Heart and pericardium

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The author of the Seminar

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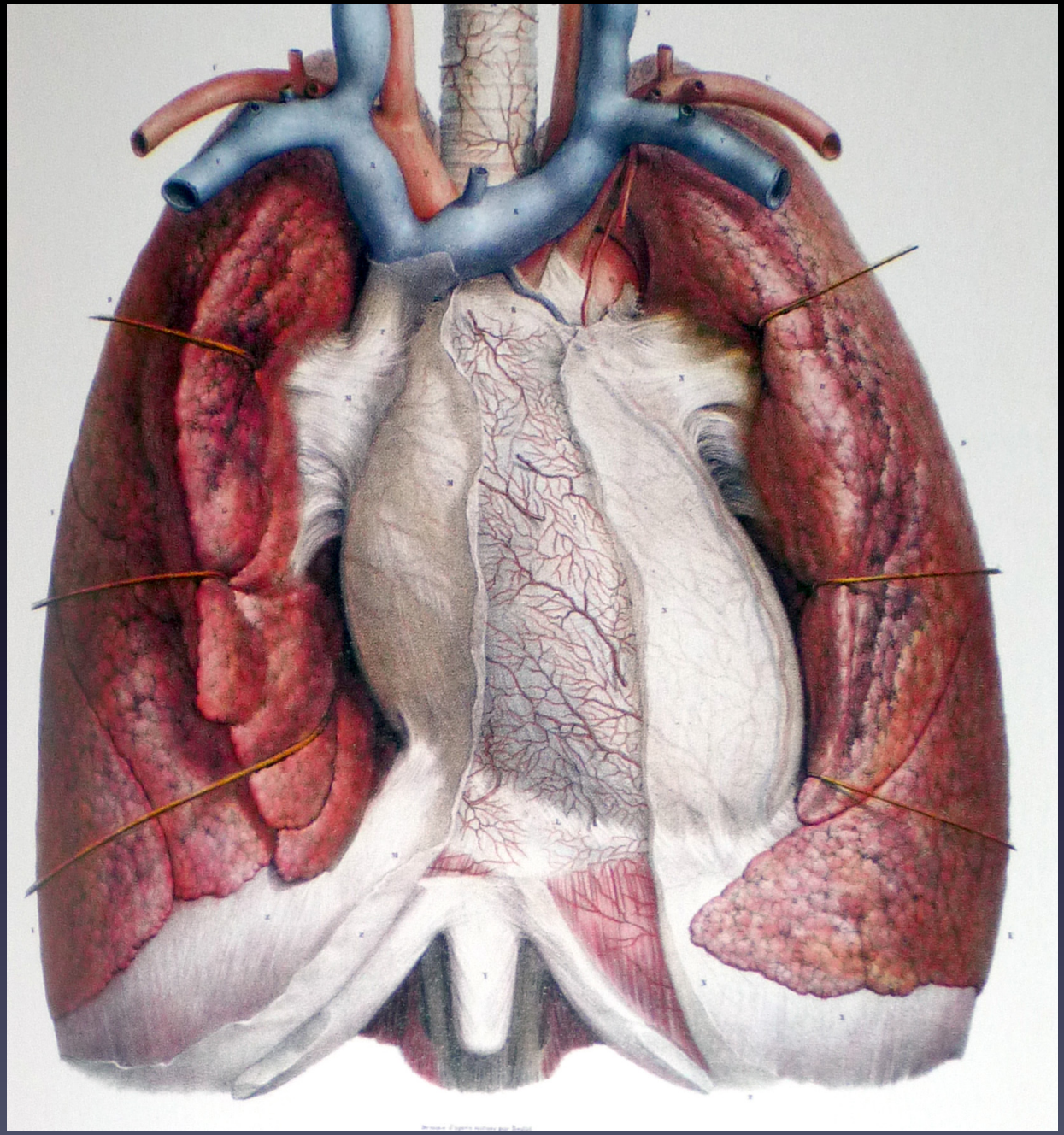
- Since 2014 : Collaborator of Finet and Williame D.O. : Workshops in France, Belgium, Spain, Germany… Structuring the osteopathic treatment : simplified procedure, visceral and urogenital osteopathy on Evidence Based Medicine and own Researches.
- http://deltadyn.be

Link to booklet

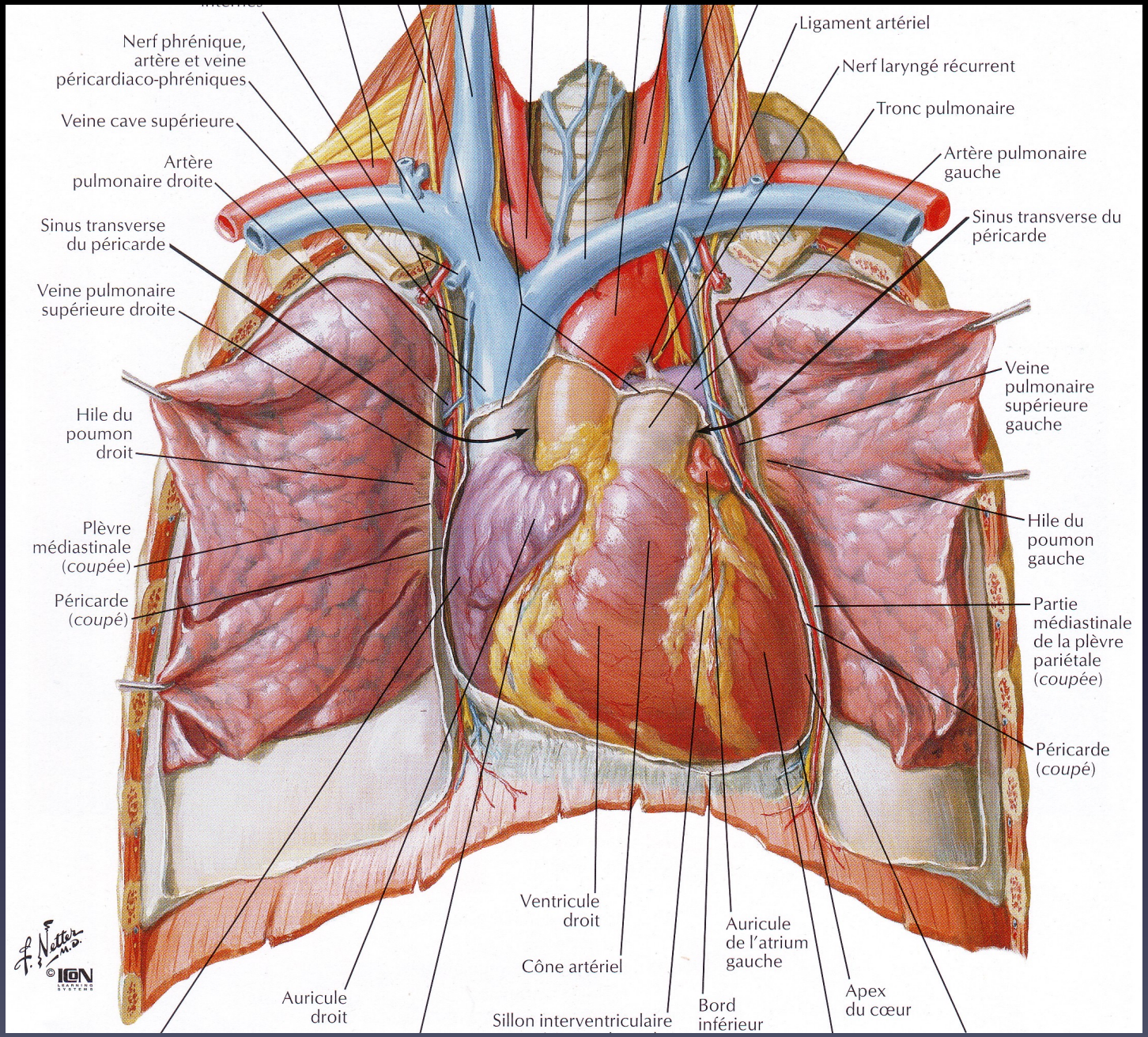
- http://exercicesdestill.net/download/pericardium



I - HEART

A - Anatomy

- Located in the anterior mediastinum, between the lungs, above the diaphragm.
- Between the sternum at the front, and the posterior mediastinum at the back.
- Shape of a pyramid, the apex near the 5th intercostal space.
- The axis leads down, front and left.


Nerf phrénique, artère et veine péricardiaco-phréniques
Veine cave supérieure
Artère pulmonaire droite
Sinus transverse du péricarde
Veine pulmonaire supérieure droite
Hile du poumon droit
Plèvre médiastinale (coupée)
Péricarde (coupé)
Ligament artériel
Nerf laryngé récurrent
Tronc pulmonaire
Artère pulmonaire gauche
Sinus transverse du péricarde
Veine pulmonaire supérieure gauche
Hile du poumon gauche
Partie médiastinale de la plèvre pariétale (coupée)
Péricarde (coupé)
Ventricule droit
Cône artériel
Auricule droit
Sillon interventriculaire
Auricule de l'atrium gauche
Bord inférieur
Apex du cœur
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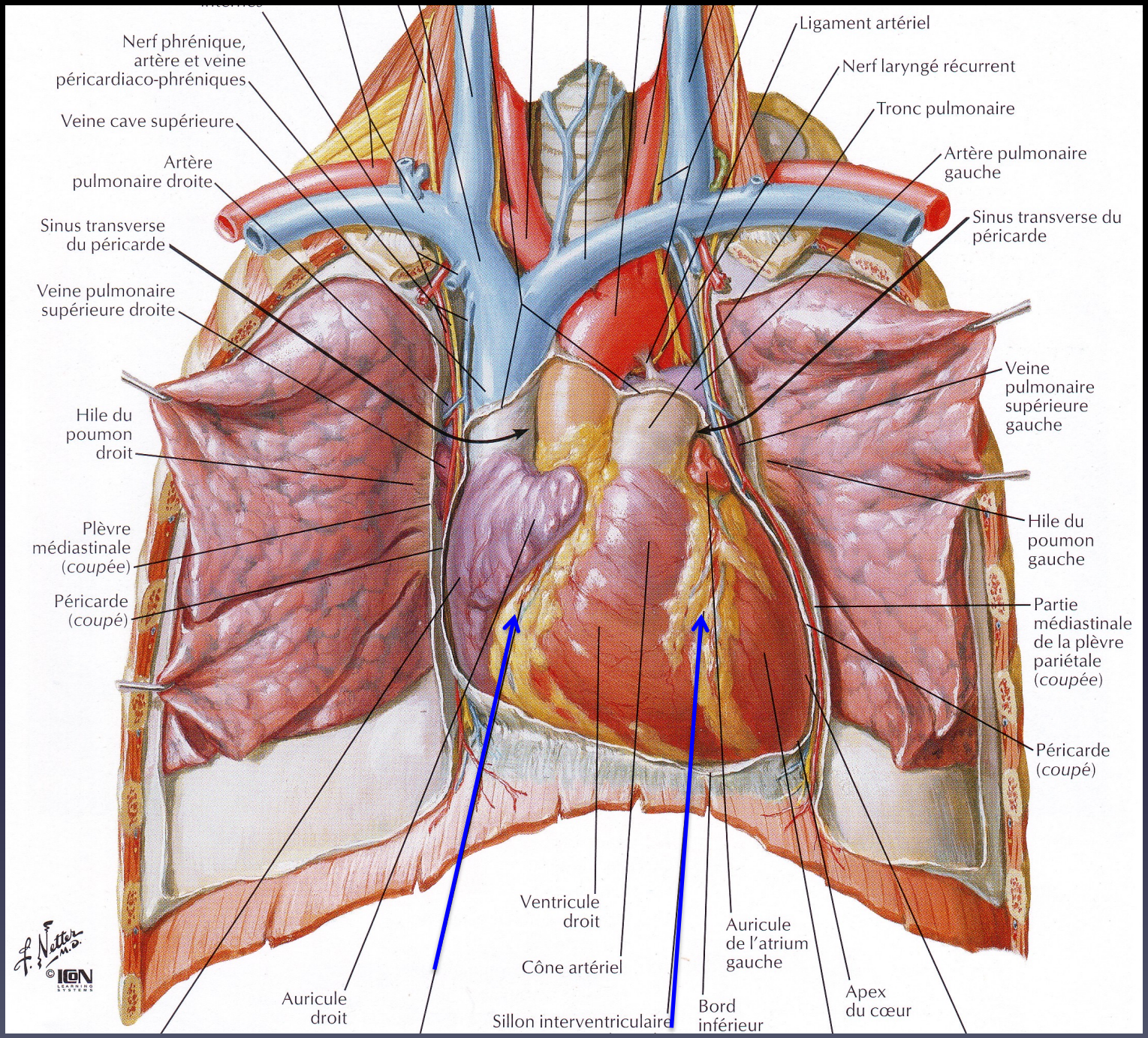
- The anterior face presents two grooves :
  - Interventricular and atrioventricular grooves : Separation line between right/left ventricles, and atriums/ventricles.
- 4 cavities : atriums and ventricles.
- Right heart : Right atrium communicates with the right ventricle by the tricuspid opening.
- Left heart : Left atrium communicates with the left ventricle by the mitral opening.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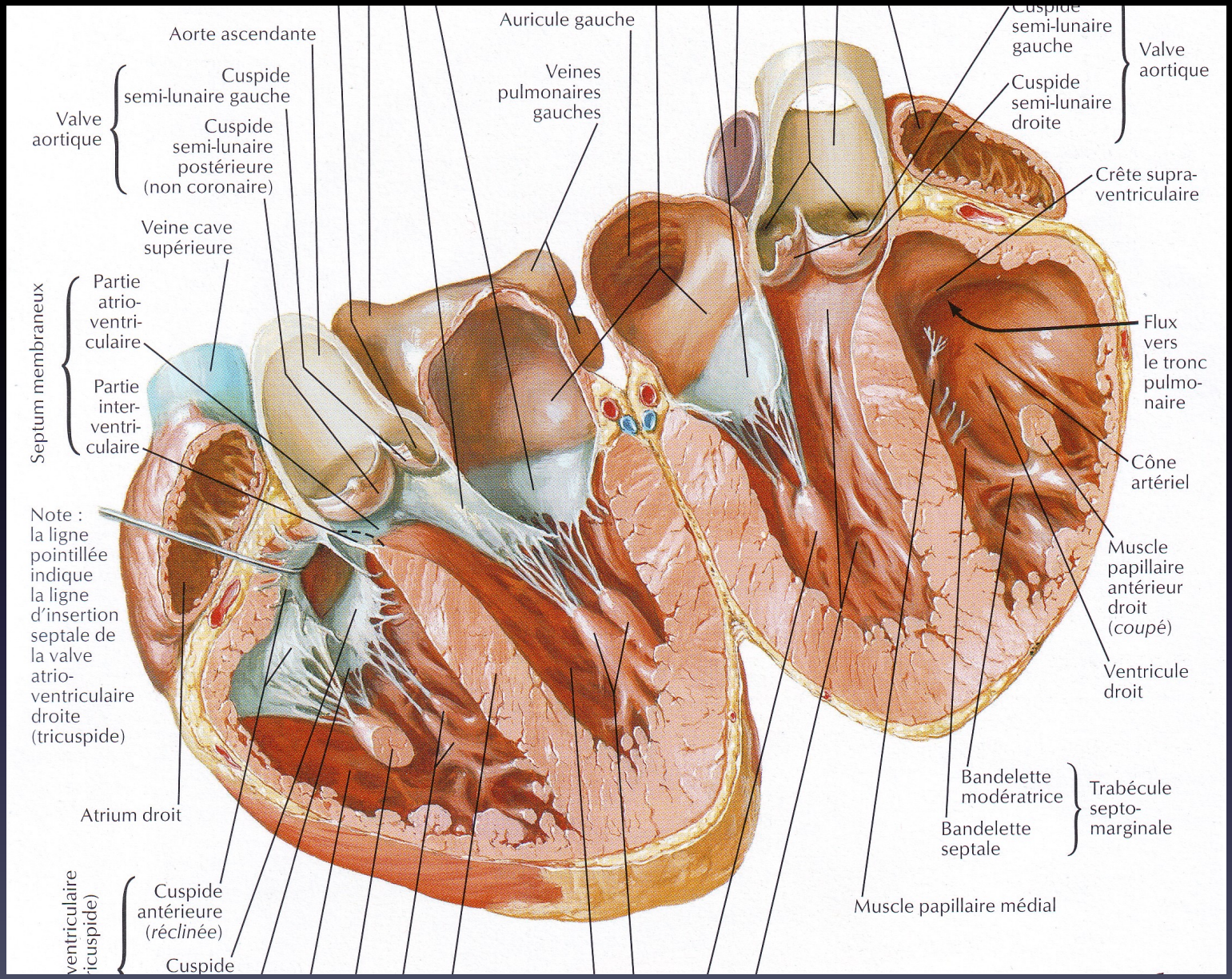
Aorte ascendante
Auricule gauche
Cuspide semi-lunaire gauche
Cuspide semi-lunaire droite
Valve aortique
Valve aortique
Cuspide semi-lunaire gauche
Cuspide semi-lunaire postérieure (non coronaire)
Veines pulmonaires gauches
Crête supra-ventriculaire
Veine cave supérieure
Septum membraneux
Partie atrio-ventri-culaire
Partie inter-ventri-culaire
Flux vers le tronc pulmo-naire
Cône artériel
Note : la ligne pointillée indique la ligne d'insertion septale de la valve atrio-ventriculaire droite (tricuspide)
Muscle papillaire antérieur droit (coupé)
Ventricule droit
Atrium droit
Bandelette modératrice
Trabécule septo-marginale
Bandelette septale
Muscle papillaire médial
Cuspide antérieure (réclinée)
Cuspide

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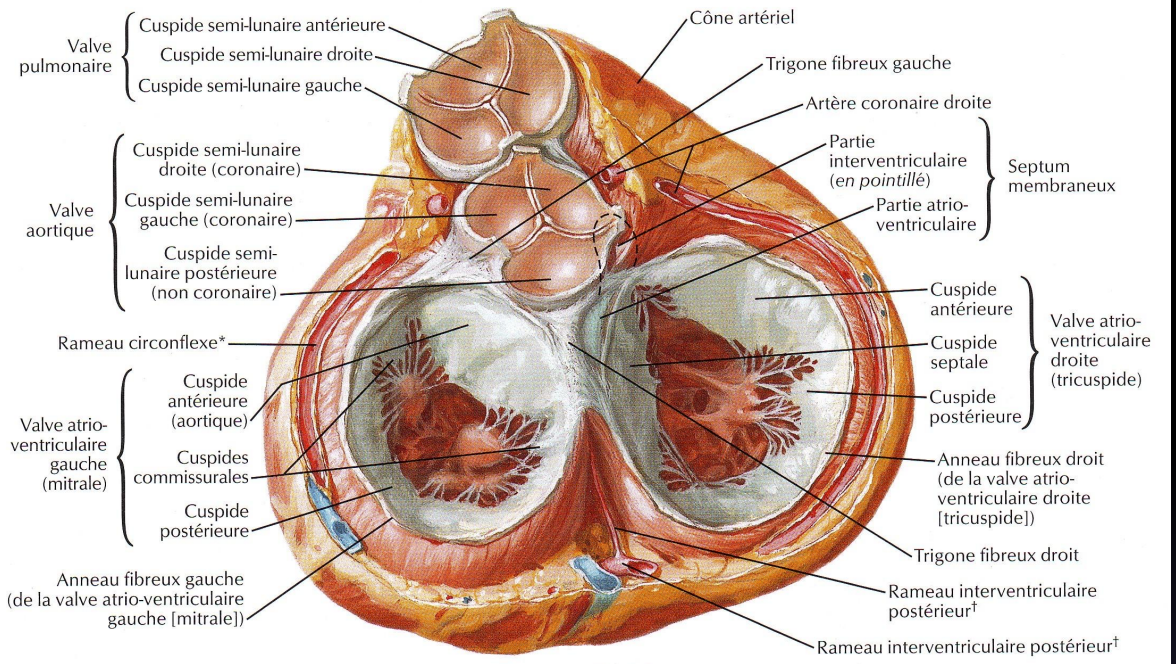
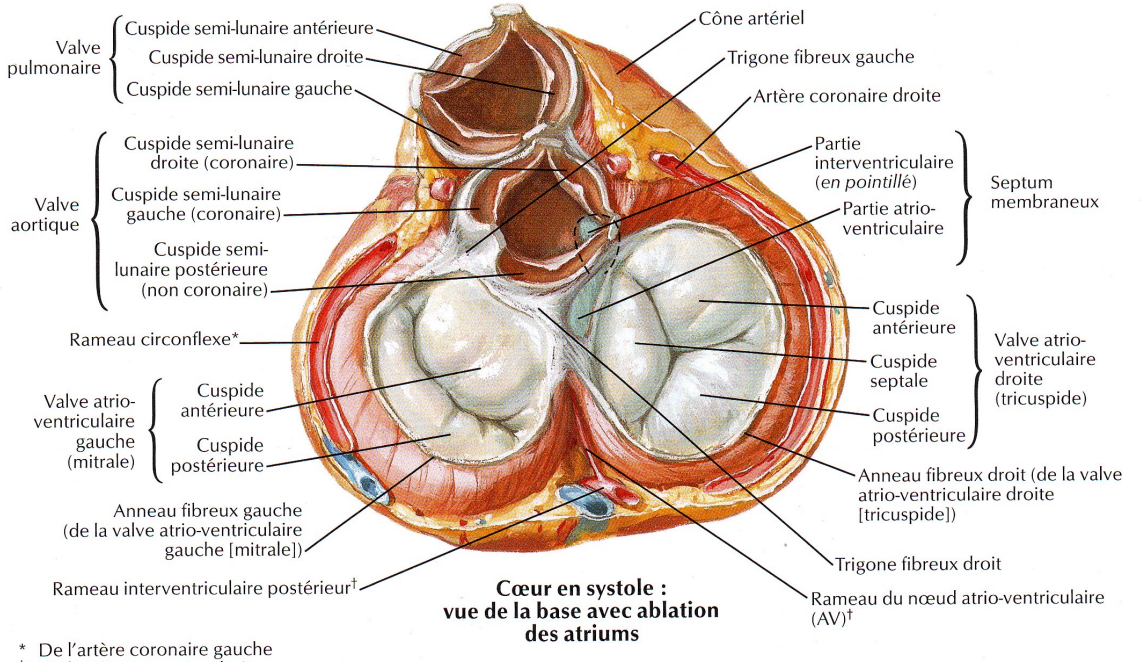
Valves :

- They close the cardiac cavities.
- Tricuspid : 3 valves, right heart.
- Mitral : 2 valves, left heart.
- Sigmoid : 3 valves for the pulmonary and aortic openings.
- The valves are attached by pillars.



Cœur en diastole :
vue de la base avec ablation des atriums



Cœur en systole :
vue de la base avec ablation des atriums

* De l'artère coronaire gauche
† De l'artère coronaire droite

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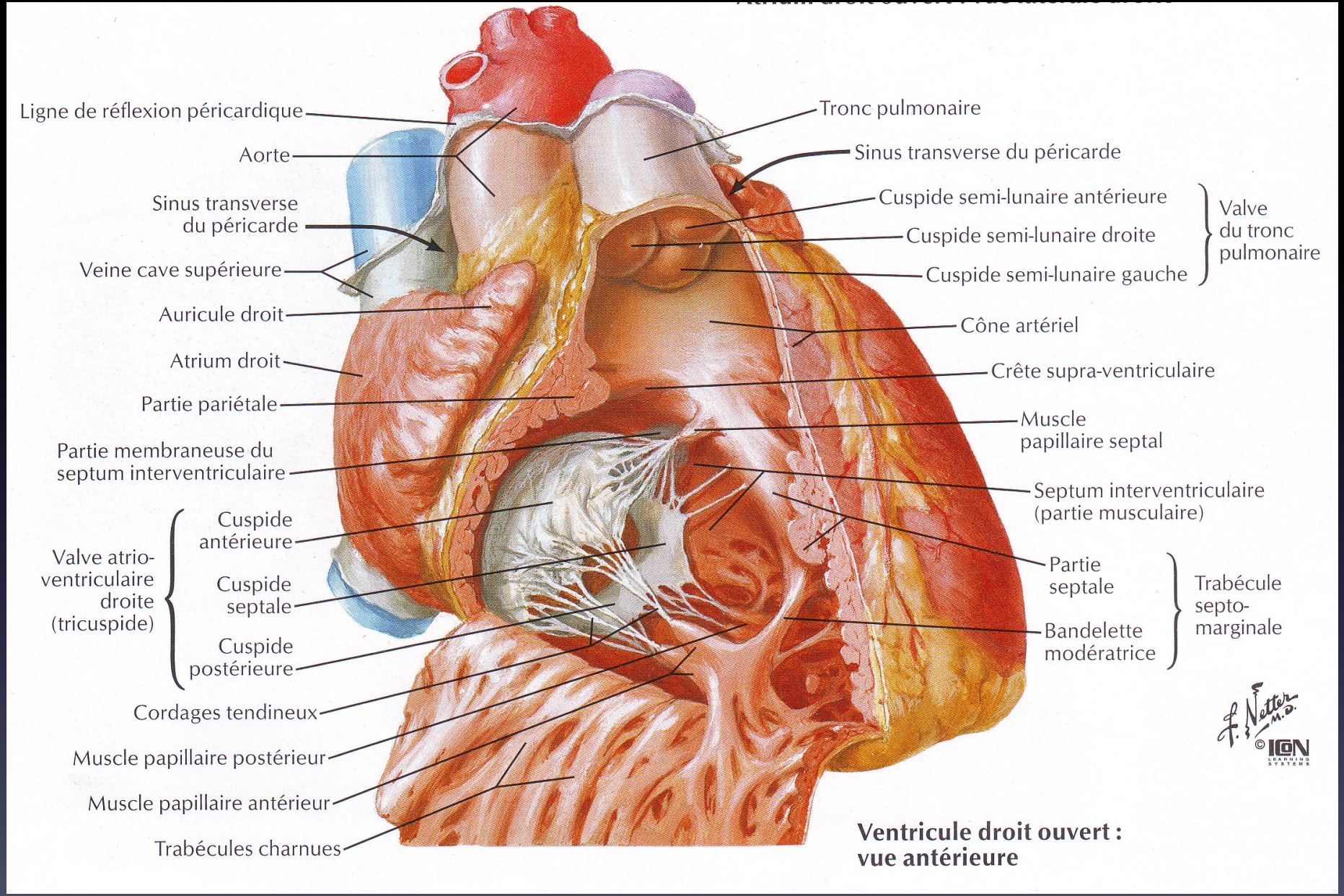

Ventricule droit ouvert : vue antérieure

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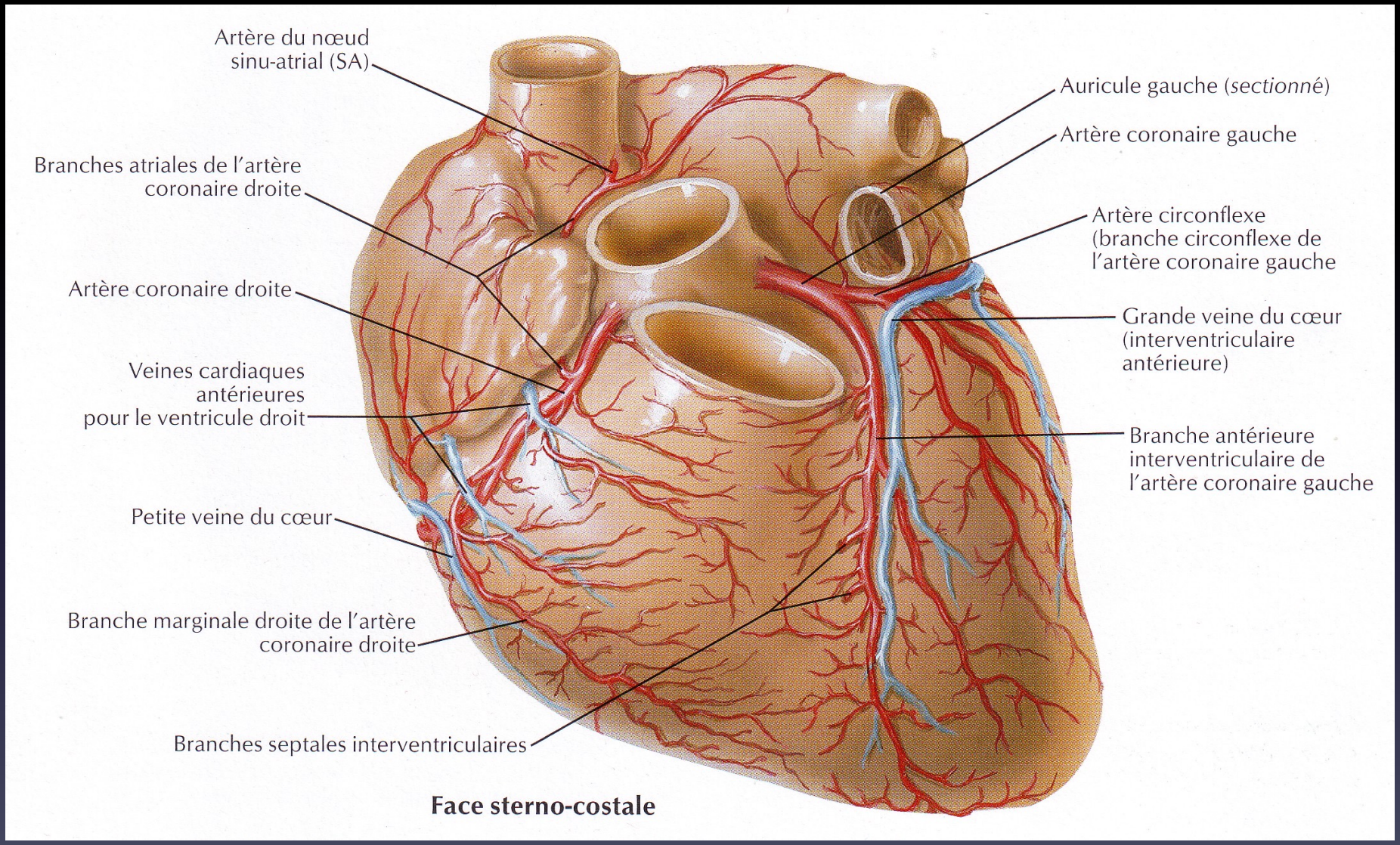
Arteries : The coronary network

- **Left coronary art.** : gives the anterior interventricular branch and the circumflex branch.
- **Right coronary artery**.

The **veins** follow the same route :

- The great cardiac vein follows the anterior interventricular artery.
- The small cardiac vein is in the right atrioventricular groove.
- The middle cardiac vein : in the interventricular groove.
- They finish in the coronary sinus.



Face sterno-costale

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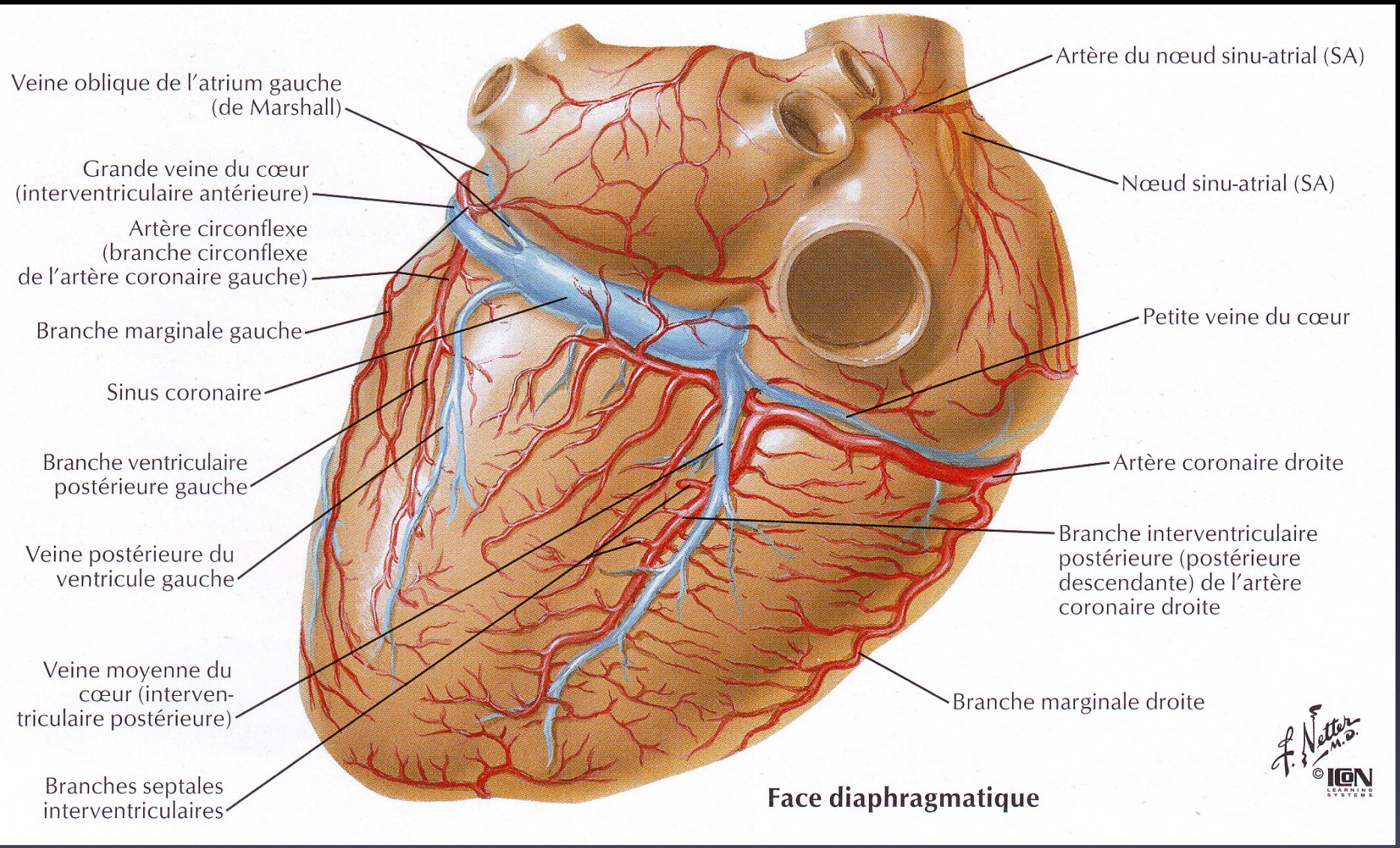

Face diaphragmatique

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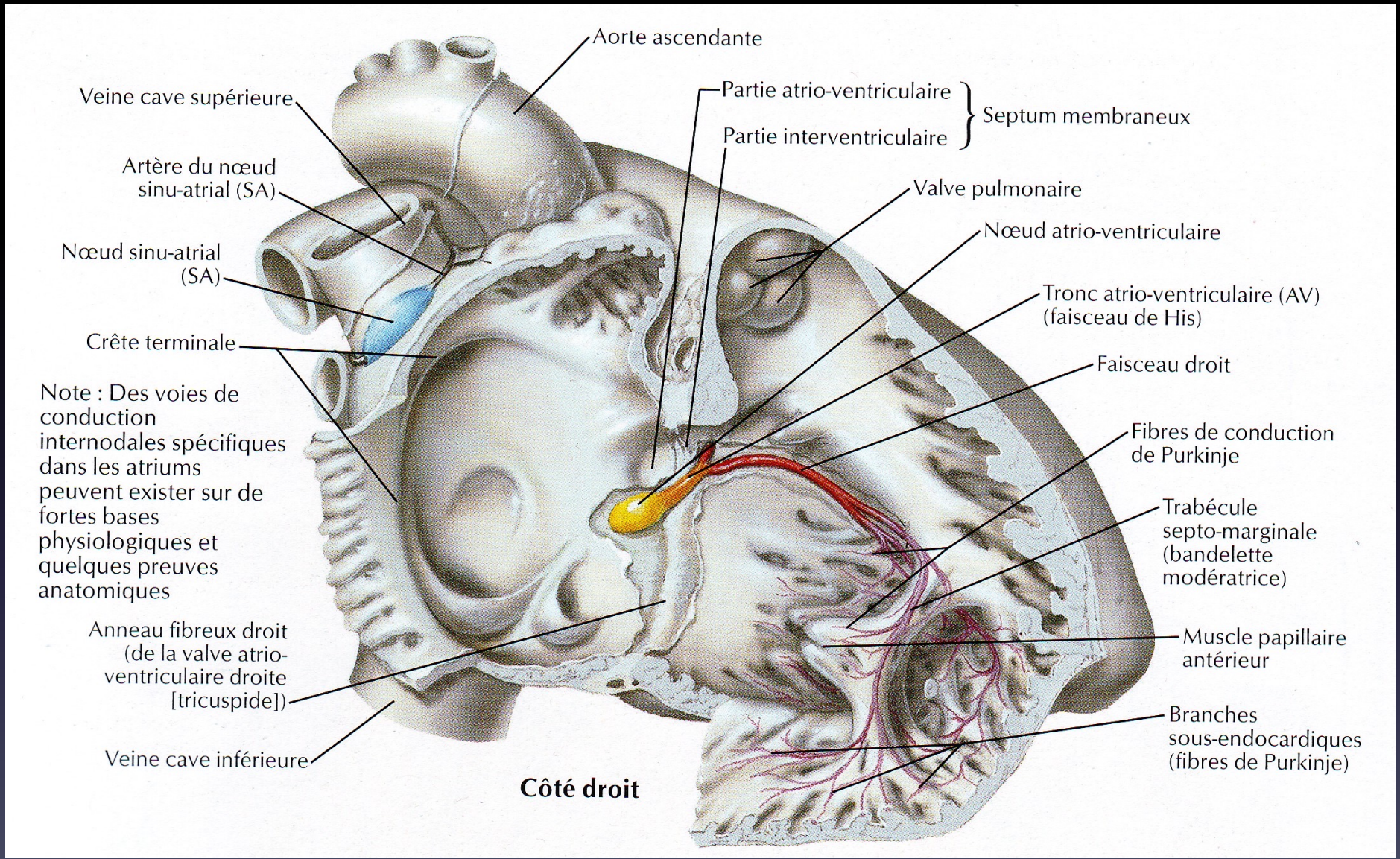
Innervation :

- Some cardiac cells have autonomous contraction : the nodal tissue.
- Generation of a nerve-action current by the sino-atrial node (Keith and Flack), and then by the atrioventricular node.
- Then a distribution by the bundle of His and network of Pukinje.


Aorte ascendante
Veine cave supérieure
Partie atrio-ventriculaire
Partie interventriculaire
Septum membraneux
Artère du nœud sinu-atrial (SA)
Valve pulmonaire
Nœud sinu-atrial (SA)
Nœud atrio-ventriculaire
Tronc atrio-ventriculaire (AV) (faisceau de His)
Crête terminale
Faisceau droit
Note : Des voies de conduction internodales spécifiques dans les atriums peuvent exister sur de fortes bases physiologiques et quelques preuves anatomiques
Fibres de conduction de Purkinje
Trabécule septo-marginale (bandelette modératrice)
Anneau fibreux droit (de la valve atrio-ventriculaire droite [tricuspide])
Muscle papillaire antérieur
Veine cave inférieure
Branches sous-endocardiques (fibres de Purkinje)
Côté droit

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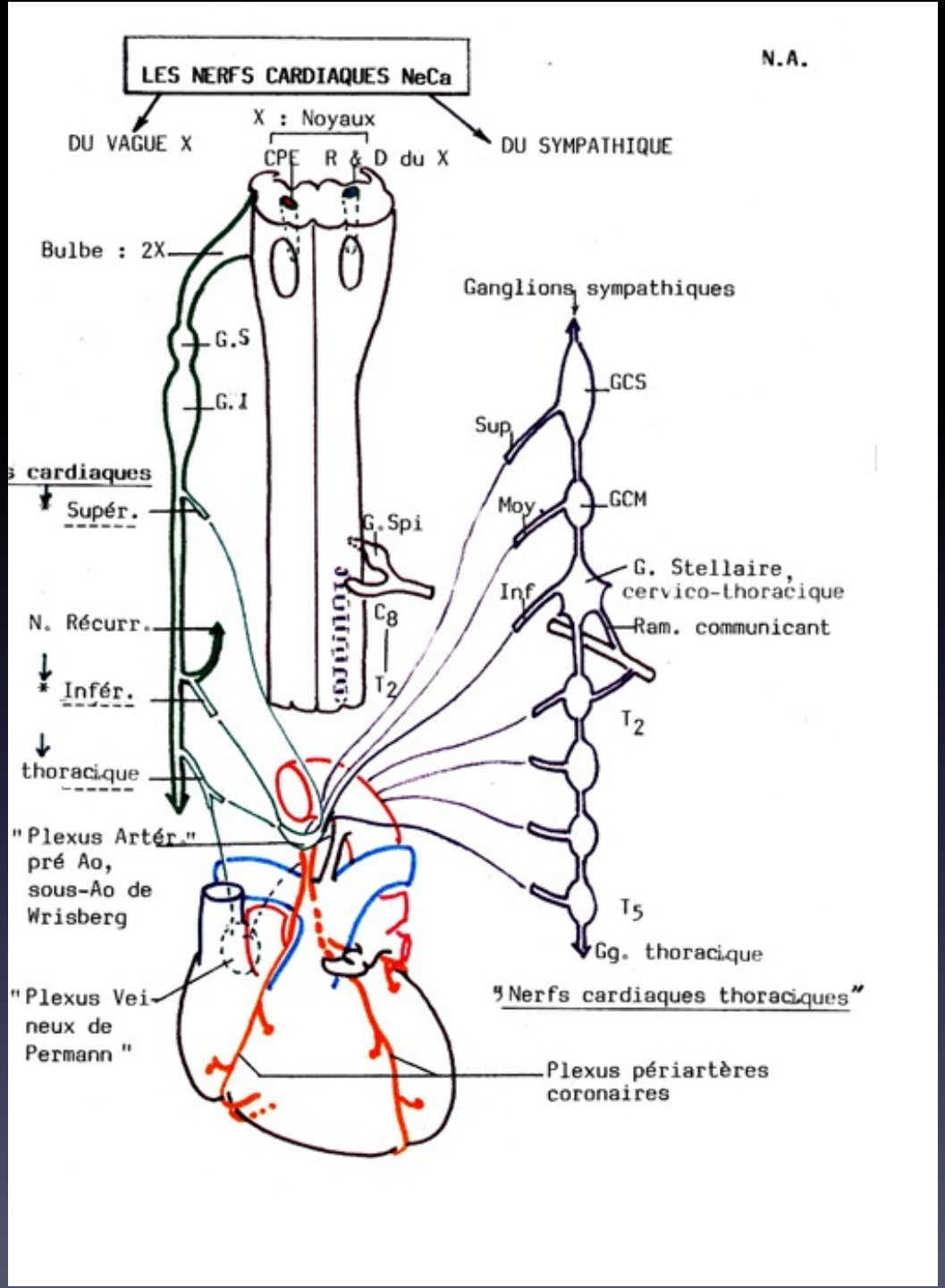
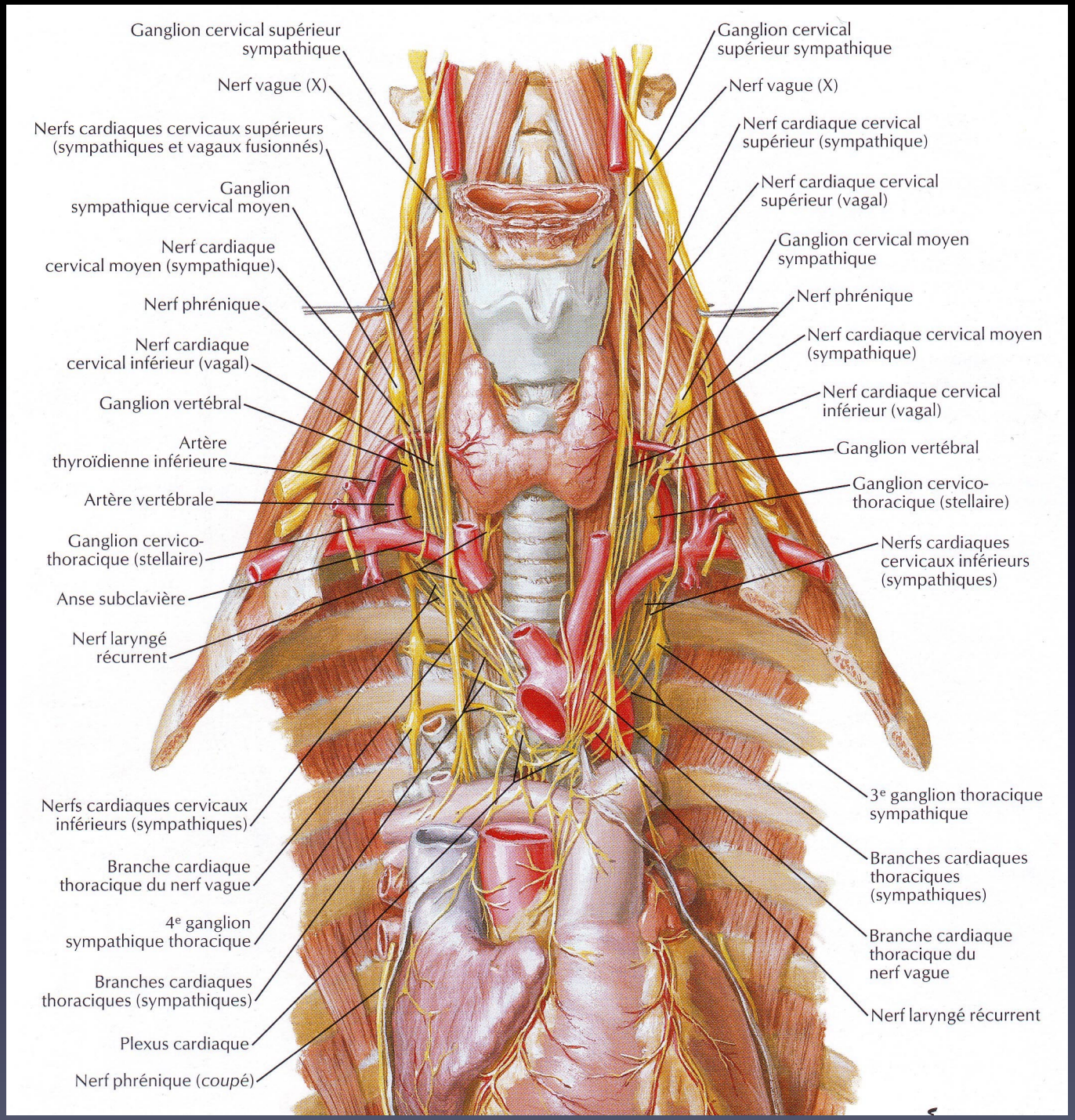
Innervation :

- And : influence of the autonomic nervous system.
- Sympathetic : Cardiac medullar centers and thoracic ganglia : TH1-TH5.
- + Cardiac nerves : From the cervical ganglia (superior, middle and inferior+++).
- Parasympathetic : Branches of the vagus nerve.


LES NERFS CARDIAQUES NeCa
N.A.
DU VAGUE X
X : Noyaux
CPE R & D du X
DU SYMPATHIQUE
Bulbe : 2X
G.S
G.I
s cardiaques
Supér.
N. Récurr.
Infér.
thoracique
"Plexus Artér."
pré Ao,
sous-Ao de
Wrisberg
"Plexus Vei
neux de
Permann "
Ganglions sympathiques
GCS
Sup
Moy.
GCM
G.Spi
G. Stellaire,
cervico-thoracique
Inf
Ram. communicant
C8
T2
T2
T5
Gg. thoracique
"Nerfs cardiaques thoraciques"
Plexus périartères
coronaires


Ganglion cervical supérieur sympathique
Nerf vague (X)
Nerfs cardiaques cervicaux supérieurs (sympathiques et vagaux fusionnés)
Ganglion sympathique cervical moyen
Nerf cardiaque cervical moyen (sympathique)
Nerf phrénique
Nerf cardiaque cervical inférieur (vagal)
Ganglion vertébral
Artère thyroïdienne inférieure
Artère vertébrale
Ganglion cervico-thoracique (stellaire)
Anse subclavière
Nerf laryngé récurrent
Nerfs cardiaques cervicaux inférieurs (sympathiques)
Branche cardiaque thoracique du nerf vague
4e ganglion sympathique thoracique
Branches cardiaques thoraciques (sympathiques)
Plexus cardiaque
Nerf phrénique (coupé)
Ganglion cervical supérieur sympathique
Nerf vague (X)
Nerf cardiaque cervical supérieur (sympathique)
Nerf cardiaque cervical supérieur (vagal)
Ganglion cervical moyen sympathique
Nerf phrénique
Nerf cardiaque cervical moyen (sympathique)
Nerf cardiaque cervical inférieur (vagal)
Ganglion vertébral
Ganglion cervico-thoracique (stellaire)
Nerfs cardiaques cervicaux inférieurs (sympathiques)
3e ganglion thoracique sympathique
Branches cardiaques thoraciques (sympathiques)
Branche cardiaque thoracique du nerf vague
Nerf laryngé récurrent

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B - Physiology

- The veinous blood comes from the 2 Vena Cava (sup and inf) to the right atrium, then in the right ventricle.
- It goes through the pulmonary arteries to diffuse in the circulation of the lungs.
- After oxygenating, the blood goes to the left atrium by the pulmonary veins, then in the left ventricle.
- The blood is ejected through the aorta to distribute in the general circulation.

- Systole : ejects the blood.
- Diastole : The blood enters.

Nervous system influence

Sympathetic system : noradrenalin :

- Tachycardy
- Excitability
- Flow increased

Parasympathetic : Acetylcholin :

- Bradycardy
- Lower pressure

Extrinsic factors

Hormonal system :

- Adrenalin
- Thyroxin (T_4)

They increase the blood pressure, heart rate and contractility.

Ions :

- Calcium
- Sodium
- Potassium

II - Pericardium

A - Anatomy

- **Double layered sac** containing the heart.
- Fibrous pericardium (external) and serous pericardium (internal) : Between : pericardial fluid.
- **Roles** :
  - Fixation of the heart in the mediastinum, to the sternum and diaphragm,
  - Preventing the heart to increase its volume to fast,
  - Lubrication : movements and beats are easy,
  - Protection : against infections.

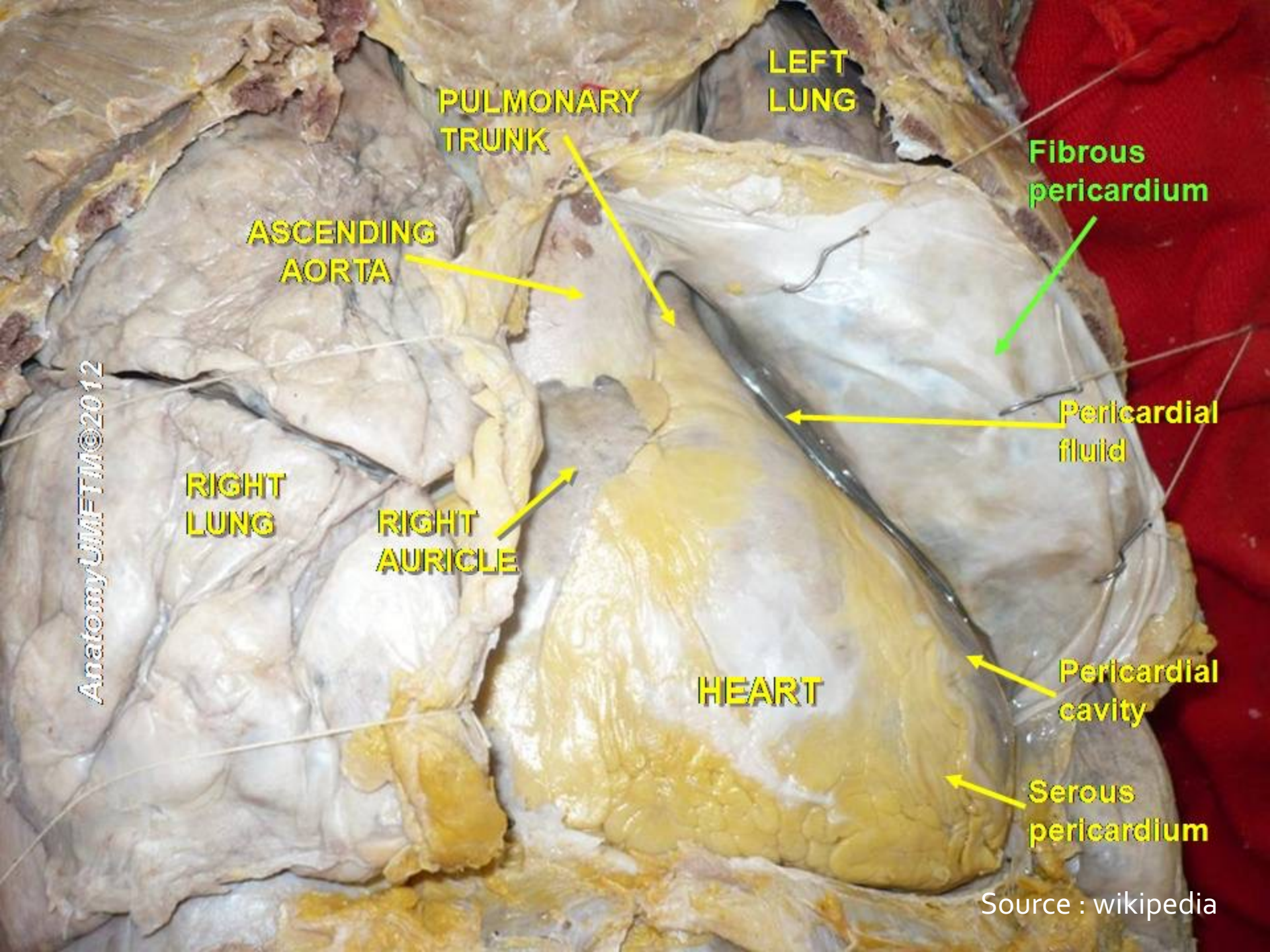
A - Anatomy

Fibrous pericardium :

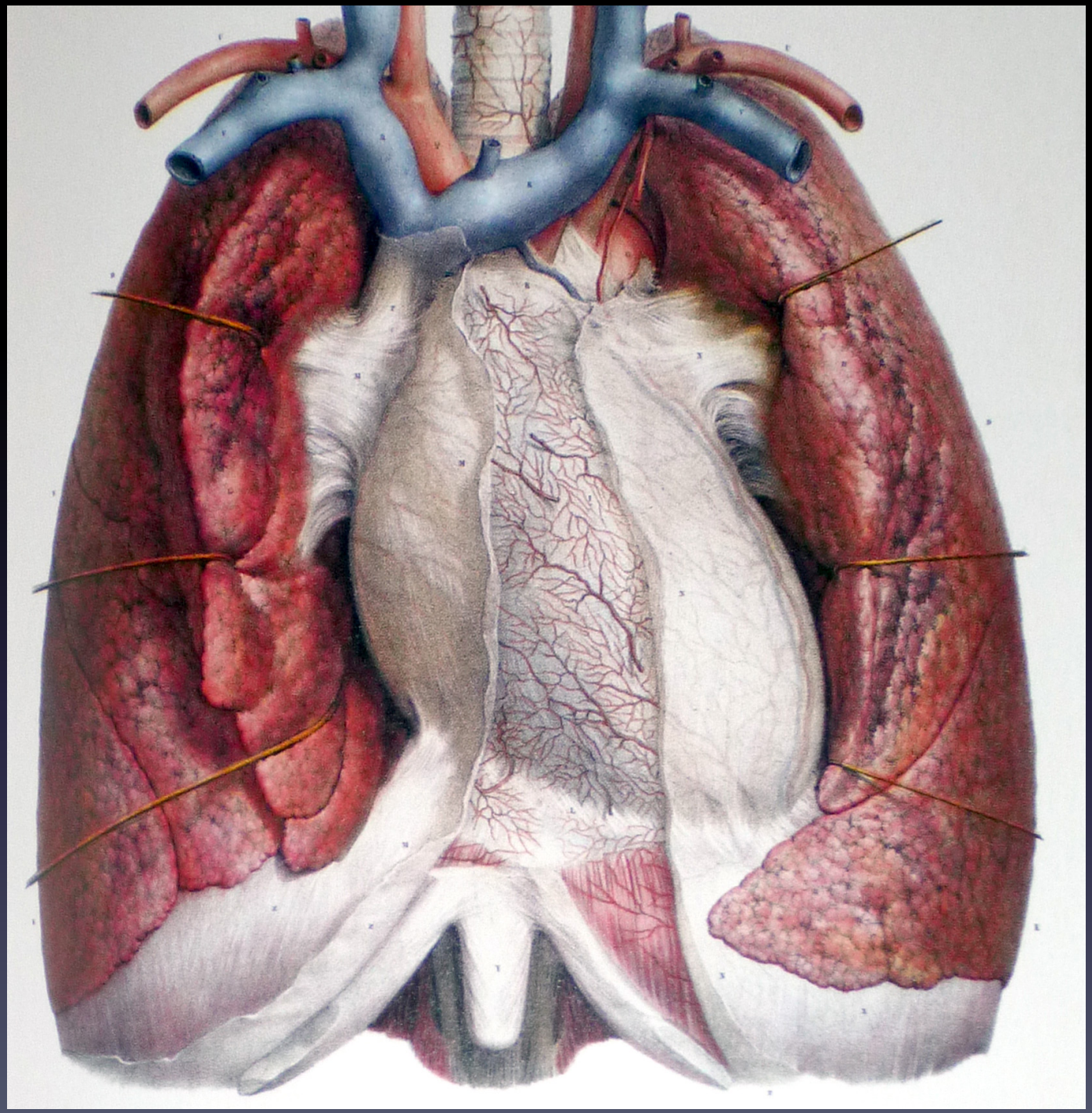
- Dense connective tissue, attaches the heart with ligaments.

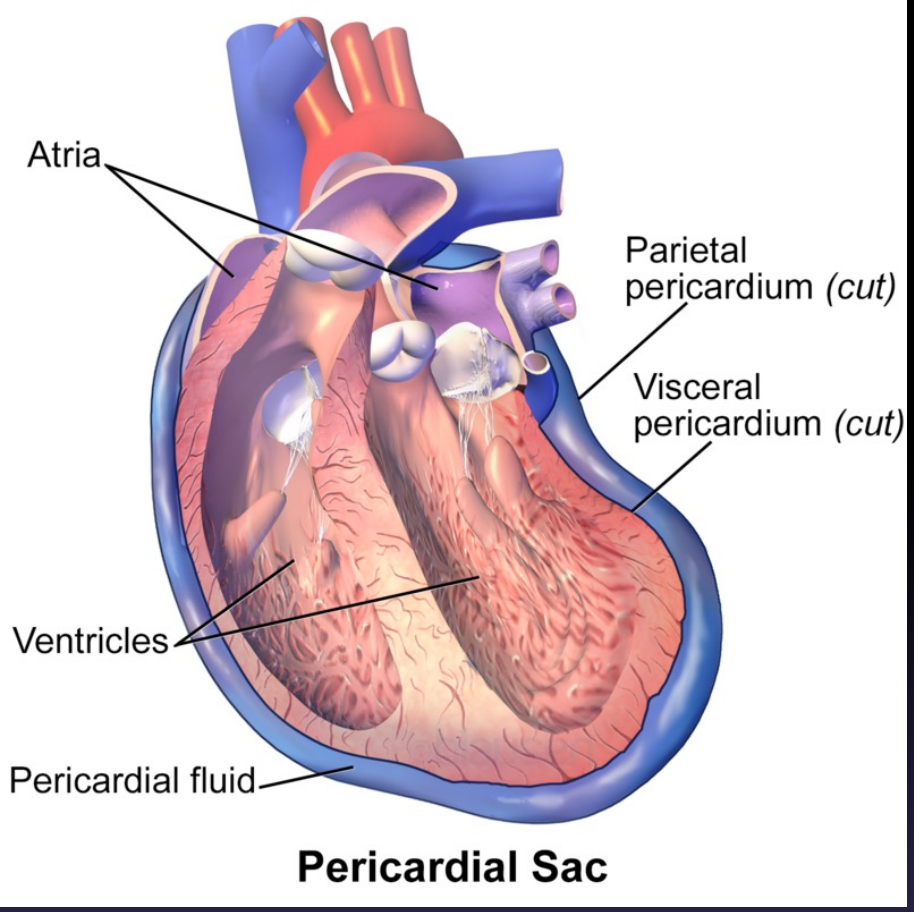
Serous pericardium :

- 2 layers : visceral and parietal pericardium (glued to the fibrous pericardium).

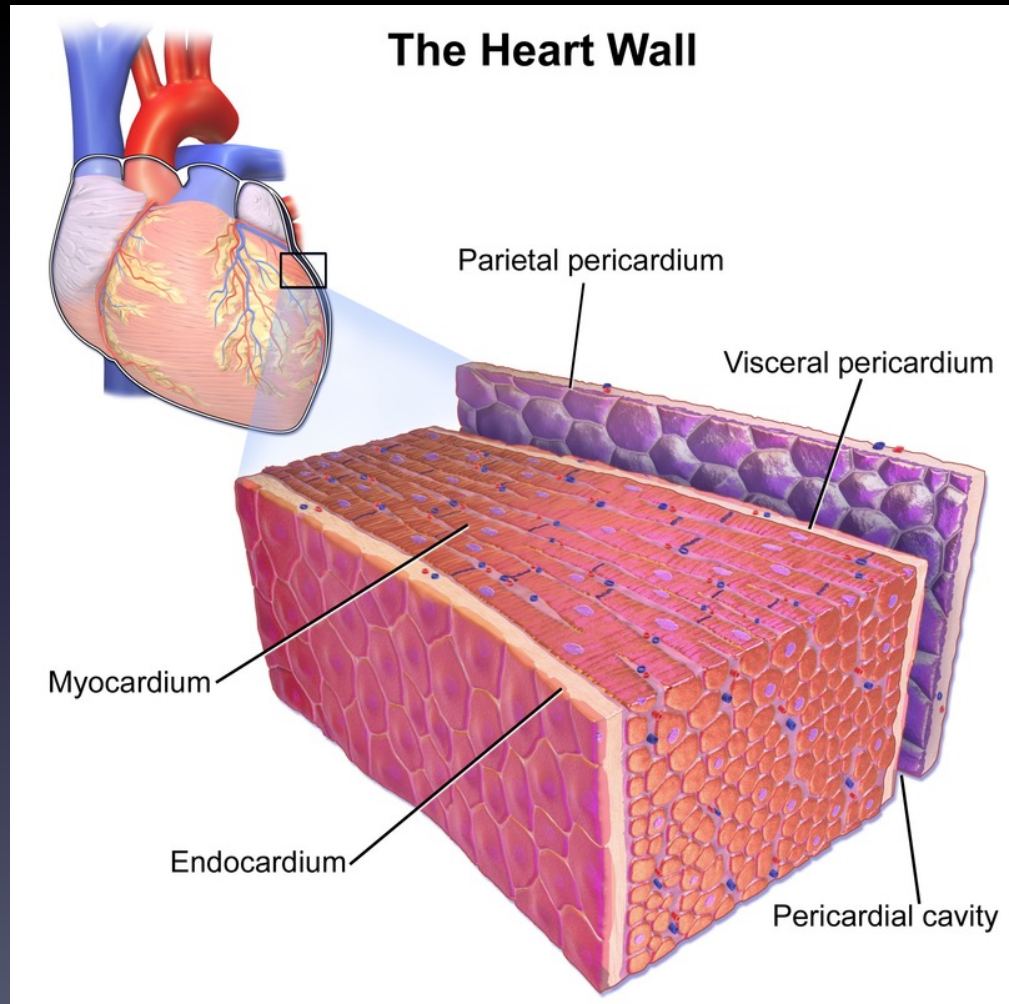


Source : wikipedia





Pericardial Sac



Source : wikipedia

Ligaments

- Superior sterno-pericardial ligament :

Strong adhesions between the top of the anterior part of the pericardium (below the vessels) and the upper posterior face of the sternum (manubrium) + cervical aponeurosis. 4 - 8cm long.

Comes from the **middle lamina of the neck** (medium layer, deep aponeurosis) in the middle, and from the sternum + first rib cartilage on the sides.

Suspends the pericardium in vertical and horizontal position.

Ligaments

- Inferior sterno-pericardial ligament :

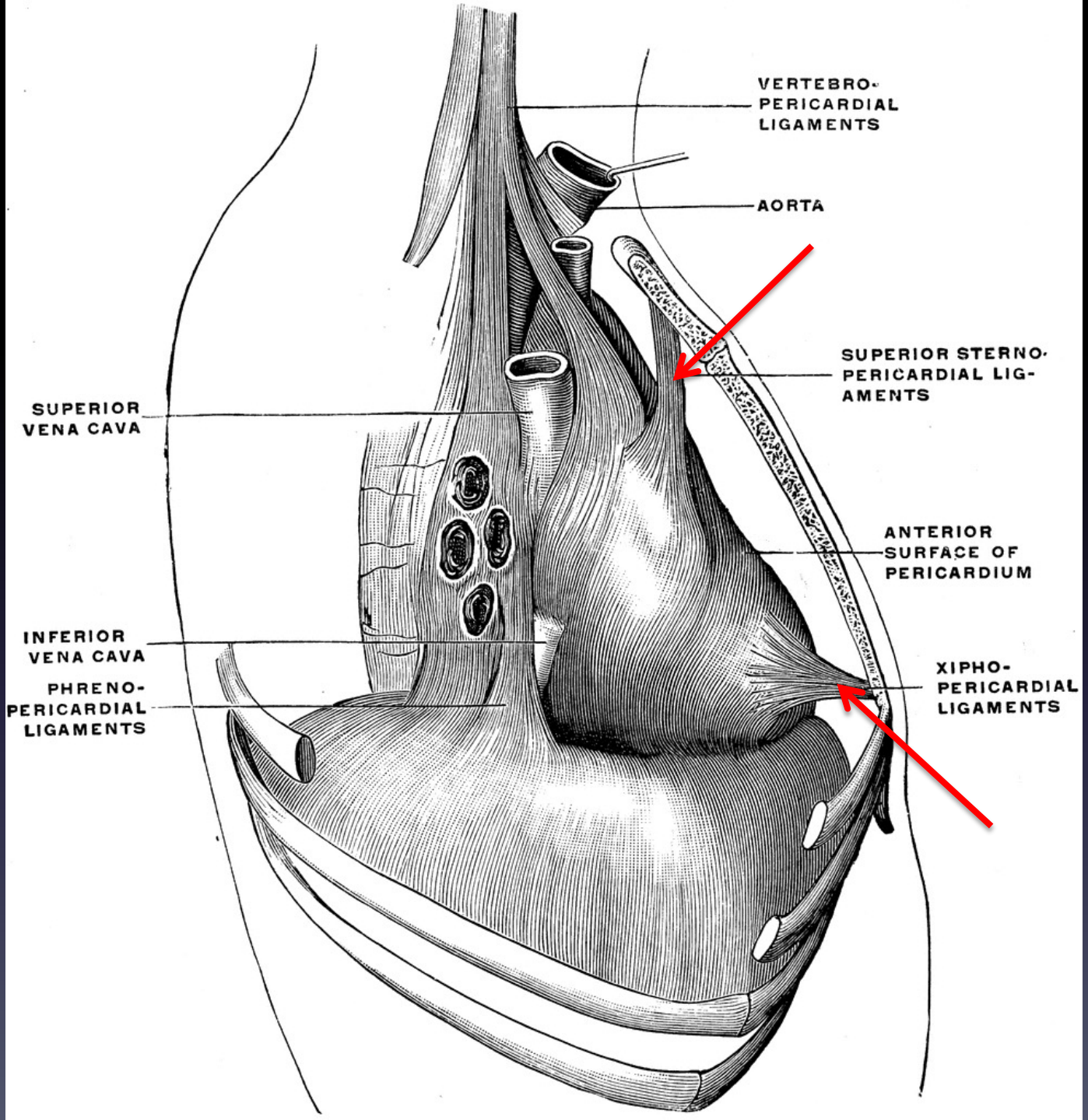
2 - 6 cm long, 4 - 8cm wide, direction : up, back, left.

Strong adhesions between the anterior wall of the pericardium and the post. face of the sternum (xiphoid process, not more than 2cm above).

Suspends the pericardium in horizontal position mainly.

Ligaments

Sometimes we observe a **connective tissue** between the posterior face of the sternum and the anterior wall of the pericardium (continuity between the sup and inf ligaments).


VERTEBRO-
PERICARDIAL
LIGAMENTS
AORTA
SUPERIOR STERNO-
PERICARDIAL LIG-
AMENTS
SUPERIOR
VENA CAVA
ANTERIOR
SURFACE OF
PERICARDIUM
INFERIOR
VENA CAVA
XIPHO-
PERICARDIAL
LIGAMENTS
PHRENO-
PERICARDIAL
LIGAMENTS

- Phreno-pericardial ligament :

Strong adhesion between the bottom of the pericardium and the anterior part of the central tendon of the diaphragm.

3 bundles linked together, often considered as one ligament (anterior, left and right).

Continuity of the endothoracic fascia and pericardium.

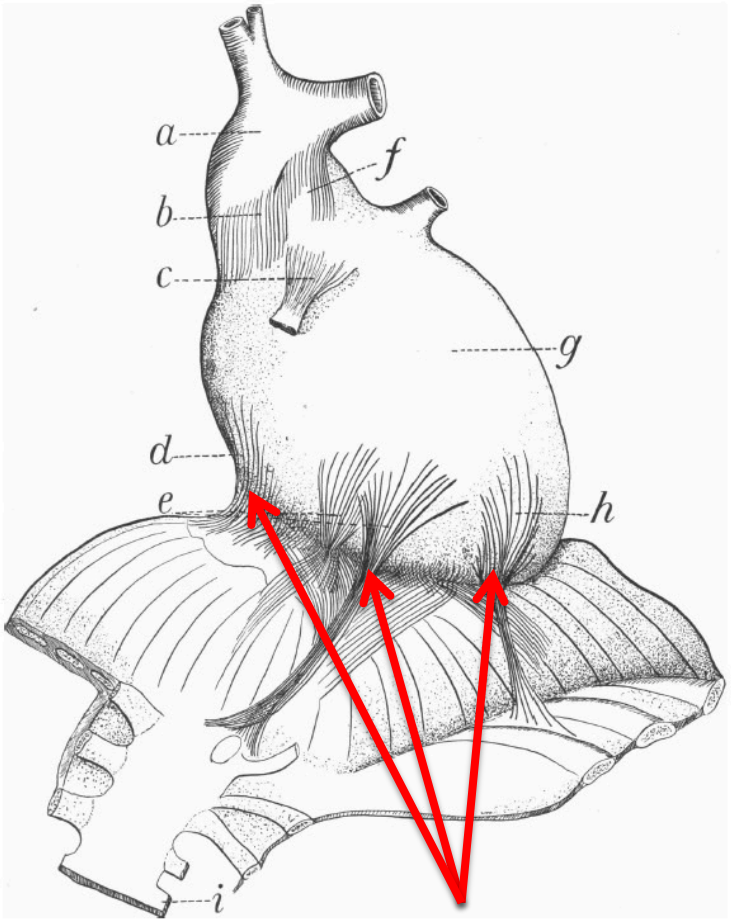
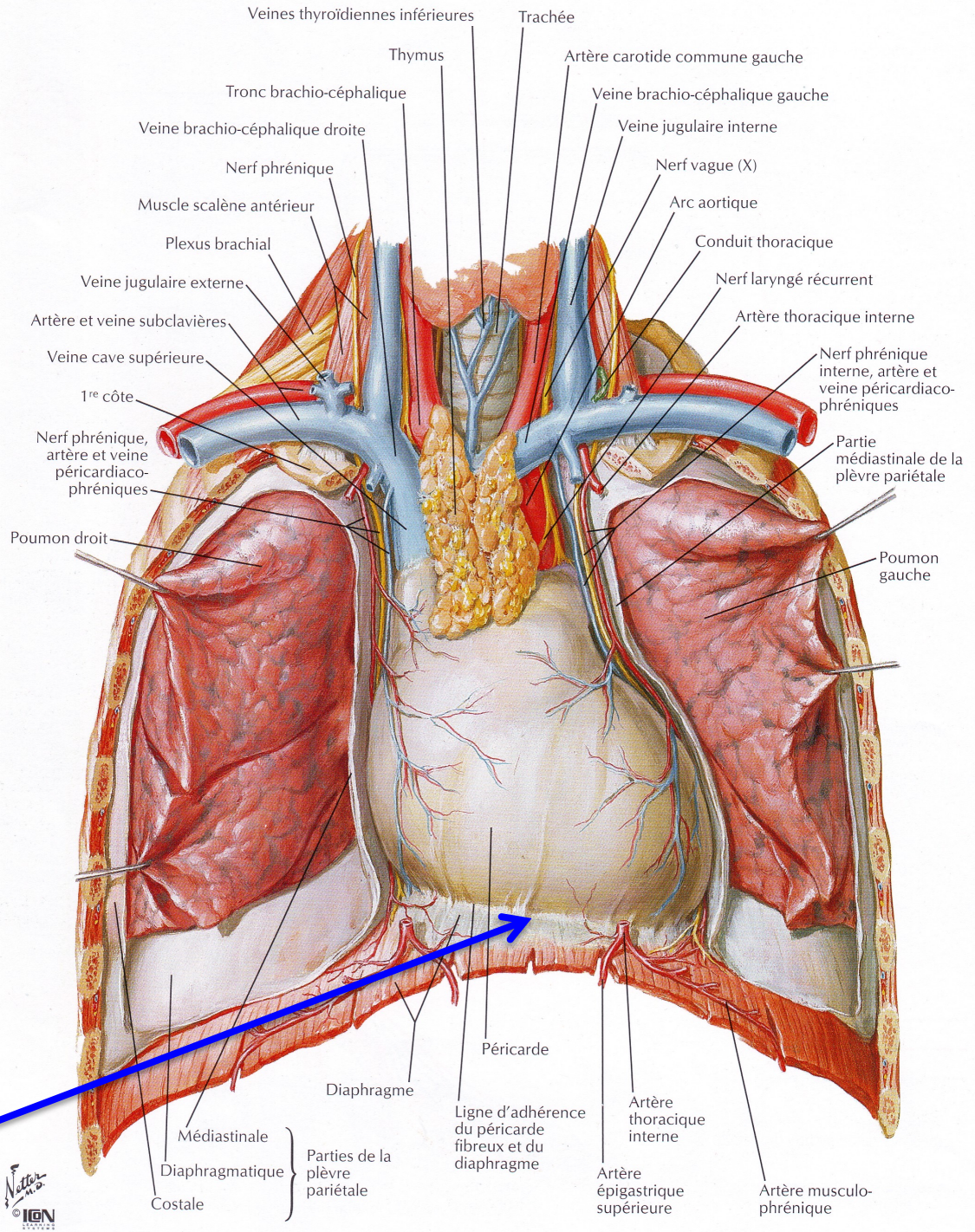


Fig. 2. Ligamenta anteriora pericardii. (Human.)
a, arcus aorticus; *b*, fibrae inter-arteriales; *c*, ligamentum sterno-pericardiacum superius; *d*, ligamentum phreno-pericardiacum anterius dextrum; *e*, ligamentum phreno-pericardiacum anterius medium; *f*, arteria pulmonalis; *g*, facies anterior cordis; *h*, ligamentum phreno-pericardiacum anterius sinistrum; *i*, sternum.



- Vertebro-pericardial ligament :

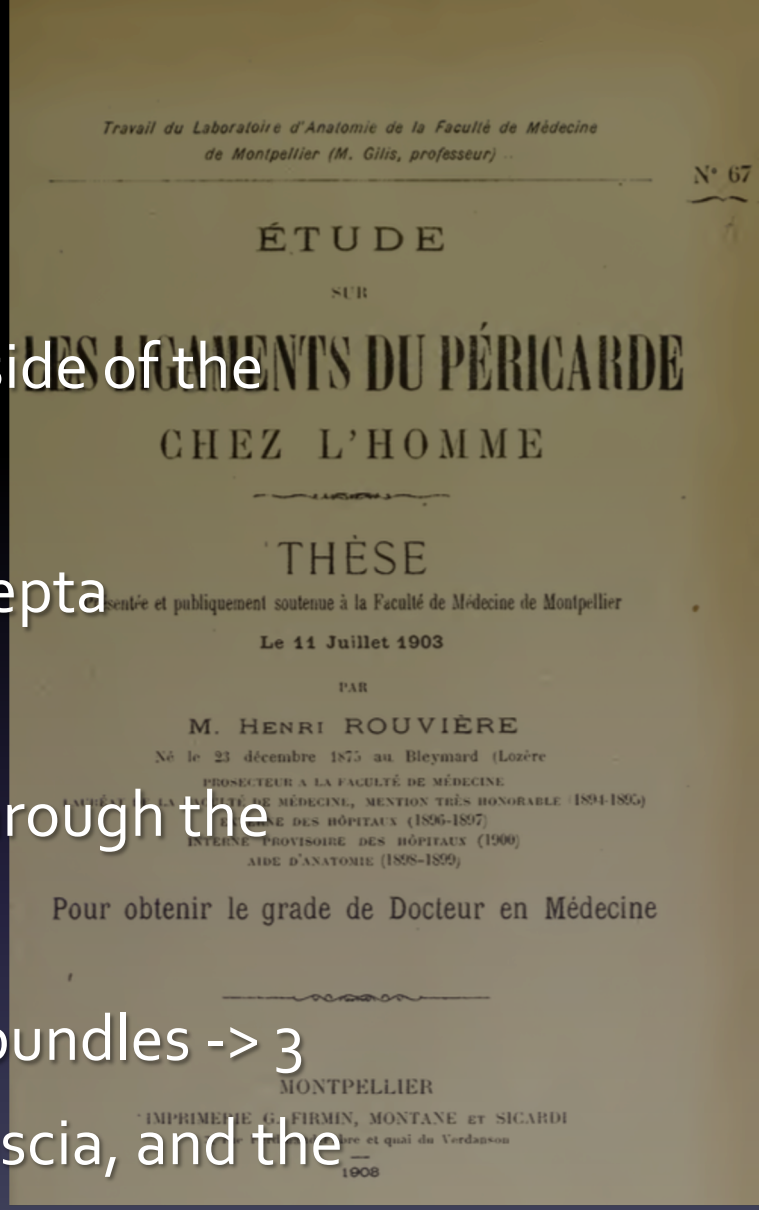
Inconstant, depends on authors.

A lot of longitudinal fibres on the dorsal side of the pericardium can be taken as a ligament.

On both sides, comes from the sagittal septa (Charpy's) and carotid sheath :

Right : Thin, from C6-C7 and T2-T3 to through the right bronchus,

Left : Stronger, from C4-T4 (max), few bundles -> 3 bundles to the esophagus, pretracheal fascia, and the aorta/pericardium.



Travail du Laboratoire d'Anatomie de la Faculté de Médecine de Montpellier (M. Gilis, professeur)

N° 67

ÉTUDE

SUR

LES LIGAMENTS DU PÉRICARDE

CHEZ L'HOMME

THÈSE

ntée et publiquement soutenue à la Faculté de Médecine de Montpellier

Le 11 Juillet 1903

PAR

M. HENRI ROUVIÈRE

Né le 23 décembre 1875 au Bleymard (Lozère)

PROSECTEUR A LA FACULTÉ DE MÉDECINE

MÉDECINE, MENTION TRÈS HONORABLE (1894-1895)

DES HÔPITAUX (1896-1897)

INTERNE PROVISOIRE DES HÔPITAUX (1900)

AIDE D'ANATOMIE (1898-1899)

Pour obtenir le grade de Docteur en Médecine

MONTPELLIER

IMPRIMERIE G. FIRMIN, MONTANE ET SICARDI

1908

- Fibres in the pericardium :

Mainly 2 layers of fibres :

Anterior pericardium : Thin layers

Posterior pericardium : Very thick layers

- Longitudinal fibres ventral and lateral sides :
  - From the xyphoid process to the brachiocephalic artery,
  - Central tendon to the aortic arch,
  - Aortic arch to the ventral pericardium,
  - Aortic arch to the central tendon,
  - Ascending aorta to the left edge of pericardium,
  - Vena cava inferior to the brachiocephalic artery and pulmonary veins.

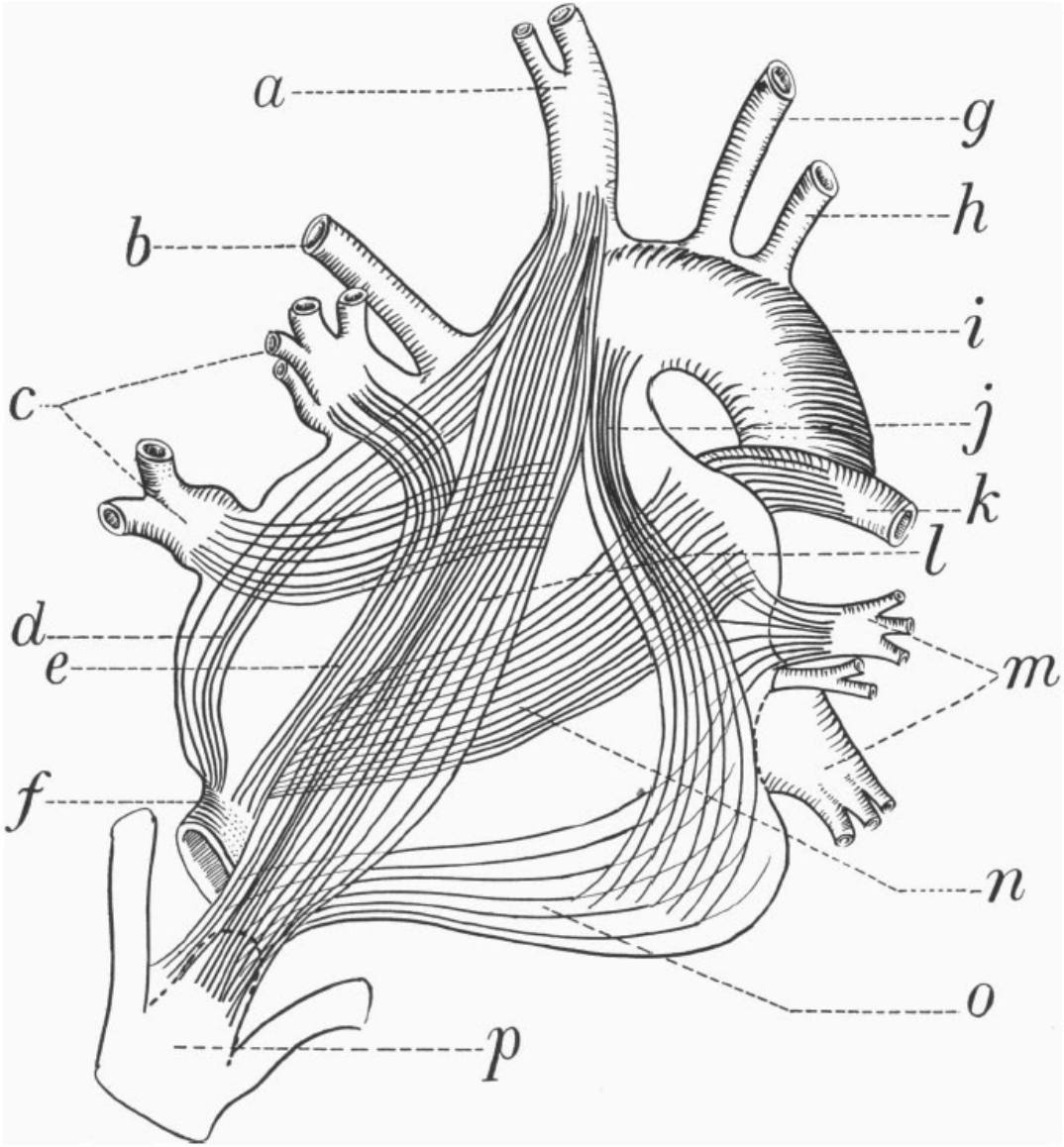


Fig. 3. Heart and vessels with the mechanostructures of the pericardium projected upon them. The lower end of the processus xiphoideus is reversed (anterior aspect). (Human.)

a, arteria anonyma; *b*, ramus dexter arteriae pulmonalis; *c*, venae pulmonales dextrae; *d*, fasciculus cavo-anonymus; *e*, fasciculus cavo-pulmonalis; *f*, vena cava inferior; *g*, arteria carotis communis sinistra; *h*, arteria subclavia sinistra; *i*, arcus aortae; *j*, fasciculus aortico-apicalis; *k*, ramus sinister arteriae pulmonalis; *l*, fasciculus xipho-anonymus; *m*, venae pulmonales sinistrae; *n*, fibrae transversae anteriores; *o*, fasciculus xipho-apicalis; *p*, processus xiphoideus.

- Other fibres ventral and lateral sides :
  - In an oblique and transversal plane (various directions)
  - From the pulmonary veins to ventral side
  - From the aortic arch and anterior wall (= lig. Cardio aorticum)
  - Circular fibres around venous orifices (inextensible)

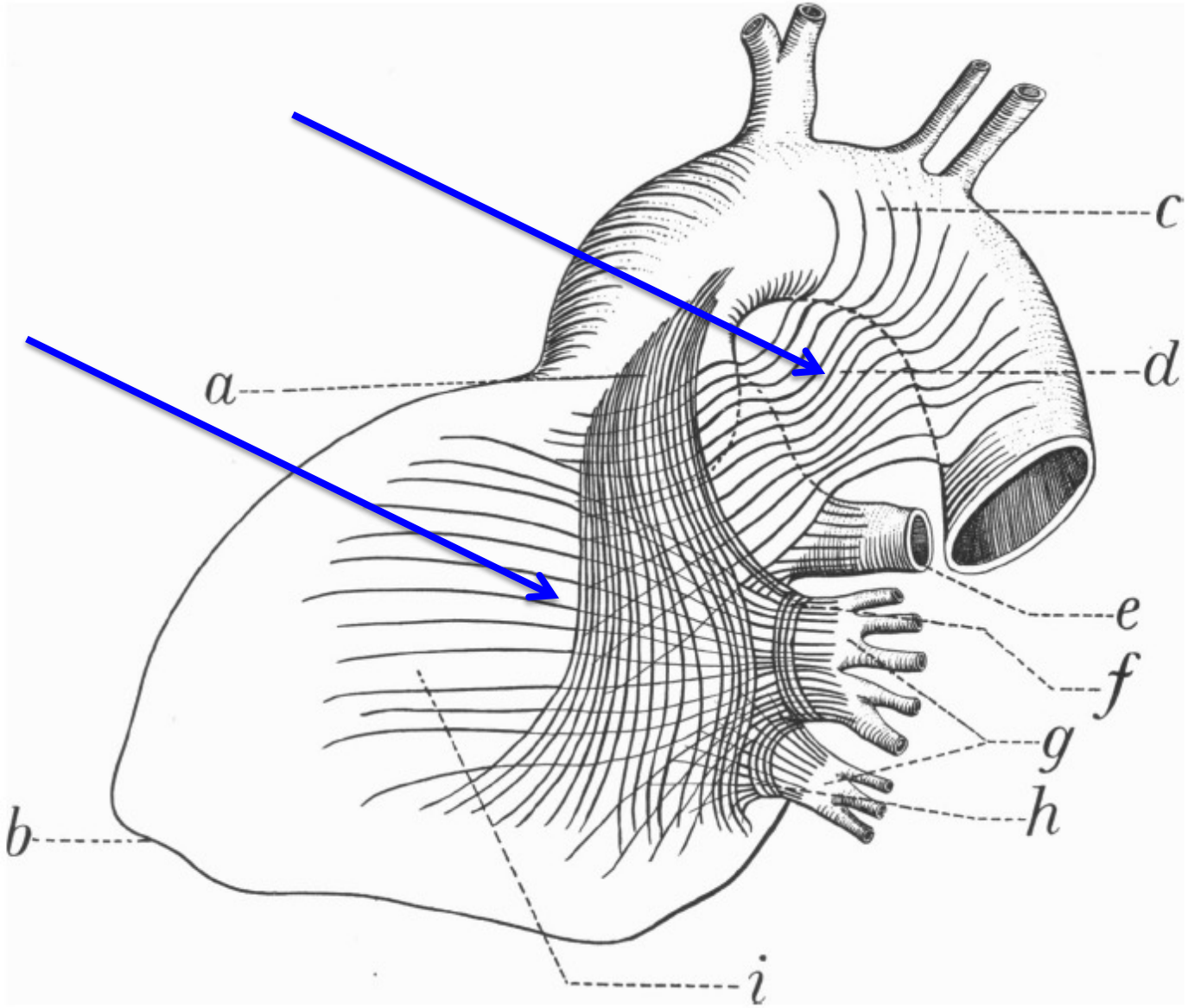


Fig. 6. Heart and vessels with some anterior mechanostructures of pericardium projected upon them (lateral aspect). (Human.)

a, fasciculus aortico-cardiacus; *b*, apex; *c*, arcus aortae; *d*, ligamentum cardio-aorticum; *e*, ramus sinister arteriae pulmonalis; *f*, annulus venae pulmonalis sinistrae superioris; *g*, venae pulmonales sinistrae; *h*, annulus venae pulmonalis sinistrae inferioris; *i*, fasciculus transversus pericardiacus anterior.

- Longitudinal fibres dorsal side :
  - Very thick !
  - Start from a small area near the vena cava inferior
  - Continuous with the central tendon
  - The highest go to the aortic arch and bronchi
  - Must have been considered as the vertebro-pericardic ligament

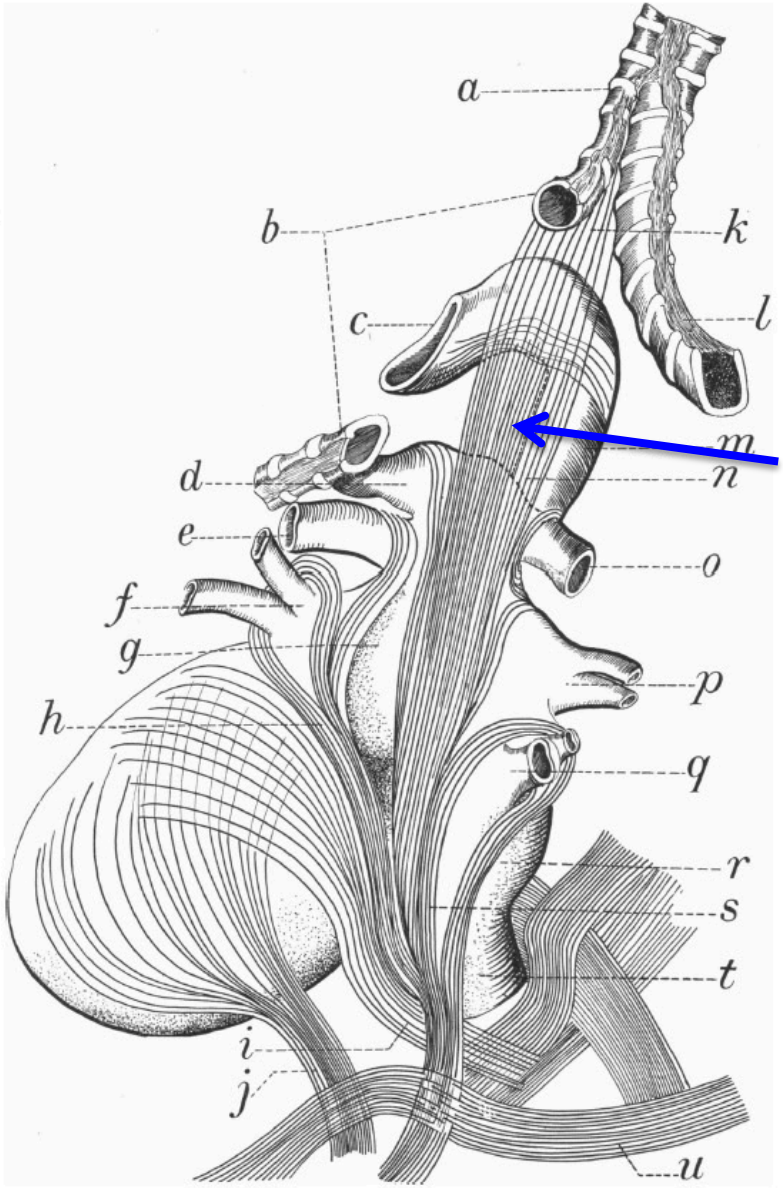


Fig. 7. Dorsal aspect of the heart and vessels on which are projected the mechanostructures of the pericardium in their principal features on the dorsal side. (Human.)

a, trachea; *b*, bronchus sinister; *c*, arcus aortae; *d*, ramus sinister arteriae pulmonalis; *e*, vena pulmonalis sinistra superior; *f*, vena pulmonalis sinistra inferior; *g*, atrium sinistrum; *h*, fasciculus centro-atrialis sinister; *i*, fasciculus centro-cardiacus I; *j*, fasciculus centro-cardiacus II; *k*, fasciculus centro-trachealis; *l*, bronchus dexter; *m*, aorta descendens; *n*, fasciculus centro-aorticus; *o*, ramus dexter arteriae pulmonalis; *p*, vena pulmonalis dextra superior; *q*, vena pulmonalis dextra inferior; *r*, atrium dextrum; *s*, fasciculus centro-atrialis dexter; *t*, vena cava inferior; *u*, fasciculus intraphrenicus.

- Fibres of the inner layer :

Ventral part : Extensions of the posterior wall, mostly longitudinal

Dorsal part : Complex. Longitudinal, transverse and circular fibres.

  - Longitudinal : from the trachea to the VCI, from the VCS to the VCI…
  - Transverse : Join the lungs together (roots, hilum)
  - Circular : around pulm. veins (rings), pulm. arteries, around atrium, around root of lungs

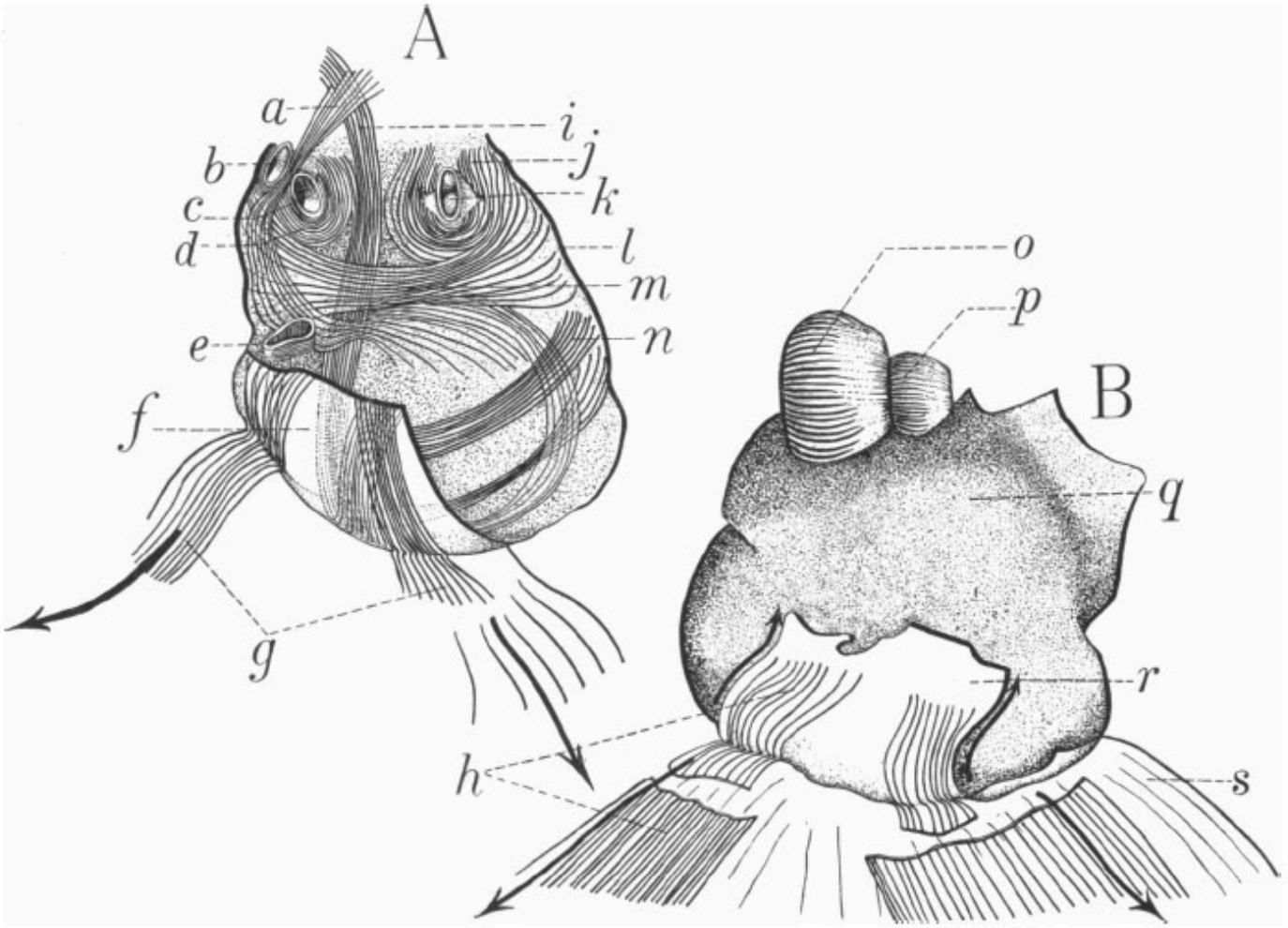


Fig. 8. A. Posterior wall of pericardium with some mechanostructures on it. B. Posterior wall of pericardium without mechanostructures and the directions of fibres in the ligamentum phreno-pericardiale. (Human.)

a, annulus periatrialis (fibrae dextrae); *b*, vena pulmonalis superior et dextra; *c*, vena pulmonalis inferior et dextra; *d*, annulus venae pulmonalis dextrae; *e*, vena cava inferior; *f*, paries anterior pericardii; *g*, ligamentum phreno-pericardiale anterior; *h*, ligamentum phreno-pericardiale anterior; *i*, fasciculus phreno-trachealis; *j*, annulus venae pulmonalis sinistrae; *k*, vena pulmonalis sinistra inferior; *l*, paries posterior pericardii; *m*, fibrae transversae posteriores; *n*, fibrae arciformae posteriores; *o*, aorta ascendens; *p*, arteria pulmonalis; *q*, paries posterior pericardii; *r*, paries anterior pericardii; *s*, diaphragma.

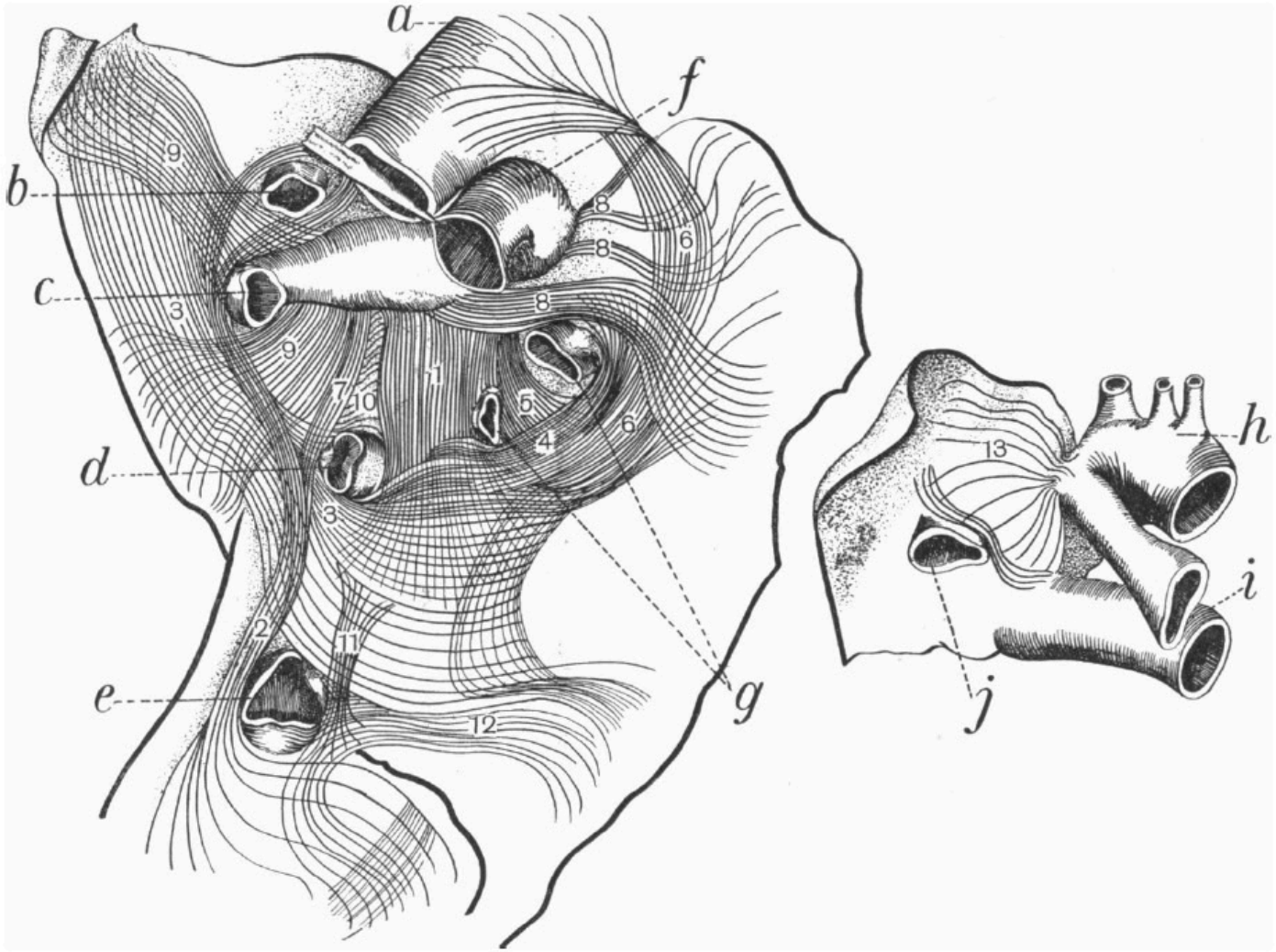


Fig. 10. Posterior wall of pericardium with its mechanostructures. (Human.)

a, arcus aortae; *b*, vena cava superior; *c*, arteria pulmonalis dextra; *d*, venae pulmonales dextrae; *e*, vena cava inferior; *f*, arteria pulmonalis sinistra; *g*, venae pulmonales sinistrae; *h*, arcus aortae; *i*, arteria pulmonalis; *j*, vena cava superior. 1, fibrae verticales; 2, fibrae intercavae; 3, annulus periatrialis (fibrae dextrae); 4, annulus periatrialis (fibrae sinistrae); 5, annulus peripulmonalis sinister; 6, fasciculus aortico-periatrialis; 7, fibrae cavo-hilares dextrae; 8, fibrae phreno-pulmonales sinistrae; 9, fibrae phreno-pulmonales dextrae; 10, fibrae transversae interhilares posteriores; 11, fibrae cavo-pulmonales inferiores; 12, fibrae cavo-apicales; 13, fibrae phreno-aorticae.

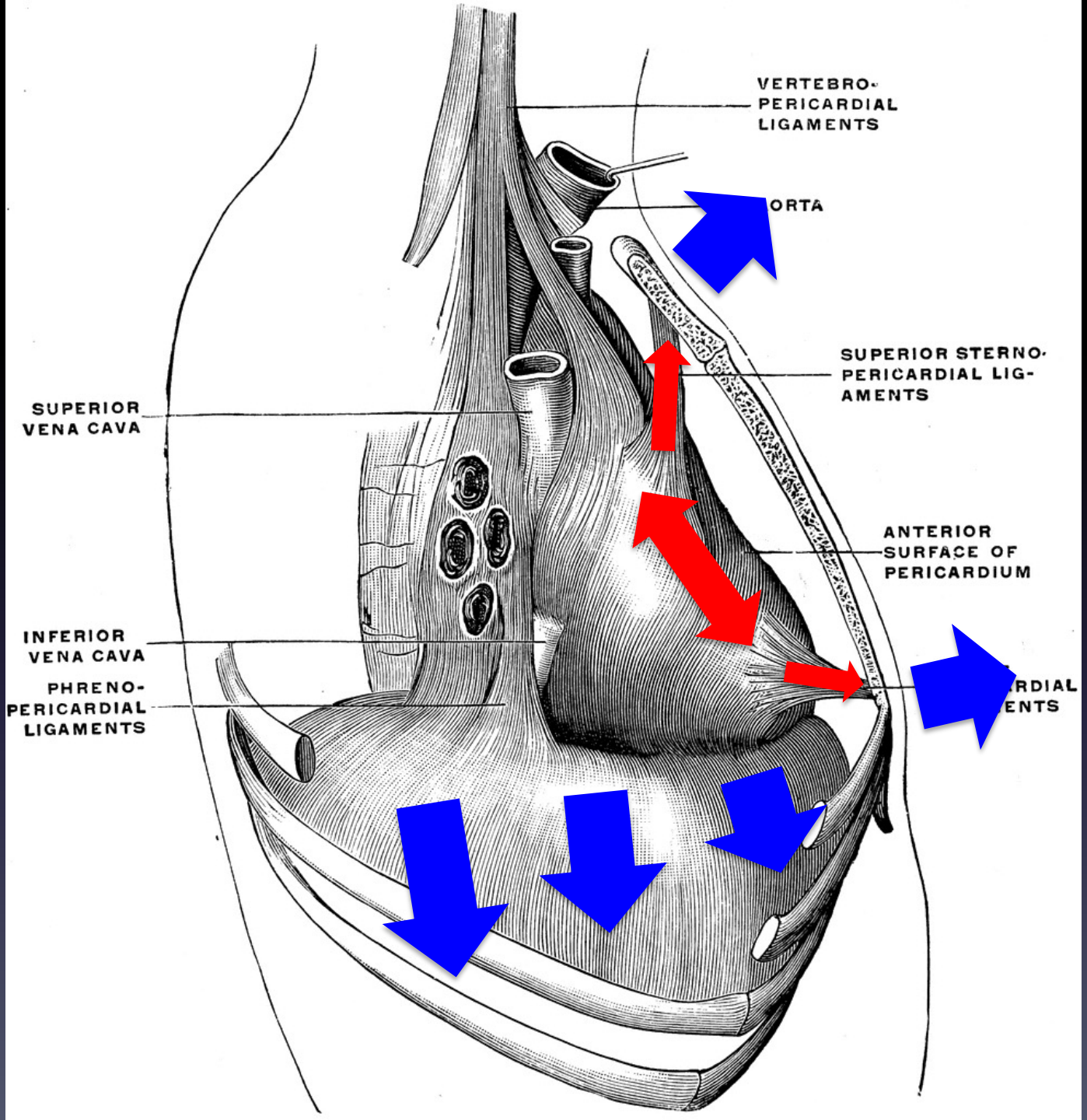
B – Biomechanics of the pericardium

- **During inspiration :**

The strains in the sternopericardial ligaments are antagonistic,

The **anterior wall is stretched longitudinally,**

The backwards movement of the heart (diaphragm), pulls the pericardium with the anchor point near the VCI, and stretches the sternopericardial ligaments.

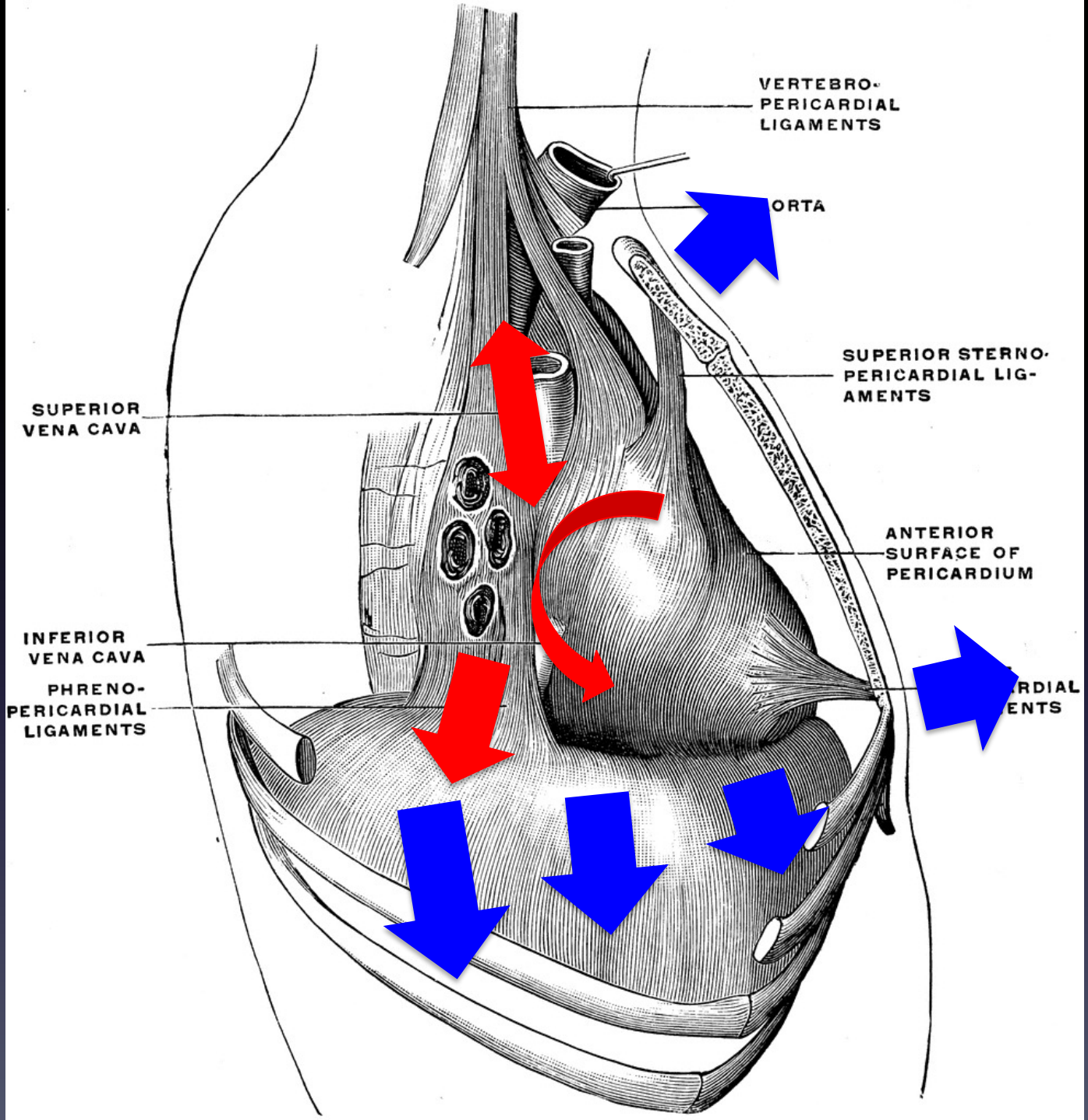

VERTEBRO-
PERICARDIAL
LIGAMENTS
ORTA
SUPERIOR STERNO-
PERICARDIAL LIG-
AMENTS
SUPERIOR
VENA CAVA
ANTERIOR
SURFACE OF
PERICARDIUM
INFERIOR
VENA CAVA
PHRENO-
PERICARDIAL
LIGAMENTS

B – Biomechanics of the pericardium

- **During inspiration :**

The backwards movement of the heart (diaphragm), attracts the pericardium with the anchor point near the VCI, and stretches the vertebropericardial ligaments.

However : The distance between bronchi and diaphragm stays equal.


VERTEBRO-
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SURFACE OF
PERICARDIUM
INFERIOR
VENA CAVA
PHRENO-
PERICARDIAL
LIGAMENTS

IEEE Trans Med Imaging. 2002 Sep;21(9):1142-50.

A study of the motion and deformation of the heart due to respiration.

McLeish K[1], Hill DL, Atkinson D, Blackall JM, Razavi R.

For all subjects, we assessed the nonrigid motion of the heart…

We show that the rigid-body motion of the heart is primarily in the **craniocaudal** direction with smaller displacements in the right-left and anterior-posterior directions.

Deformation was greatest for the free wall of the **right atrium and the left ventricle**; typical deformations were 3-4 mm with deformations of up to 7 mm observed in some subjects.

IEEE Trans Med Imaging. 2004 Aug; 23(8): 1046–1056.
doi: 10.1109/TMI.2004.828676 - MCID: PMC2494710 - IHMSID: NIHMS27037 - PMID: 15338737

Respiratory Motion of the Heart From Free Breathing Coronary Angiograms

Guy Shechter, Cengizhan Ozturk, Jon R. Resar, and Elliot R. McVeigh

For all patients, the heart **translated caudally** (mean, 4.9 ± 1.9 mm; range, 2.4 to 8.0 mm) and underwent a **cranio-dorsal rotation** (mean, 1.5° ± 0.9°; range, 0.2° to 3.5°) during inspiration.

In eight patients, the heart also translated **anteriorly** (mean, 1.3 ± 1.8 mm; range, −0.4 to 5.1 mm) and rotated in a caudo-dextral direction (mean, 1.2° ± 1.3°; range, −1.9° to 3.2°).

Pericardium and chinese medicine

- **Action** of the pericardium : sustains and protects the heart against emotional stresses.
- **Guardian of the emotions**.
- When there is a retraction around the heart : symptoms of closing in, or **oppression**.

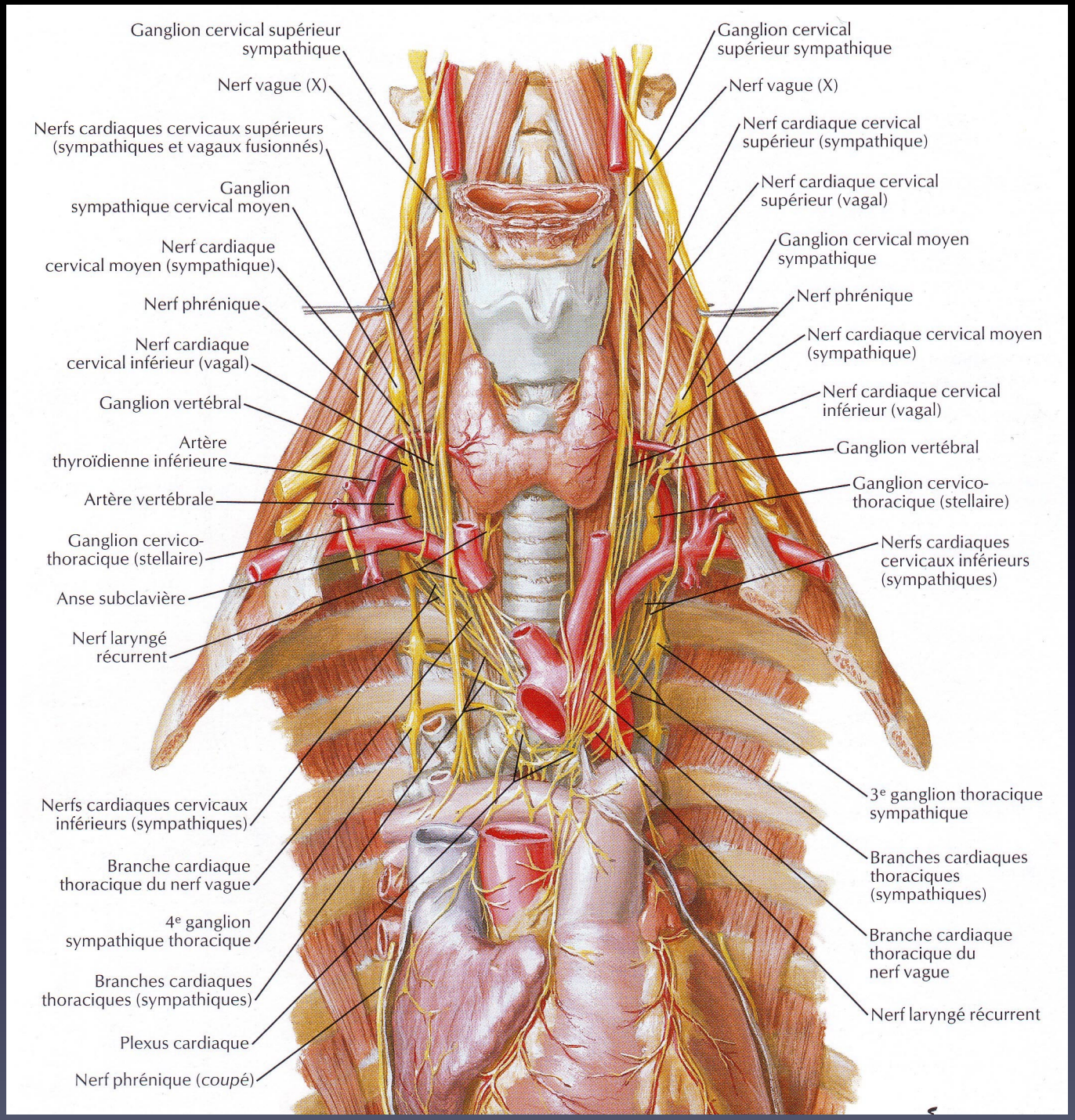
Effects of stress on the pericardium

- Effect of stress / emotions on the pericardium

  :

  - The sympathetic influences the tissues with a « **contraction** » (or retraction/shrinkage). The result could be a traction on the vessels (a. subclavia).
  - The traction could excite the ganglion and the sympathetic nervous system (afferency), the thalamus and the cortex, giving an influence on the whole body…

-> Important : Take care of the ganglion stellatum (K1)


Ganglion cervical supérieur sympathique
Nerf vague (X)
Nerfs cardiaques cervicaux supérieurs (sympathiques et vagaux fusionnés)
Ganglion sympathique cervical moyen
Nerf cardiaque cervical moyen (sympathique)
Nerf phrénique
Nerf cardiaque cervical inférieur (vagal)
Ganglion vertébral
Artère thyroïdienne inférieure
Artère vertébrale
Ganglion cervico-thoracique (stellaire)
Anse subclavière
Nerf laryngé récurrent
Nerfs cardiaques cervicaux inférieurs (sympathiques)
Branche cardiaque thoracique du nerf vague
4e ganglion sympathique thoracique
Branches cardiaques thoraciques (sympathiques)
Plexus cardiaque
Nerf phrénique (coupé)
Ganglion cervical supérieur sympathique
Nerf vague (X)
Nerf cardiaque cervical supérieur (sympathique)
Nerf cardiaque cervical supérieur (vagal)
Ganglion cervical moyen sympathique
Nerf phrénique
Nerf cardiaque cervical moyen (sympathique)
Nerf cardiaque cervical inférieur (vagal)
Ganglion vertébral
Ganglion cervico-thoracique (stellaire)
Nerfs cardiaques cervicaux inférieurs (sympathiques)
3e ganglion thoracique sympathique
Branches cardiaques thoraciques (sympathiques)
Branche cardiaque thoracique du nerf vague
Nerf laryngé récurrent

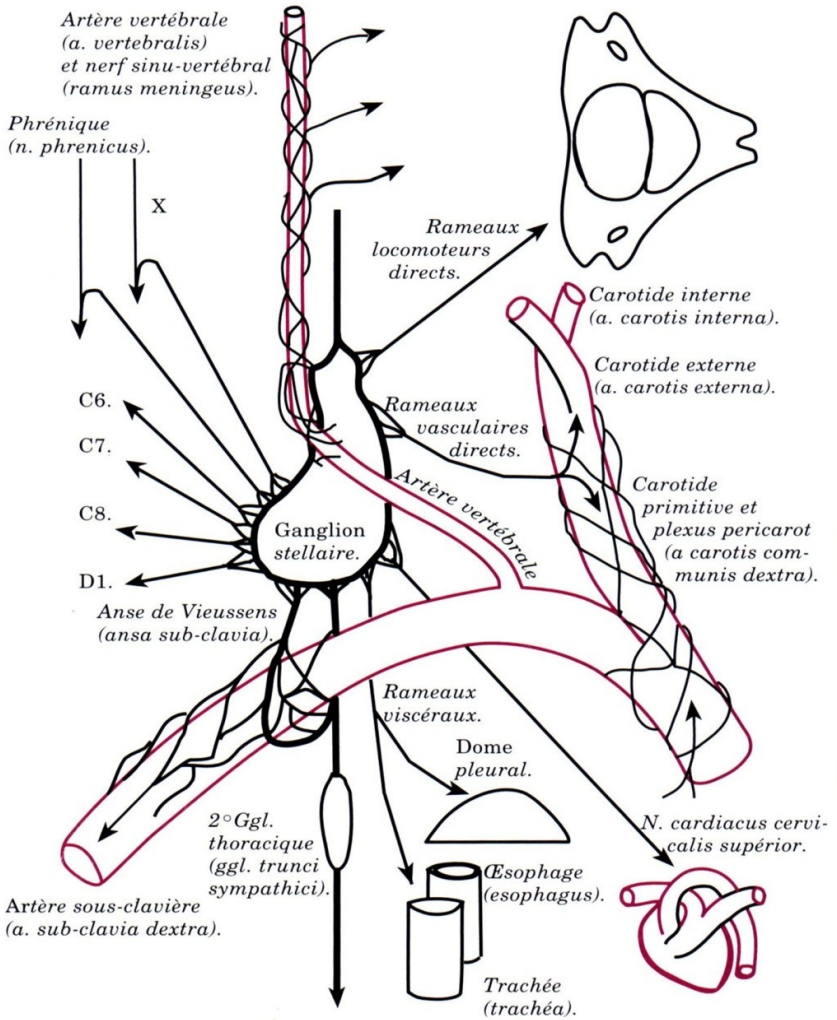


Fig. 6-D-2. Les différentes branches sympathiques issues du ganglion stellaire (ggl. cervicothoracicum) permettent de mieux comprendre la symptomatologie.

Cardiac symptoms and pathologies

A - The general pain

Type of pain :

- Constrictive, tightening, burning, stab…

Location :

- Retrosternal, epigastric, left shoulder…

Radiation :

- Left arm, jaw

Intensity :

- Can be very different between individuals

B – Thoracic pain

- Infarctus
- Acute pericarditis
- Aortic dissection
- Pulmonary embolism
- Others : pleural pain, pulmonary pain, parietal pain…

C - Dyspnea

Different cardiac pathologies :

- Angor,
- Cardiac insufficiency
- Valvular disease

From pulmonary origin

From a systemic disease : anaemia, obesity…

D - Palpitation

Heart seems to pulsate faster and faster :

- Anxiety ?
- Paroxysmal nodal tachycardia (Bouveret's disease)
- Atrial fibrillation
- Misfires of extrasystoles
- Abnormally fast beat

More serious if there is a cardiopathy

E – Blackout / Faint

- Sudden loss of consciousness with return to the normal state
- Can be benign : vagus faint
- Death is possible when cardiopathy (sudden cardiac death)

Minimal cardiac examination

- Pulse (2 arms, feet)
- Blood pressure (2 arms)
- Cardiac and pulmonary auscultation
- Cardiac insufficiency signs : Inferior limbs edema (white, soft, no pain), jugular turgescence, hepatomegaly

Practice

- Attraction test for the heart/pericardium

-> Active Listening Test

- Sterno-pericardial ligaments tests and release :

- Superior Sterno-pericardial ligament test
- Inferior Sterno-pericardial ligament test

-> Test the return movement.

Dynamic release.

Attention : Not for everyone ! (arthrosis, cardiac pathologies…)

- Superior sterno pericardial ligament release (stretching)

-> Stretching ligaments with breathing

- Anterior sterno pericardial ligaments release (global)

-> Stretching ligaments with breathing

- Vertebro-pericardial ligament test and release

-> Release by stretching

- Thyro-pericardial fascia test and release

-> Fascia technique

- Global release of the heart and pericardium

End