

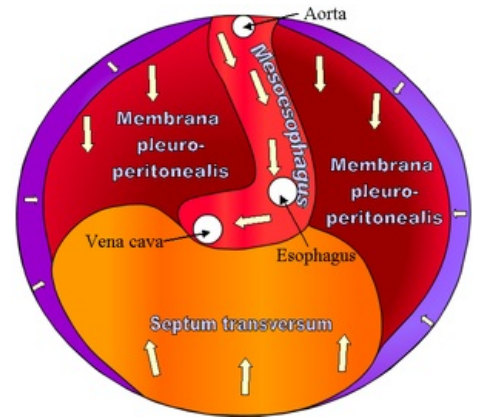
# Development of the diaphragm

The **diaphragm** arises from four embryonic components:

- transverse septum,
- pleuroperitoneal membranes,
- dorsal mesentery of the oesophagus,
- muscle growing from the lateral body wall.

## Transverse septum

- It forms the center of the tendineum of the diaphragm,
- grows dorsally from the ventrolateral body wall and forms a semicircular plate that separates the heart from the liver,
- the first septum is found as a thickened plate cranial to the pericardial cavity (still in the target stage), when the head is turned ventrally, the septum reaches ventrally and below the base of the heart,
- the septum does not separate the thoracic and peritoneal cavity completely → there remains an opening on the sides of the esophagus → the pericardioperitoneal channel,
- the septum enlarges and fuses with the mesenchyme ventral to the pharynx (primitive mediastinum) and with the pleuroperitoneal membrane.



Embryological development of the diaphragm

## Pleuroperitoneal membrane

- They merge with the dorsal mesentery of the esophagus and the septum transversum,
- this process forms a septum between the thoracic and abdominal cavity and creates a primitive diaphragm,
- even if they make up a large part of the fetal diaphragm, their share is only small in the newborn.

## Posterior oesophageal mesentery

- It merges with the previous structures, forms the middle part of the diaphragm,
- crossing *crura diaphragmatis* arise from myoblasts growing into the mesentery.

## Invasion of the muscles of the lateral body walls

- During the 9th to 12th week, the lungs and pleural cavity expand, growing into the surrounding mesenchyme and splitting the caudal mesenchyme into two layers (as they did with the pericardium anteriorly),
  - outer layer – forming the chest wall,
  - inner layer – with its muscle elements it contributes to the formation of the peripheral parts of the diaphragm,
- further growth then gives rise to the right and left *costophrenic recess*,
- during the 4th week of development, the septum transversum is somewhere at the level of C3–C6 of the cervical somite, during the 5th week, myoblasts pulling the nerves (*phrenic nerve*), enter it, later when the septum continues to progress caudally and takes the nerves with it,
  - the nerves go to the diaphragm by passing through the pleuropericardial membranes, which explains the anatomical location of the nerves on the pericardium.

**Figure 4** ([http://anmat.chytrak.cz/emb/kap05\\_4.jpg](http://anmat.chytrak.cz/emb/kap05_4.jpg))

## Links

## Related articles

- Development of the respiratory system

## References

- MOORE, Keith L. – PERSAUD, T. V. N.. *Zrození člověka*. 1. edition. Praha : ISV, 2002. pp. 564. ISBN 80-85866-94-3..