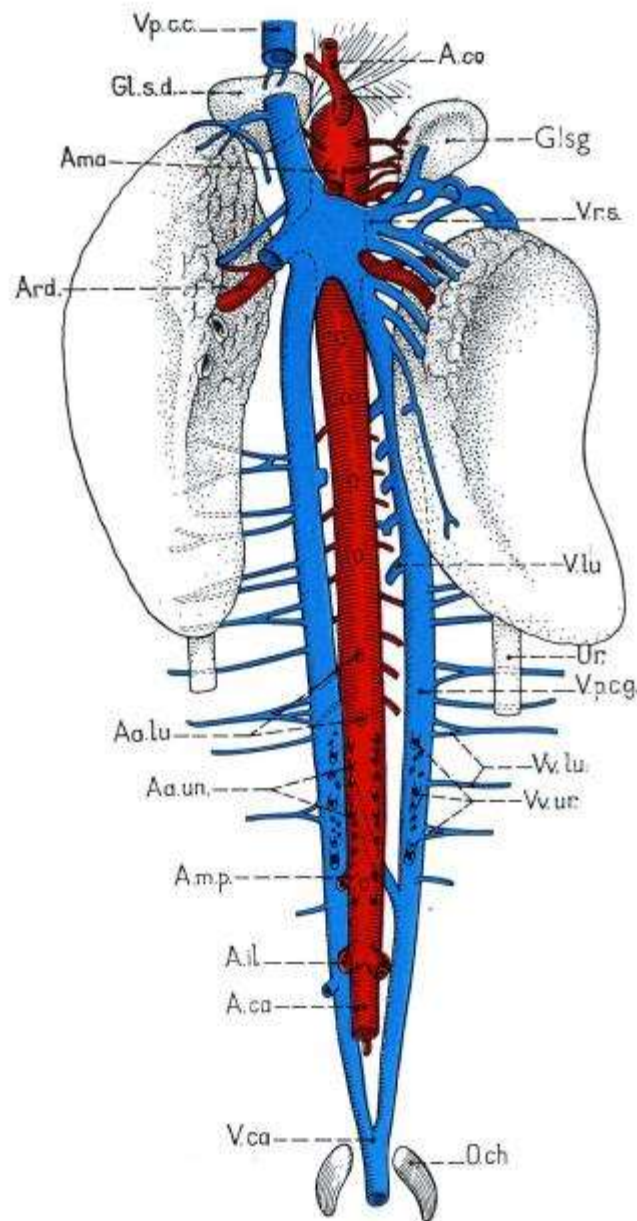


a

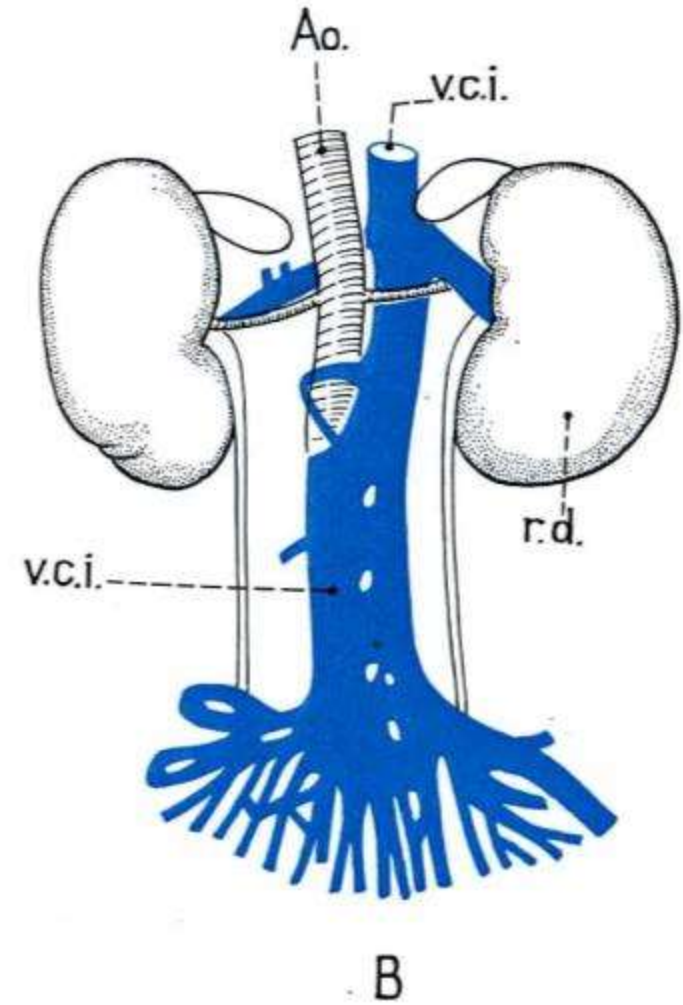
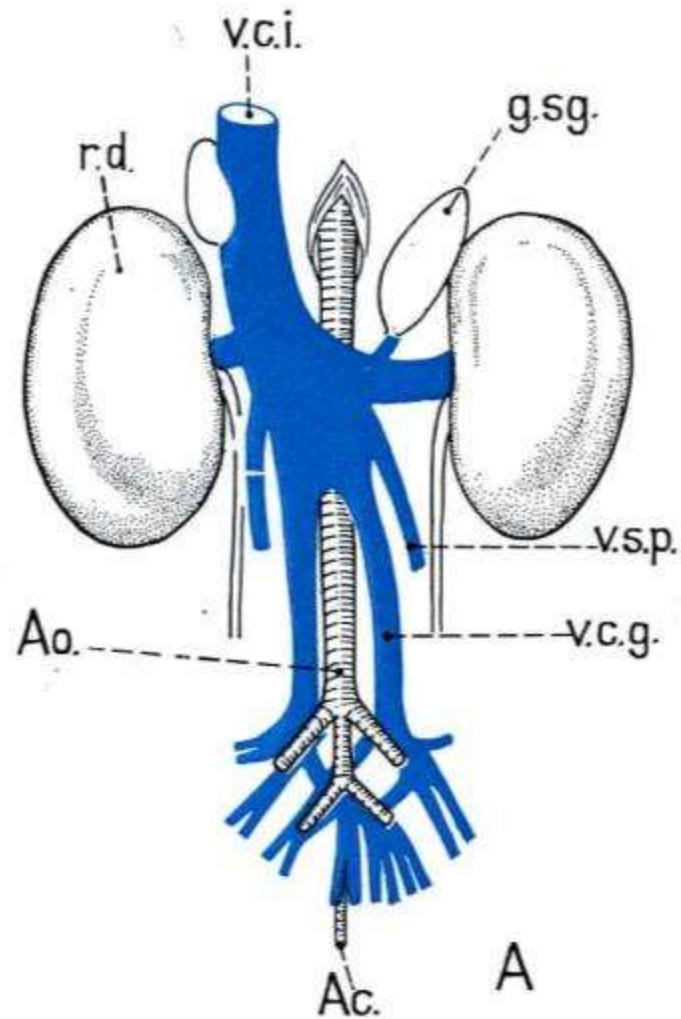


b

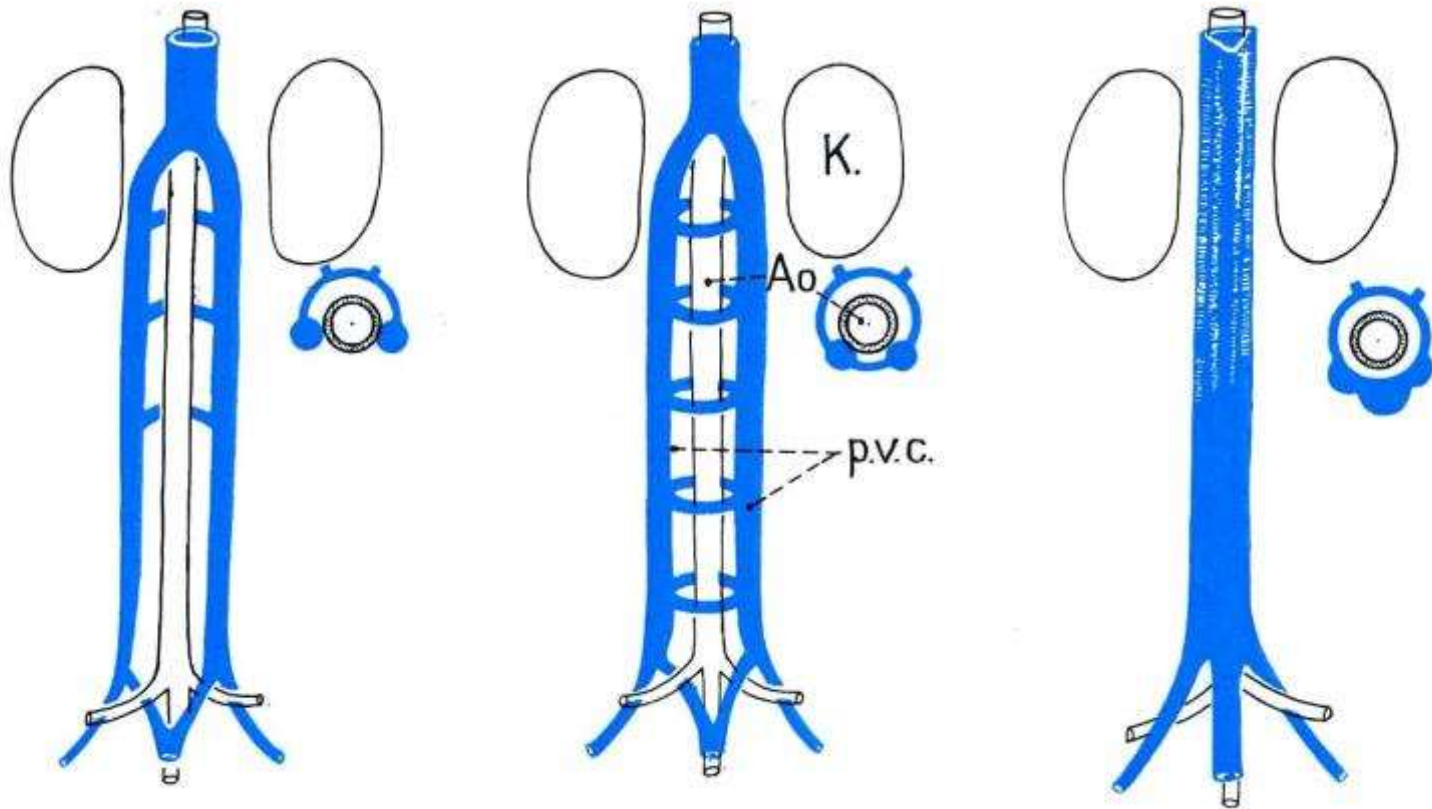




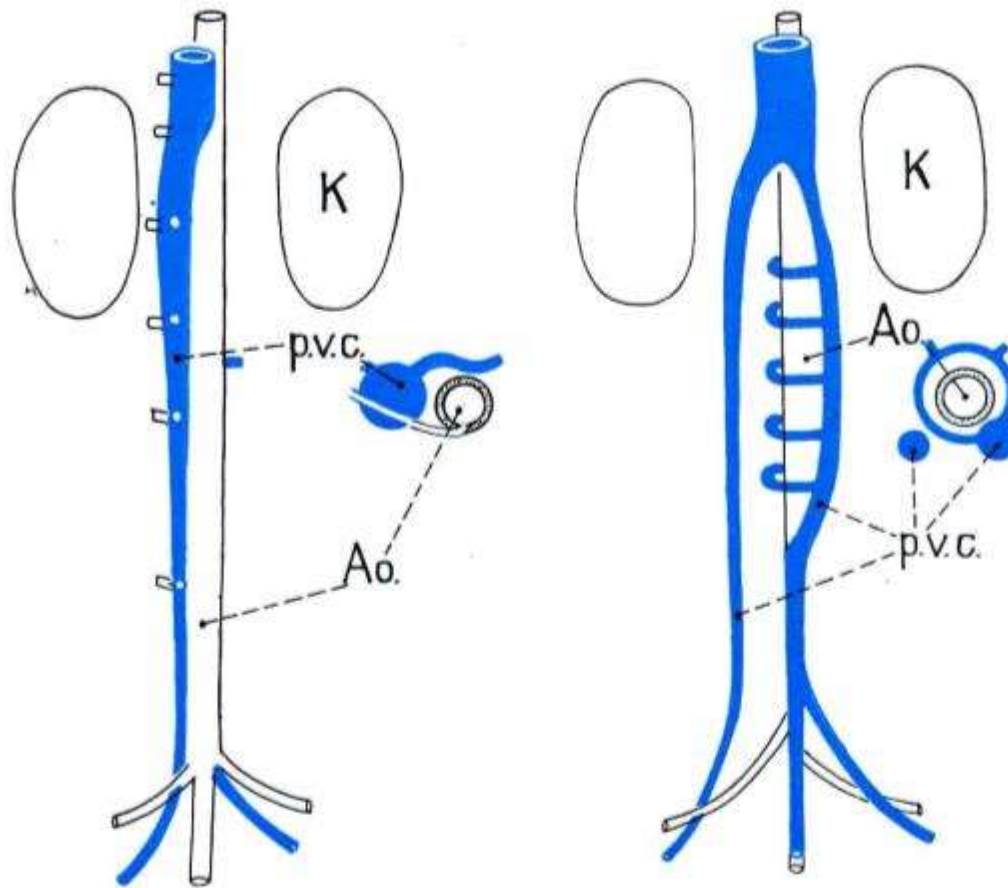
**Balaenoptera
(Cétacés)**



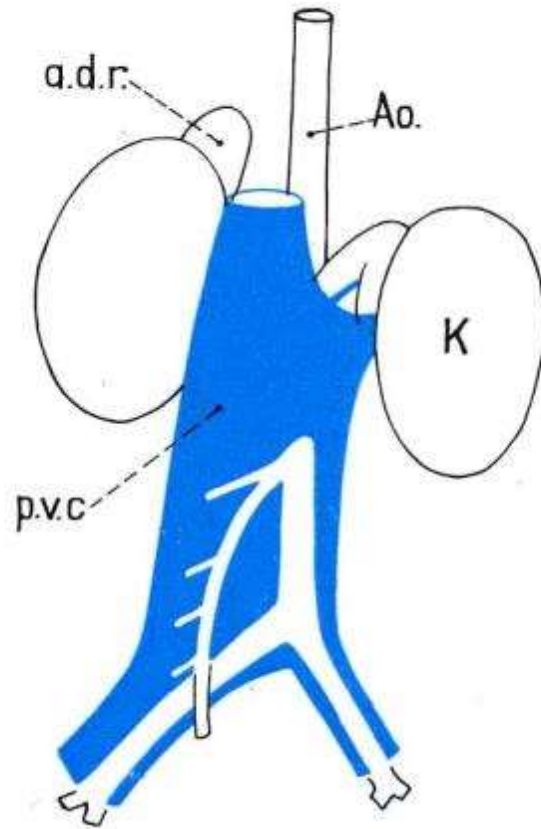
MONOTREMES : A. Echidné. B. Ornithorhynque



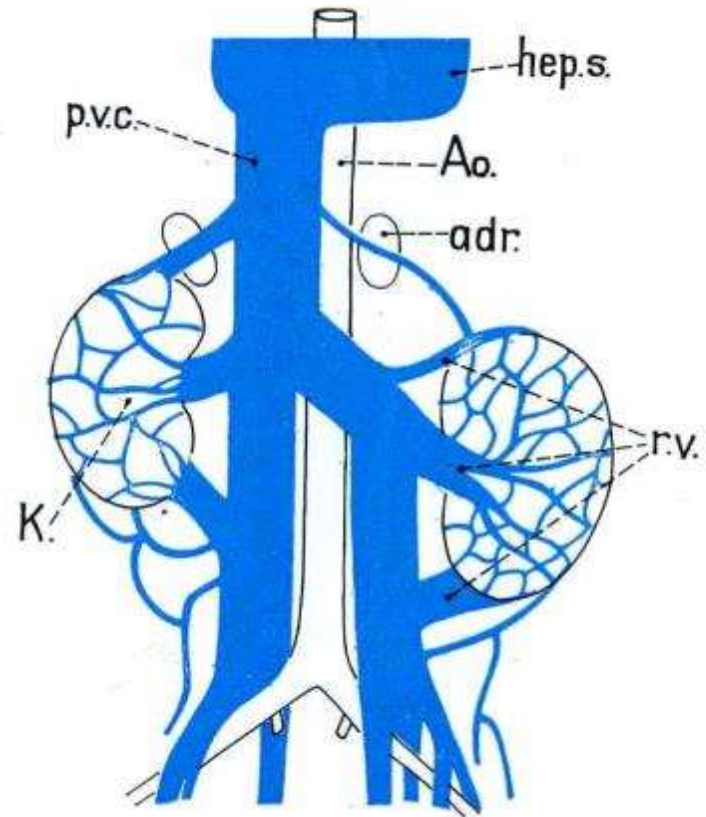
Variations chez les CETACES (1)



Variations chez les CETACES (2)

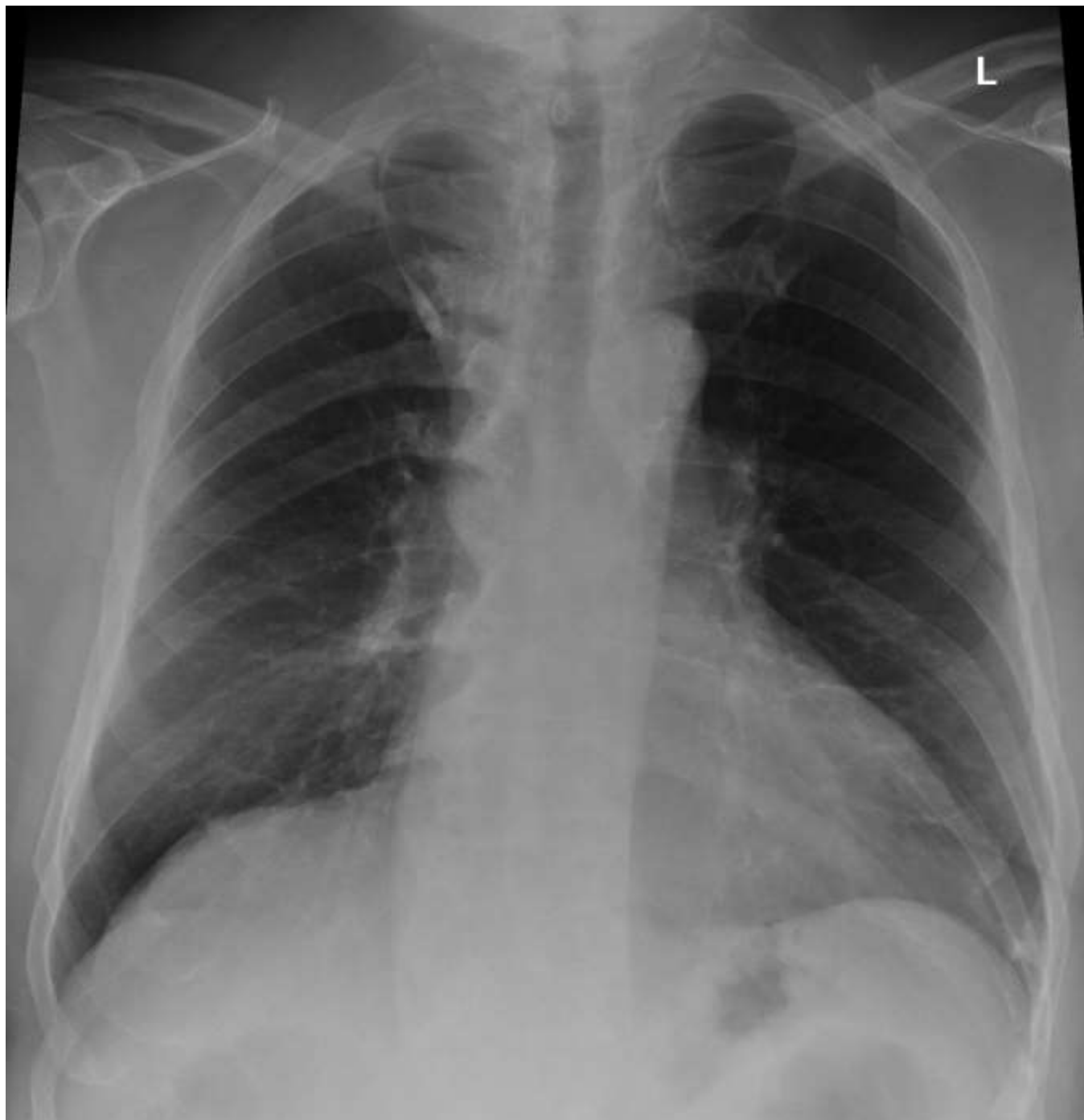


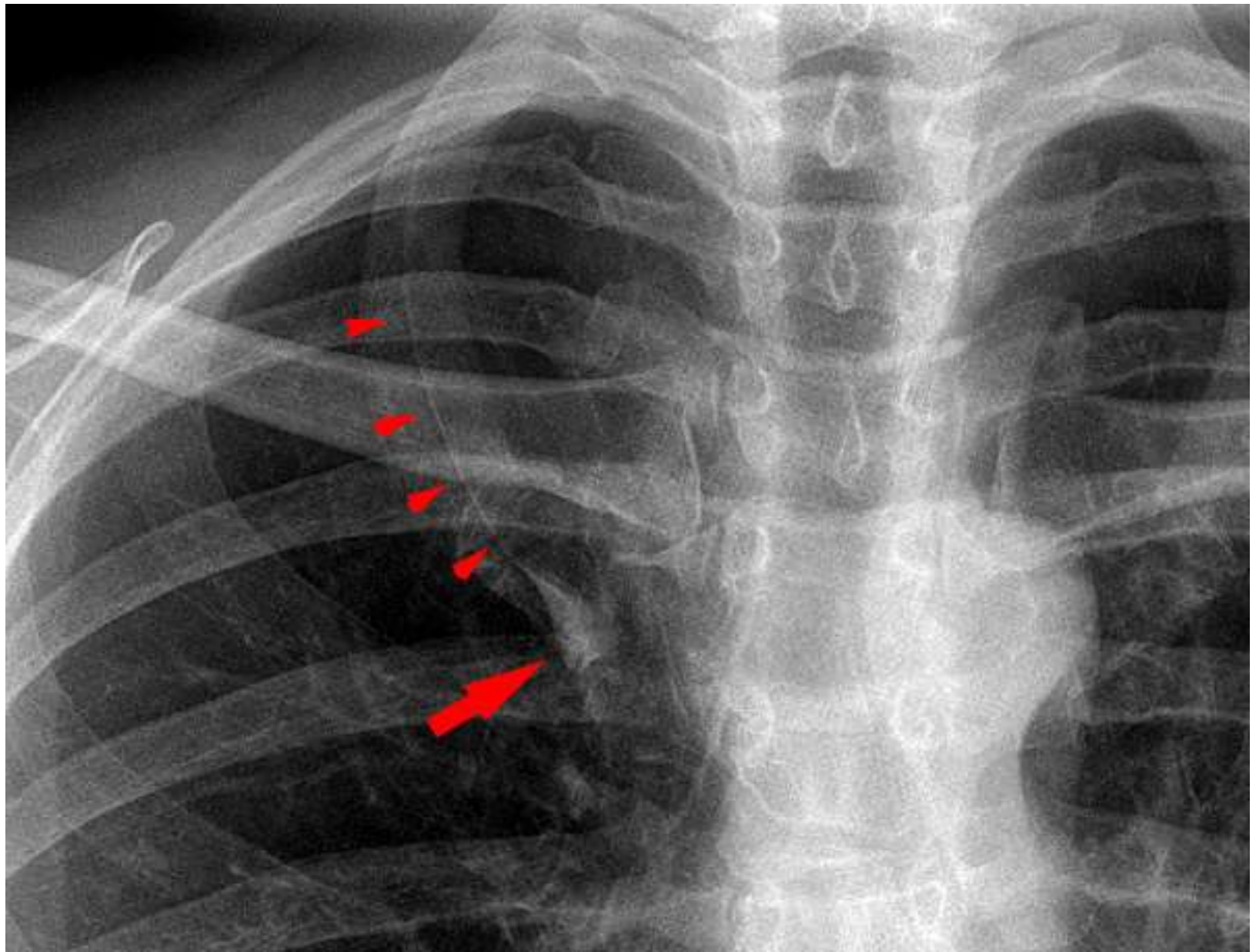
Tarsius (Primates)

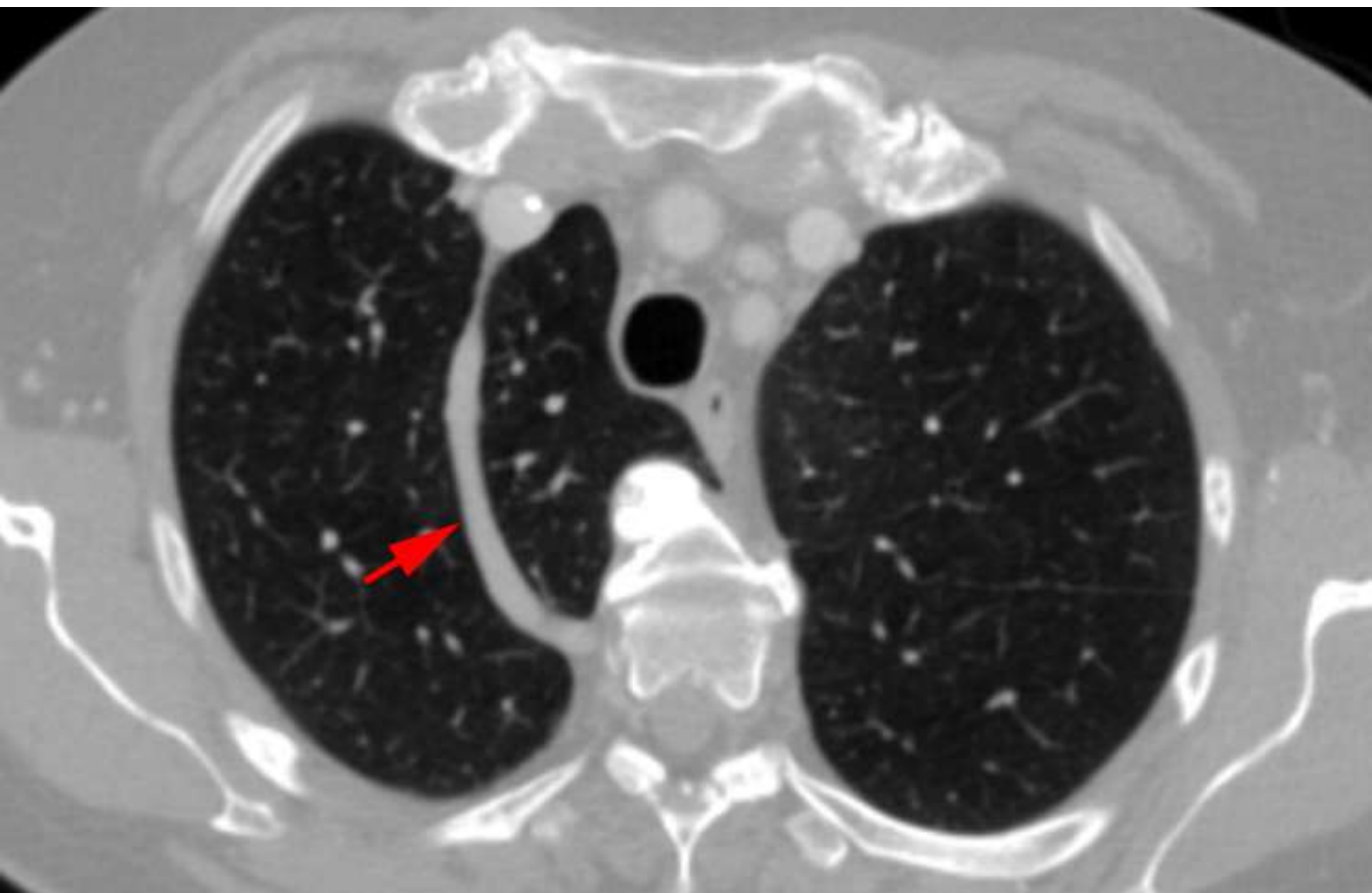


Phocaena (Pinnipèdes)

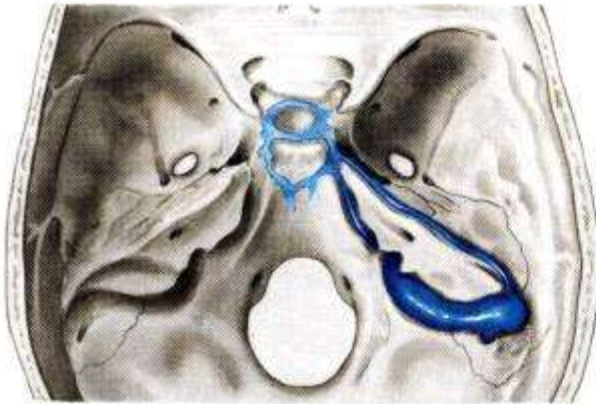
Exemples de variabilité
de la VEINE AZYGOS
= lobe azygos



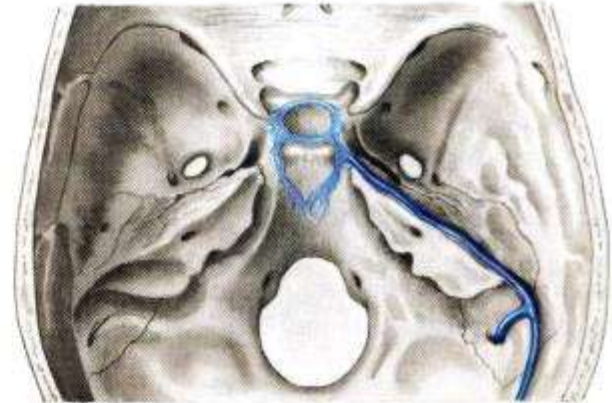




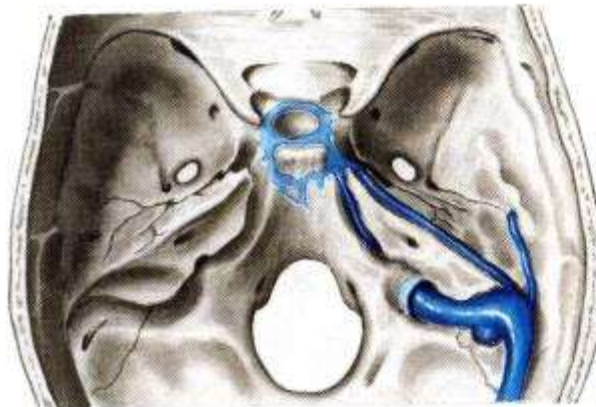
**Exemples de variabilité
des SINUS (VEINEUX)
DE LA DURE-MERE**



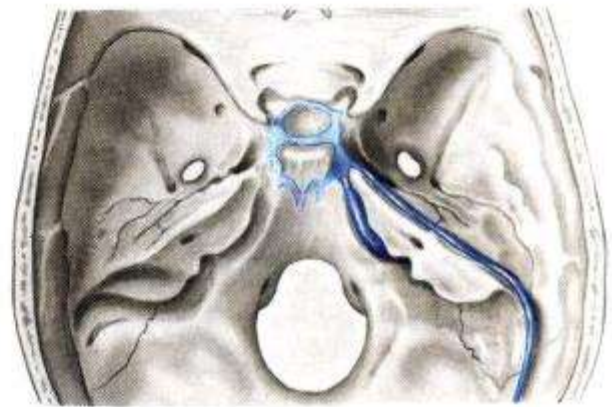
a) Sinus transversus fehlt oder ist nur fadenförmig entwickelt



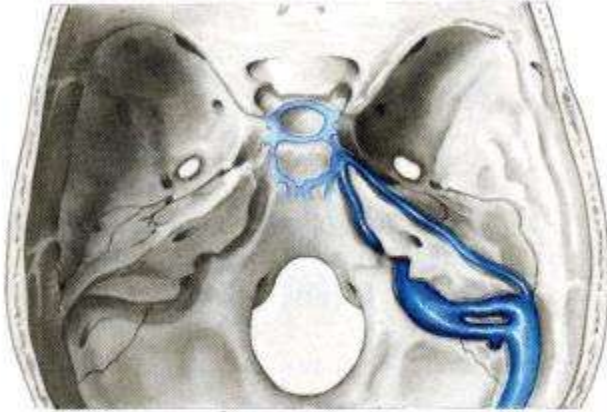
b) Englumiger Sinus transversus und Sinus petrosus superior münden in V. emissaria mastoidea ein



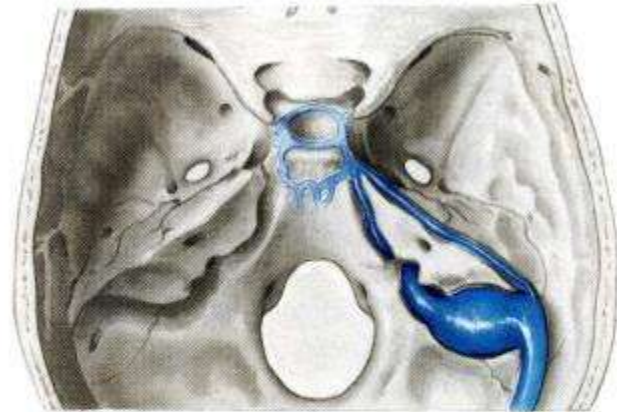
c) Sinus sigmoideus endet als blinde Tasche. Abfluß erfolgt über eine weitleumige V. emissaria mastoidea. In das obere Knie des Sinus sigmoideus mündet der Sinus petrosus superior und zusätzlich ein Sinus petrosquamosus ein



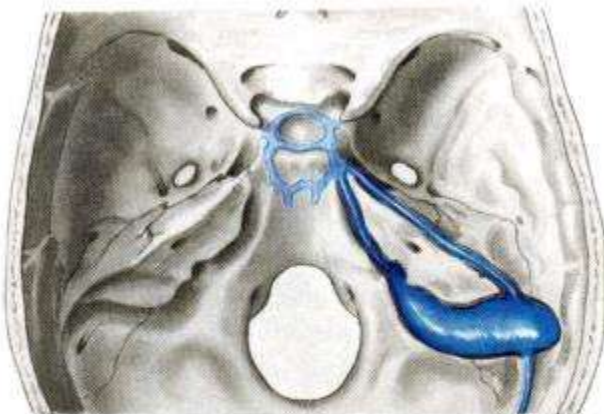
d) Sinus sigmoideus ist nicht entwickelt. Enger Sinus transversus geht in den Sinus petrosus superior über



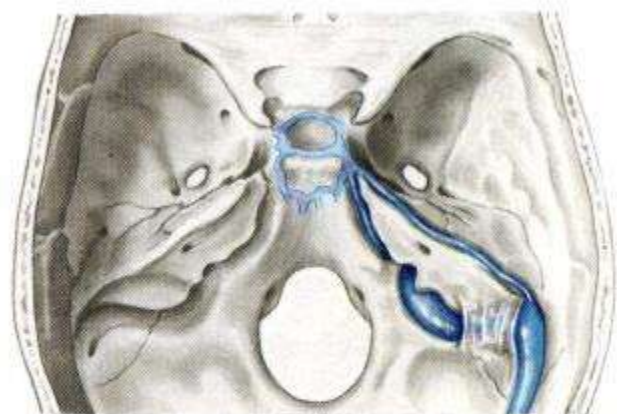
e) Sinus sigmoideus ist durch eine Knochenleiste in zwei Teilstrecken zerlegt. Die Leiste kann auch im Sinus transversus vorkommen



f) Verhältnismäßig häufig wird eine Erweiterung des Sinus sigmoideus, insbesondere an dessen basaler Seite, angetroffen

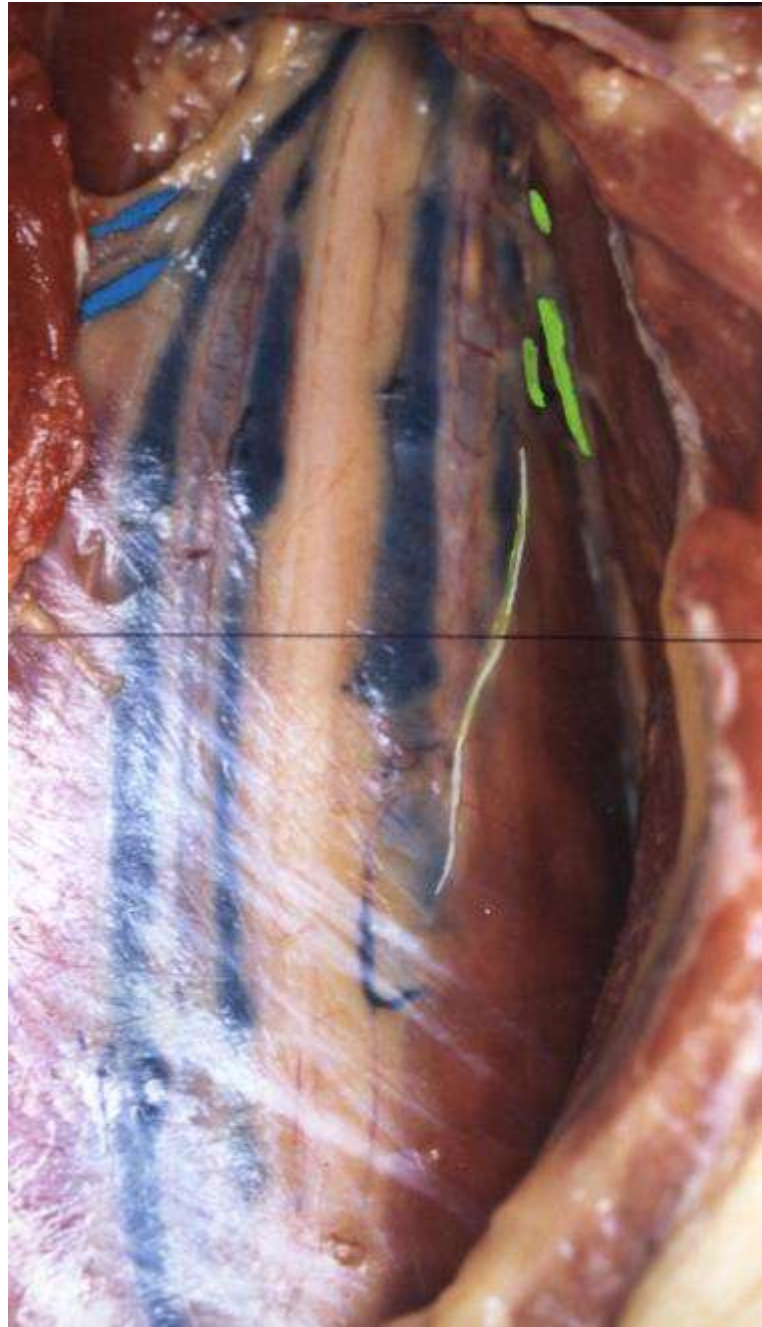


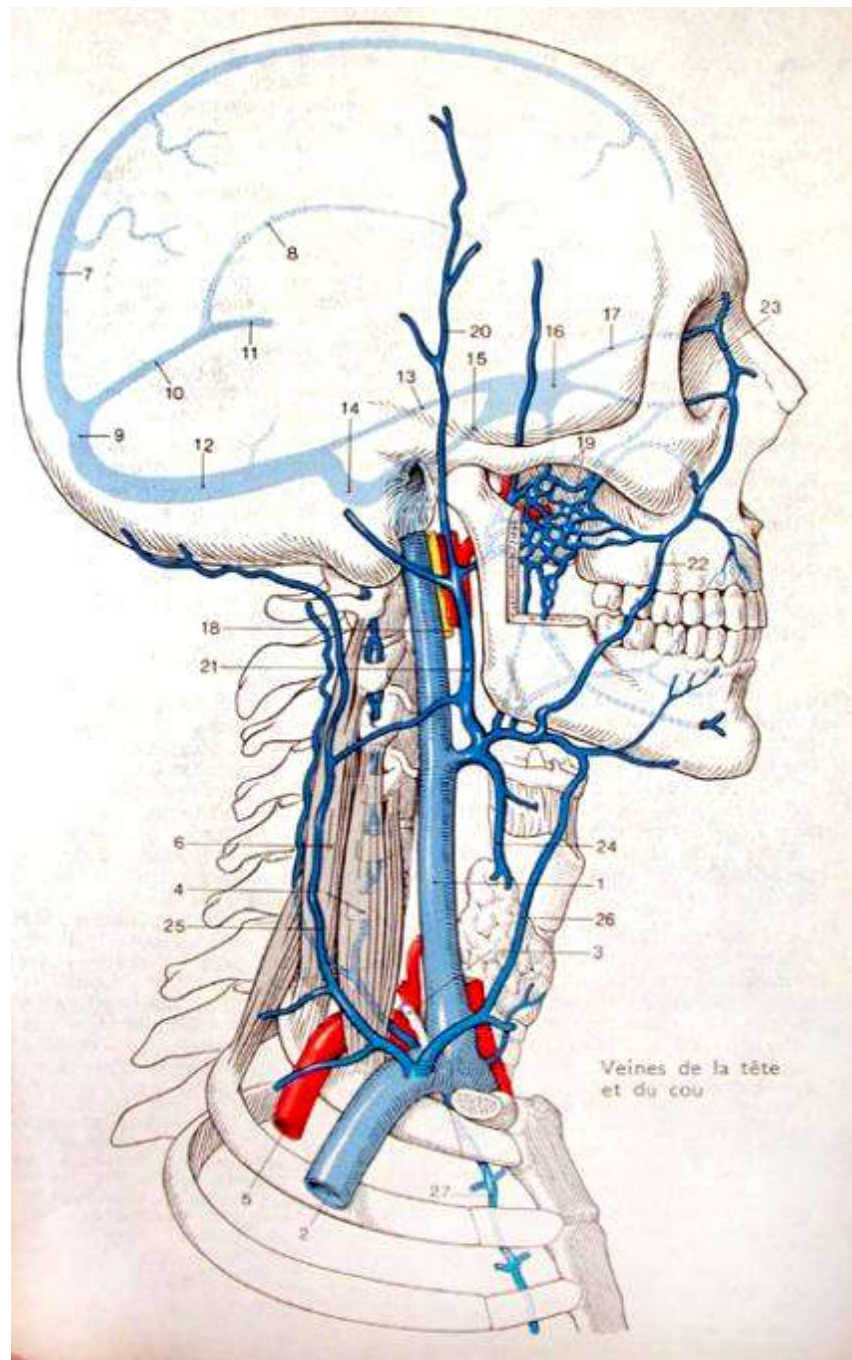
g) Sinus transversus und Sinus petrosus superior münden in erweiterten Sinus sigmoideus ein, der über eine englumige Verbindung mit der V. jugularis interna verknüpft ist



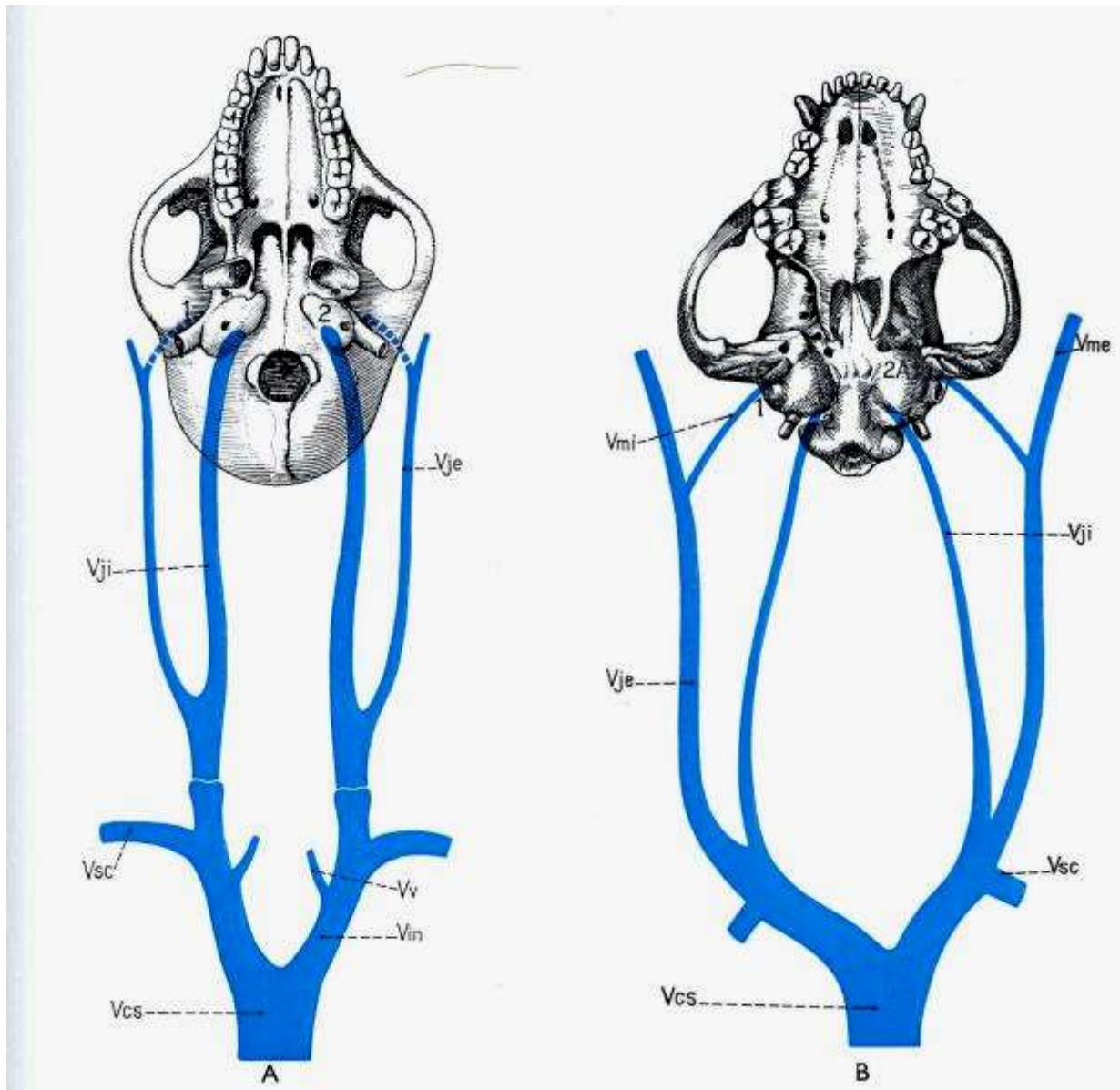
h) Sinus sigmoideus ist unterschiedlich weit von einer Knochenlamelle überdeckt

**Exemples de variabilité
des VEINES PROFONDES**





Veines de la tête
et du cou



Macaque (Primates)

Chat (Carnivores)

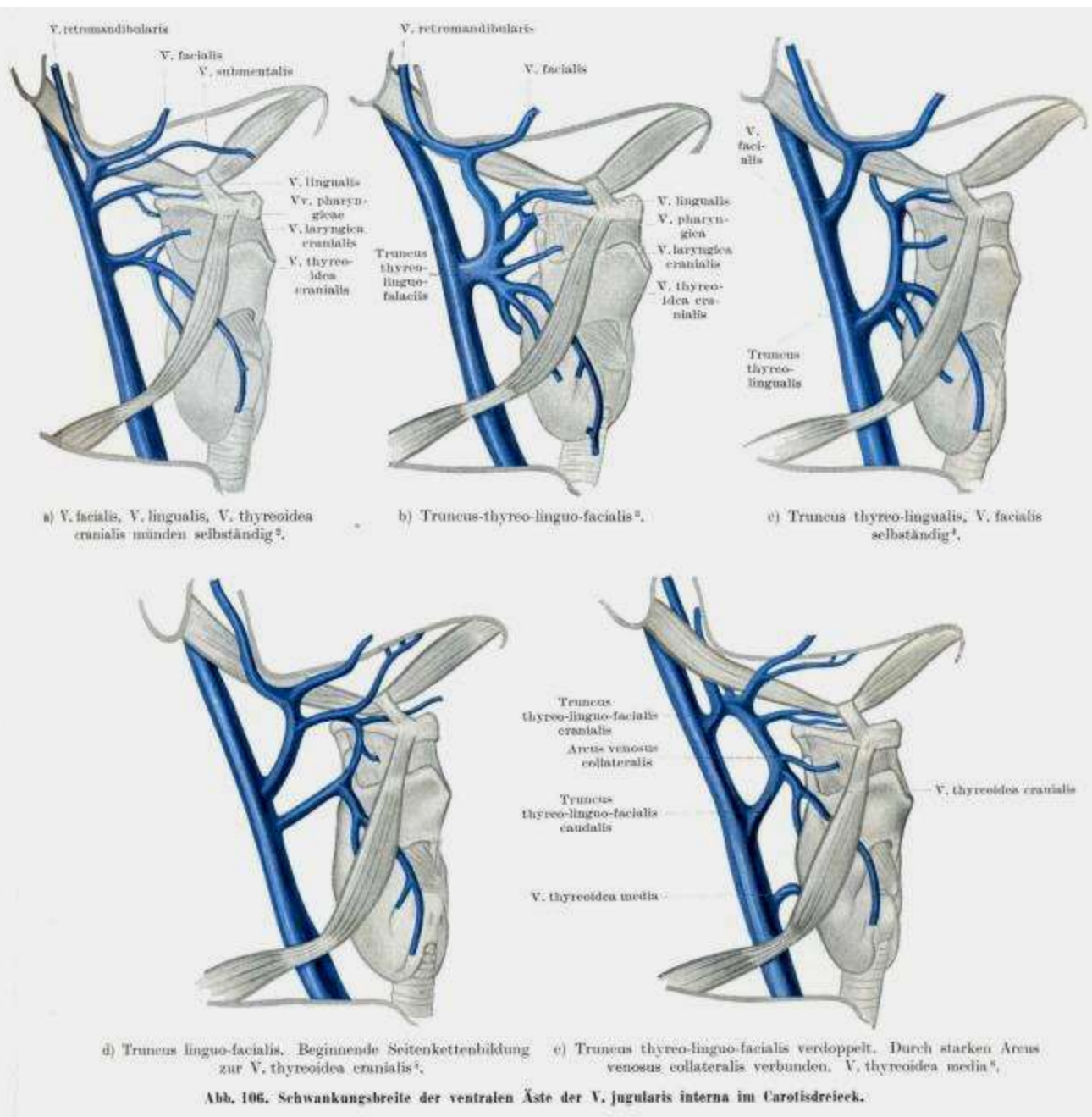
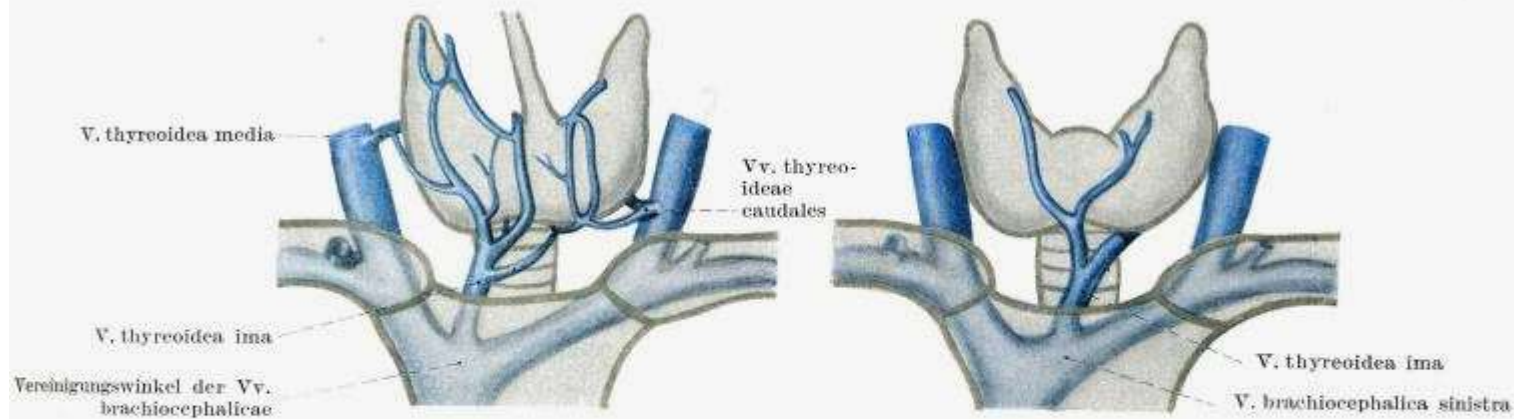
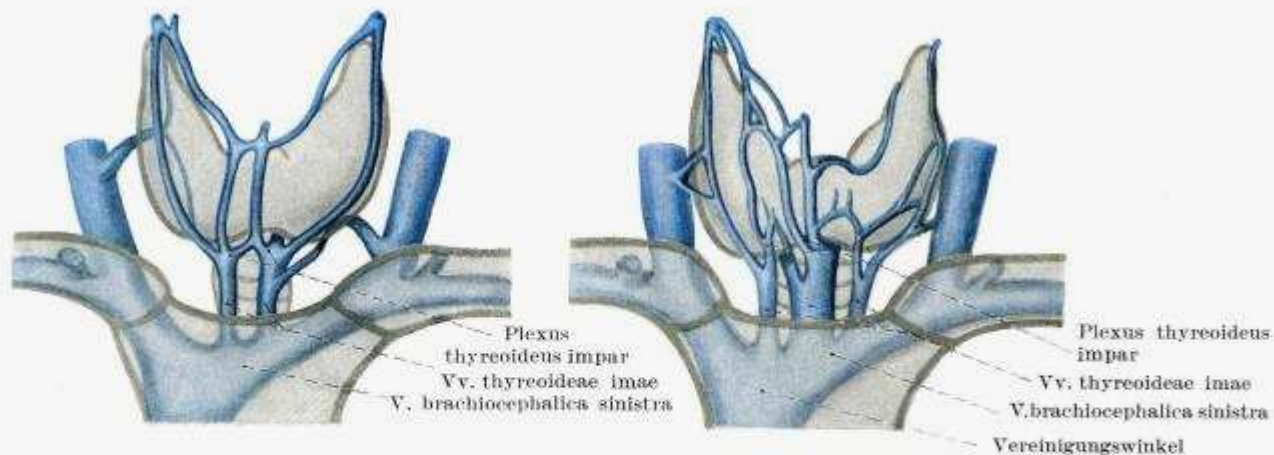


Abb. 106. Schwankungsbreite der ventralen Äste der V. jugularis interna im Carotisdreieck.



a) V. thyroidea ima einfach, mündet in den Vereinigungswinkel der beidseitigen Vv. brachiocephalicae. V. thyroidea media rechts. Vv. thyroideae caudales von der Ventral- und Dorsalfläche des Seitenlappens links¹.

b) Vv. thyroidea ima einfach, mündet in die V. brachiocephalica sinistra².



c) Vv. thyroideae imae verdoppelt, münden beide in die V. brachiocephalica sinistra. Vv. thyroideae caudales von der Dorsalfläche der Seitenlappen³.

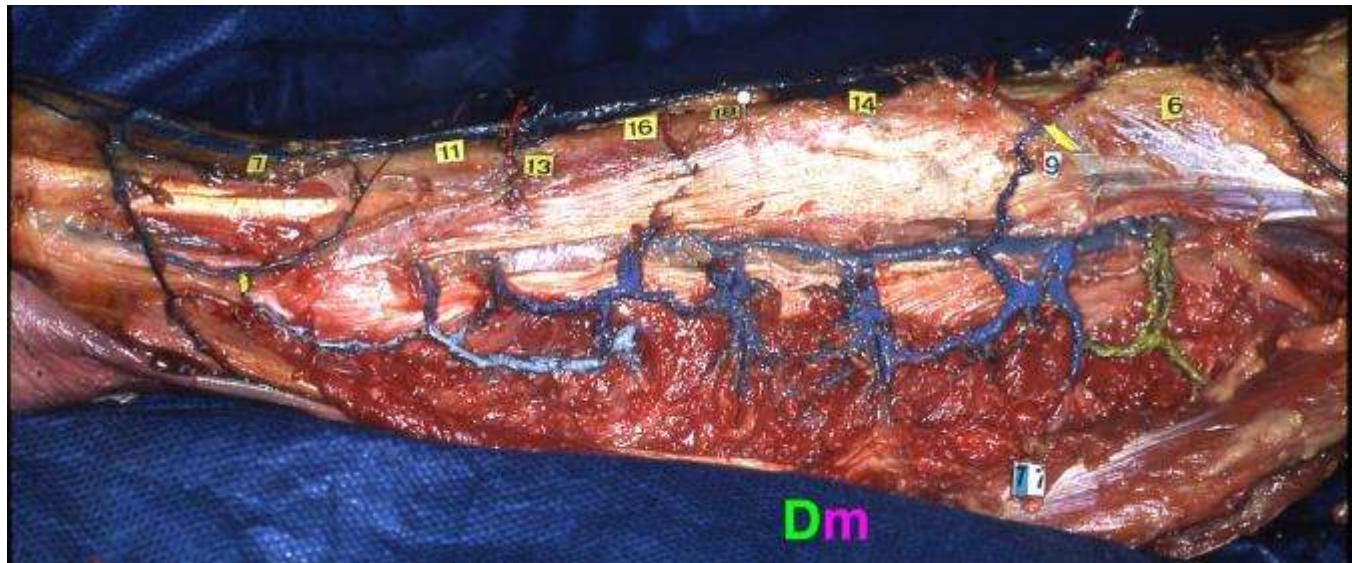
d) Plexus thyroideus impar. Vv. thyroideae imae dreifach, münden in die V. brachiocephalica sinistra und in den Vereinigungswinkel der beidseitigen Vv. thyroideae caudales beiderseits von den Ventralflächen der Seitenlappen⁴.

Abb. 167. Vv. thyroideae imae: Sonderfälle.

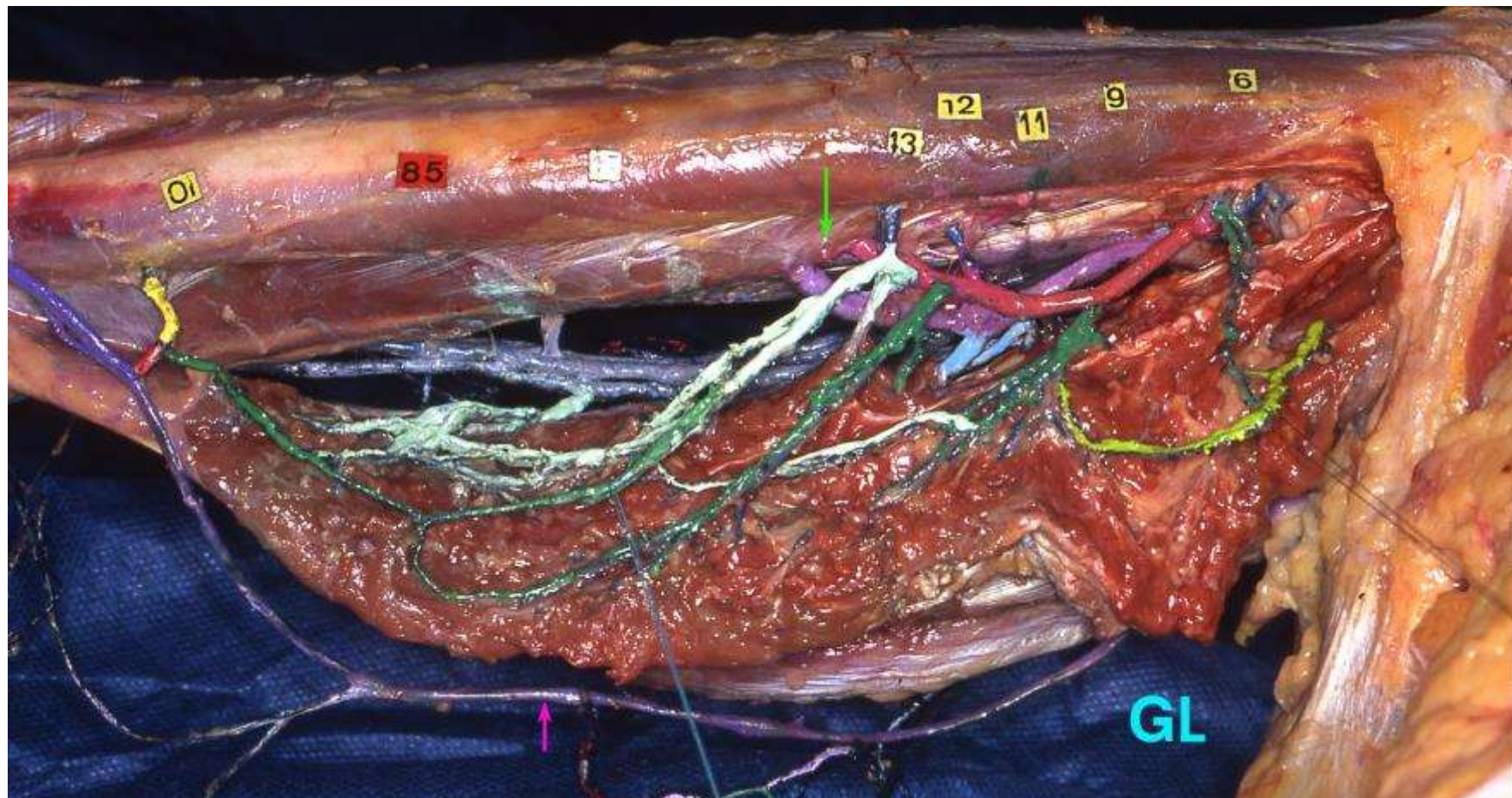


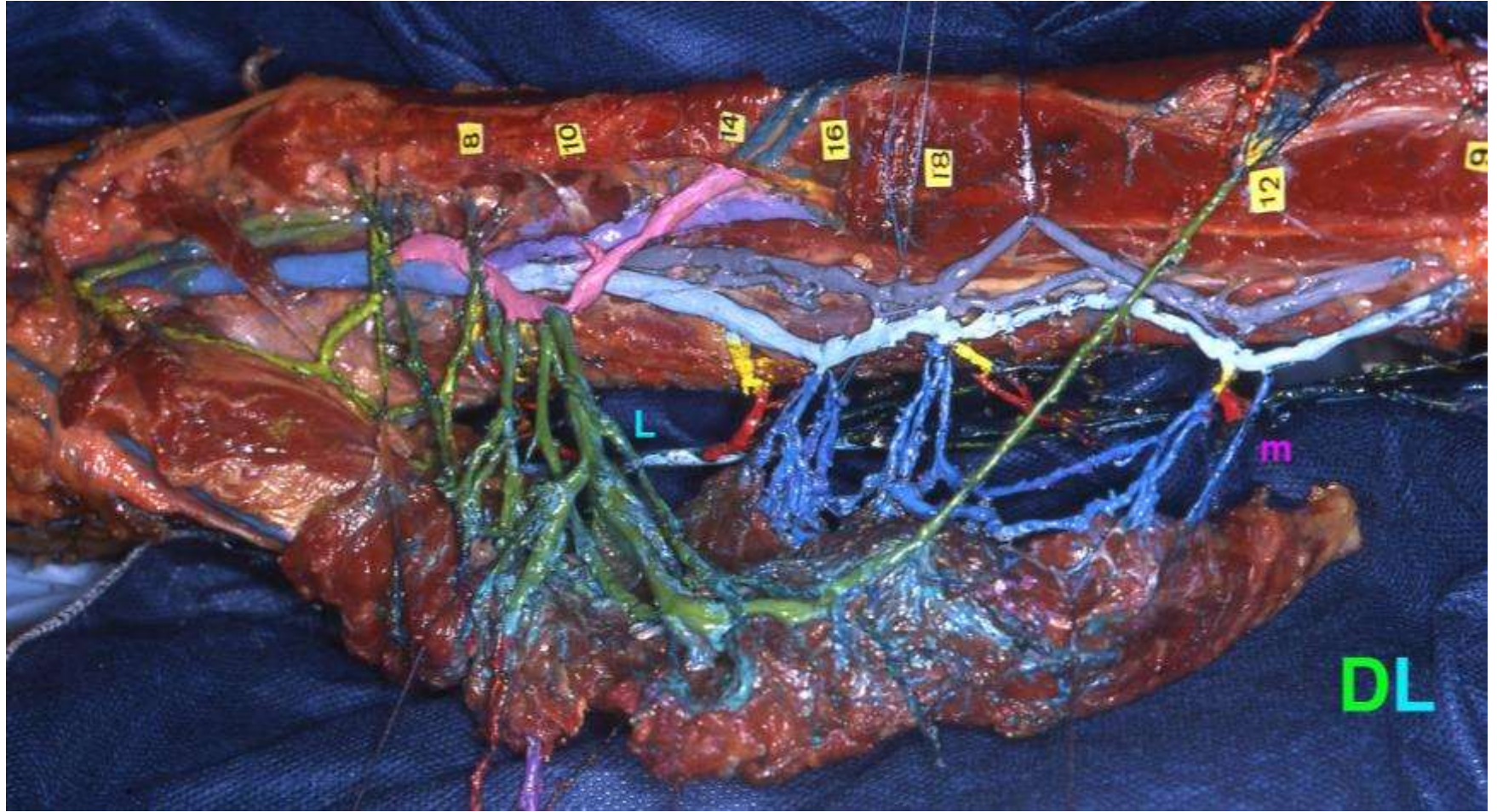














canal
collatéral
16%

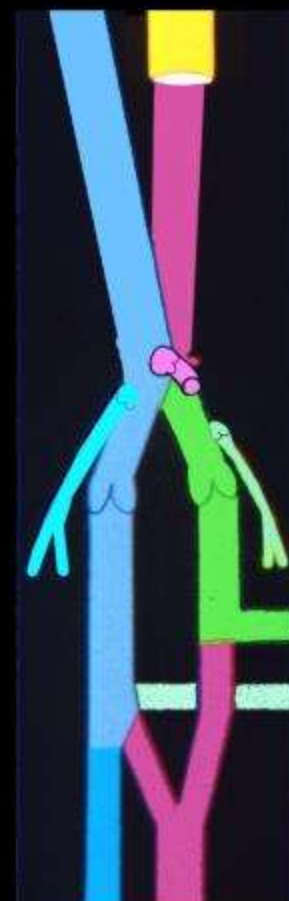


racine
faible
28%

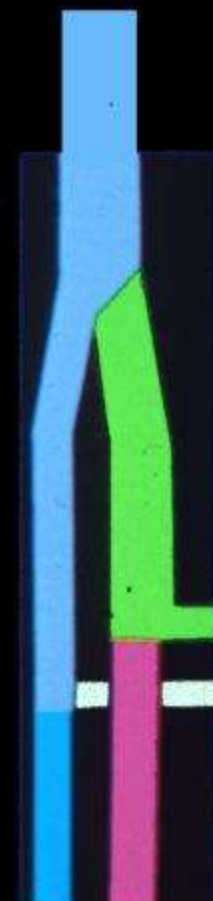
TYPE TRONCULAIRE



SCHEMA GENERAL

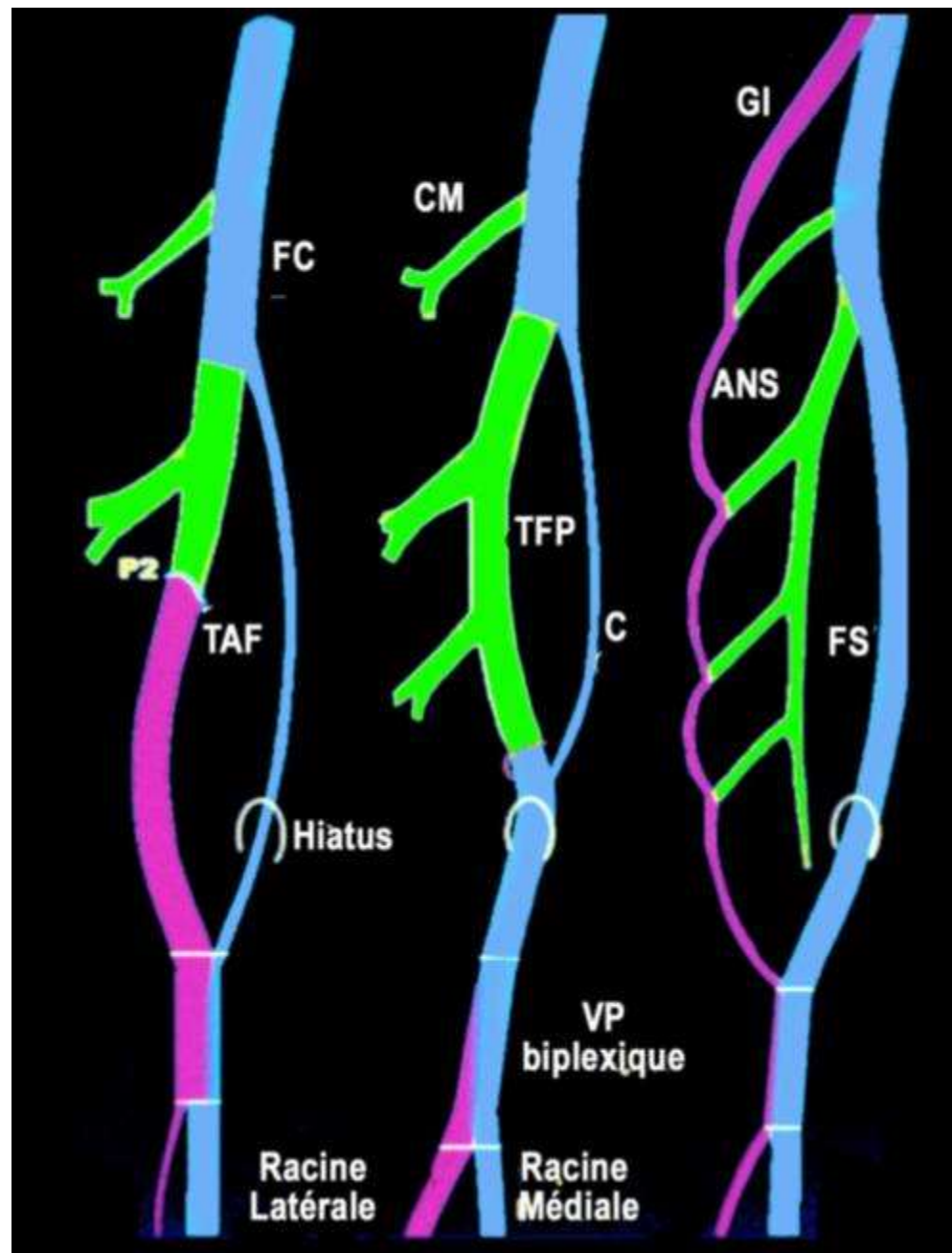


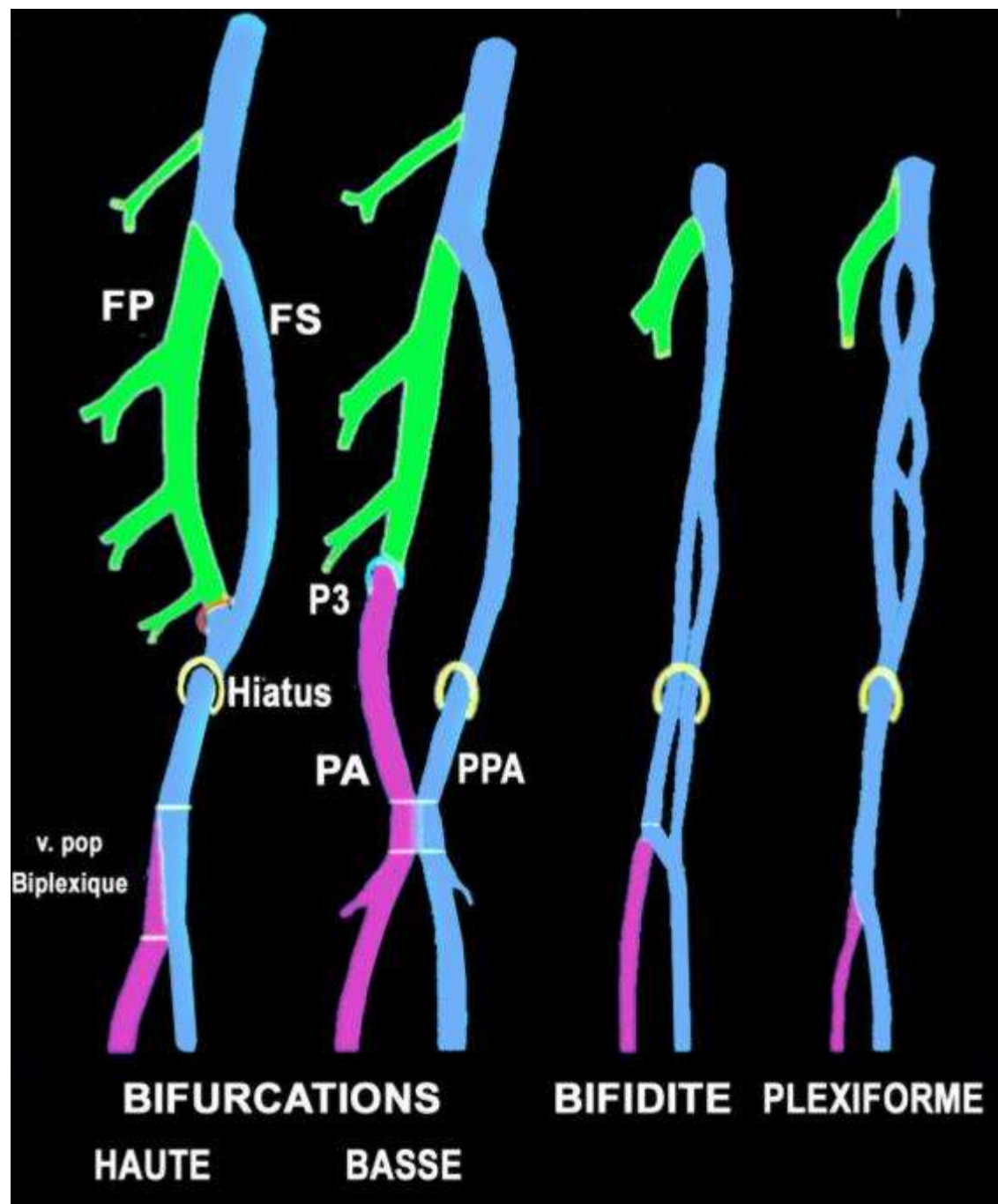
racine équilibrée 24%



asymétrique 35%

TYPE BI-RADICULAIRE VRAI





Exemples de variabilité
des VEINES SUPERFICIELLES
(= cutanées = subcutanées)

« M » VEINEUX DU PLI DU COUDE

M

« M » VEINEUX DU PLI DU COUDE

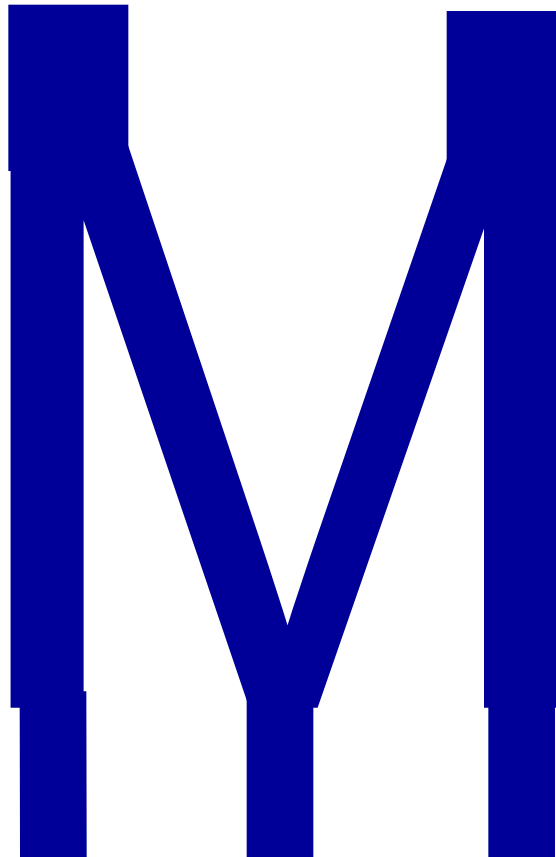
V. CEPHALIQUE

V. BASILIQUE

V. RADIALE

V. ULNAIRE

V. MEDIANE



« M » VEINEUX DU PLI DU COUDE

V. CEPHALIQUE

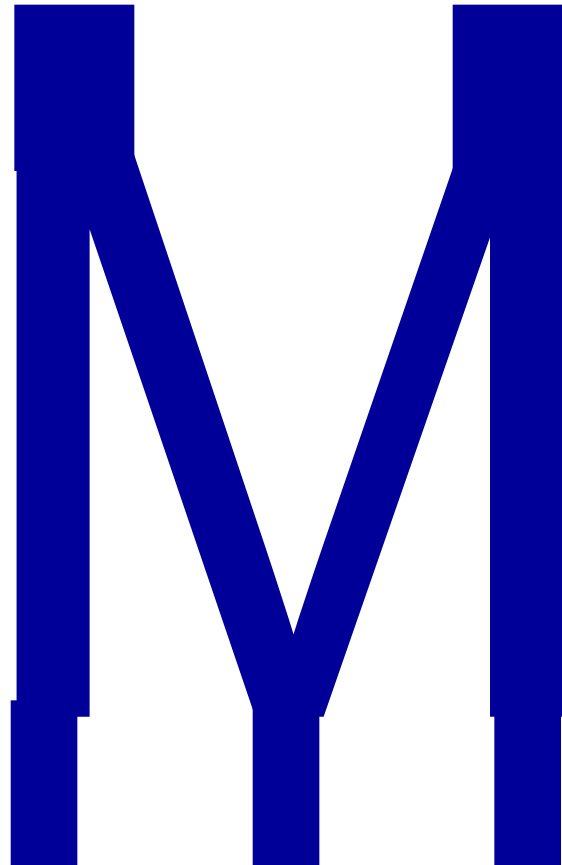
V. BASILIQUE

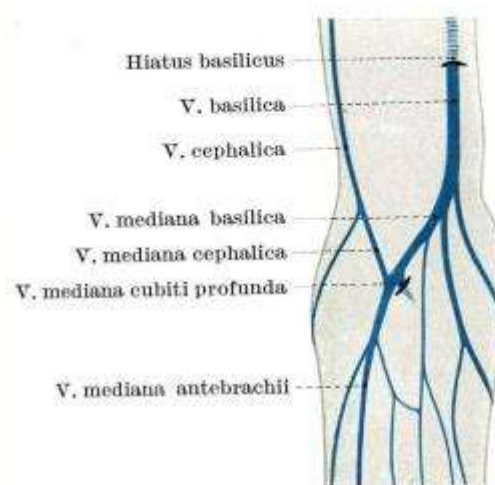
10 % DES CAS

V. RADIALE

V. ULNAIRE

V. MEDIANE

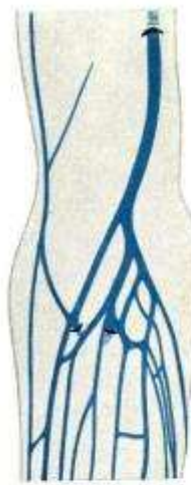




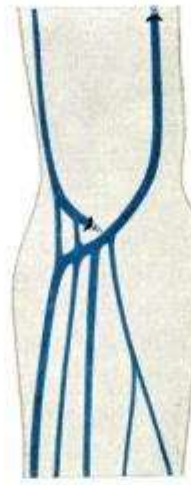
a) M-förmige Anordnung.



b) M-förmige Anordnung mit schwacher V. cephalica brachii.



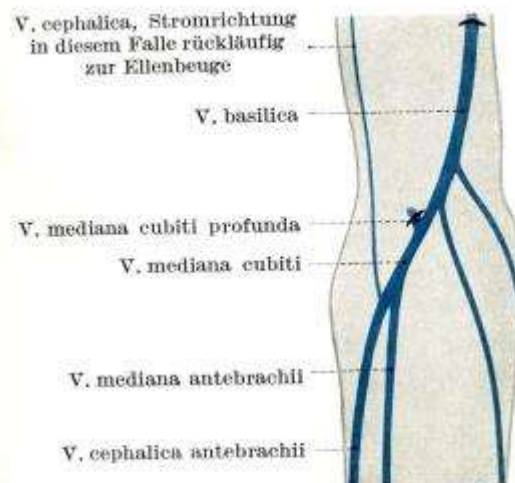
c) M-förmige Anordnung mit vielfachen Nebenstämmen am Unterarm.



d) V. basilica antebrachii fehlt. V. mediana cubiti profunda aus der V. cephalica.



e) Mehrfache Vv. medianae cubiti profundae.



f) V. mediana cubiti. V. cephalica brachii rückläufig.



g) V. cephalica brachii stärker als V. basilica.



h) Oberflächliche Querverbindung in der Ellenbeuge fehlt. Mehrfache Vv. medianae cubiti profundae.



i) Oberflächliche Querverbindung in der Ellenbeuge fehlt. V. cephalica vollkommen selbständig.



k) Ersatz der fehlenden Ellenbeugenquerverbindungen durch Quervene am Oberarm. V. cephalica stärker als V. basilica.

VEINES SUPERFICIELLES DE LA MAIN (PALMAIRES)

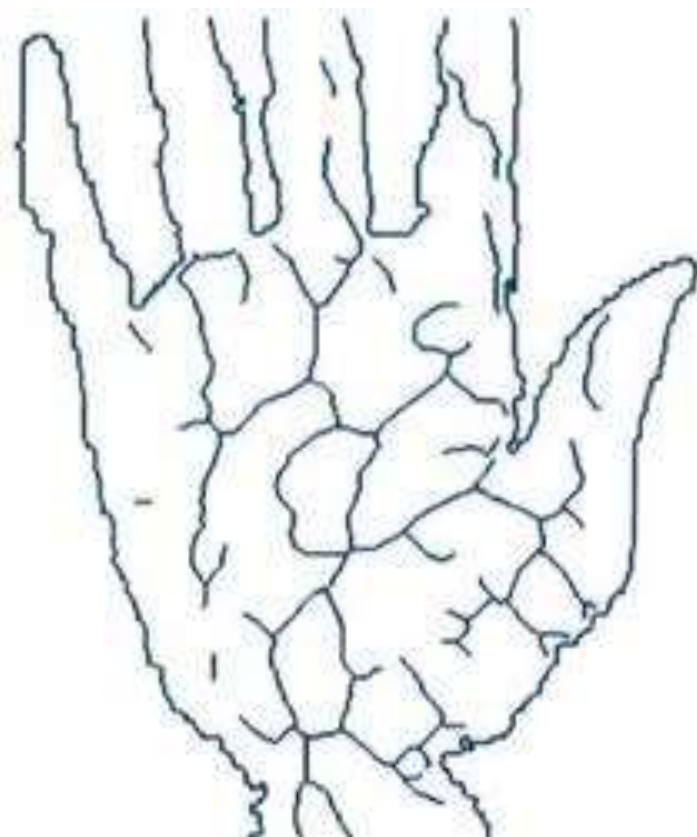
















VEINES SUPERFICIELLES DE LA MAIN (DORSALES)



**VARIABILITE
VASCULAIRE :
RESEAU VEINEUX
DORSAL DE LA
MAIN**

7.

Exemples de variabilité lymphatique

K.-H. Günter Müller

Lympho- graphie

Anatomie Technik Diagnostik



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