



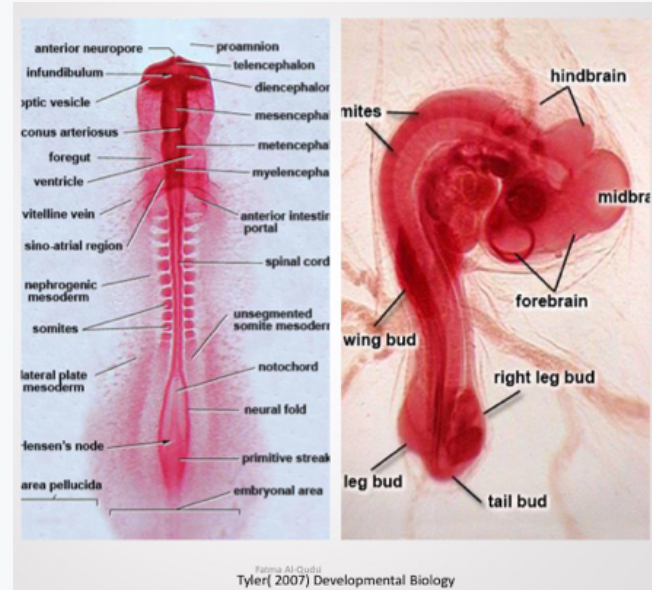
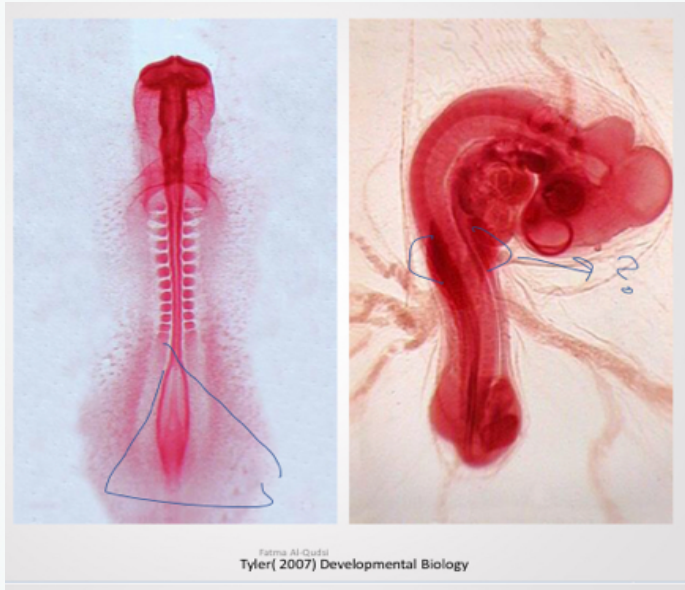
# Embryology

Bio 355



# What is embryology?

It is a science that studies between fertilization and birth, the developing organism is known as an embryo.



# Branches of embryology

Descriptive Embryology

Comparative

Developmental Biology

Experimental

Ontogeny

Teratology

Tissue culture

Ecological developmental biology



# Historical overview

**Aristotle** was the first to study comparative developmental anatomy.

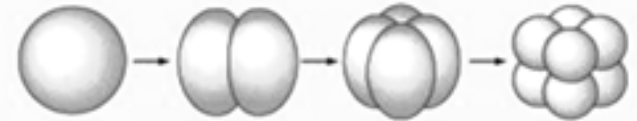
He noted that of the animals are born:

- Oviparity
- Viviparity
- Ovoviviparity

Also, he identified the two major cell division patterns:

- holoblastic pattern of cleavage
- meroblastic pattern of cleavage

Holoblastic cleavage



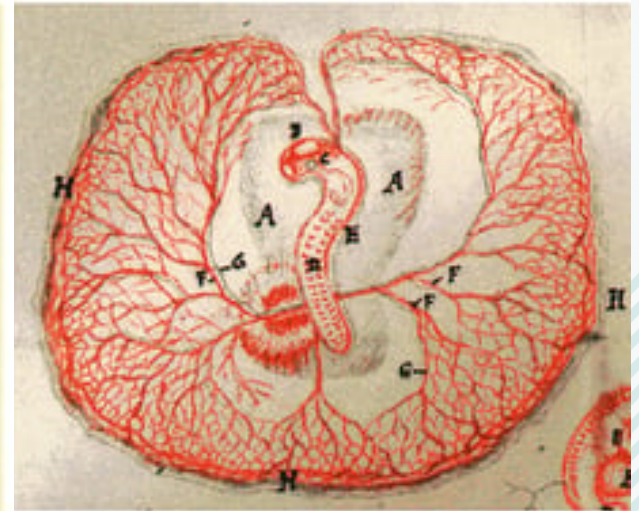
Meroblastic cleavage





# Historical overview

in 1672, **Marcello Malpighi** published the first microscopic account of chick development.  
the first circulation of the arteries and veins—to and from the yolk—were identified.

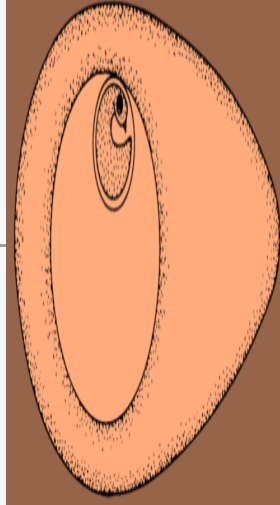
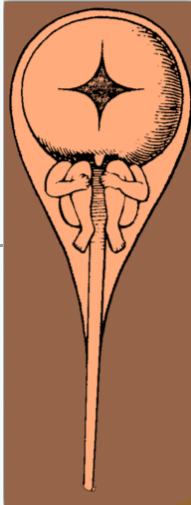


# Development Theories

## Preformation theory

Malpighi: the organs of the embryo are formed de novo ("from scratch") at each generation, or **the embryo is already form it weather in ova or in sperm.**

Hartsoeker became an outspoken proponent of the spermist version of preformation theory.



## Epigenesis theory

**the growth of an egg cell that develops in stages to finally produce a complex organism.**

The first view, epigenesis, was supported by Aristotle and Harvey.

By carefully observing the development of chick embryos, Wolff demonstrated that the embryonic parts develop from tissues that have no counterpart in the adult organism.

Supported by Spallanzani and vonbaer.

# علم الأجنة في القرآن

مِنْ نُطْفَةٍ خَلَقَهُ فَقَدَّرَهُ) أَي: جعله مُقَدَّرًا أَطْوَارًا: نطفة، ثم علقه، ثم مضغه)

القرآن الكريم  
كلمة في صورة

قال تعالى:

يَتَذَكَّرُ الْإِنسَانُ  
أَلَمْ يَكُنْ نُطْفَةً مِنْ مَنَى يُمْنَى (٢٧)  
ثُمَّ كَانَ عَلَقَةً فَخَلَقَ فَسَوَّى (٢٨)  
سورة القيامة

نُطْفَةٌ: قطرة ماء  
يُمْنَى: تصب من الرجل في  
رحم المرأة  
عَلَقَةٌ: قطعة دم متجمد  
الوسيط لطنطاوي  
www.nature.com

نطفة

علقه

مضغة

fb.com/QuranKareemWordInPicture