CELL 413/613 - Embryology

Fall, 2002; TTH – 11:00 - 12:15 am

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Text: **Human Embryology and Developmental Biology** (2nd Ed.) by B.M. Carlson

Description and Content: The focus of this course is on the anatomy of vertebrate embryogenesis with specific emphasis on humans. Topics include Fertilization, Implantation, Reproductive Physiology, Morphogenesis and Organogenesis of a variety of structures.

Goals and Objectives: The primary objective of this course is to introduce students to developmental anatomy of the human embryo. Emphasis is placed on **anatomical change** with some discussion of developmental mechanism and physiology.

Undergraduates:

1) Attend lectures
2) 4 lecture exams
3) Web-based lab / 2 lab exams, **or** service learning

Lecture Exams – 100 points each, final exam is not comprehensive. Each lecture exam will include a combination of multiple choice, true/false, matching, definitions and short answer questions.

Labs - The goal of the lab is to introduce you to a microscopic examination of the embryo. Histological sections of the chick and the pig embryo will be used to illustrate changes that occur as the embryo develops. Images of serial sections of these embryos have been transferred onto the internet and can be visualized from any computer station on campus or via modem from a remote site. The web address for this lab is: **http://www.tulane.edu./~embryo.** There will be two lab exams worth a total of 100 points (50 points each).

Service Learning – Alternative to lab. In collaboration with the Office of Service Learning at Tulane University and the volunteer services programs at a number of local hospitals. Students will volunteer their time at one of 3 Service Learning sites:

1) University Hospital Labor and Delivery
2) University Hospital OB/GYN
3) Children's Hospital Neonatal Intensive Care Unit

Commitment: 3-4 hours each week (a total of 35 hours during the semester), maintain a journal, write a reflective paper (5-10 pages double spaced). Grade - 100 points, based on attendance, journal and the reflective paper (due on December 5). Weekly journal entries must be submitted electronically at kmuneoka@tulane.edu.

Graduate students:

1) Attend lectures

2) 4 lecture exams

3) 3 take home exams

4) Term Paper

Take Home Exams – Graduate students will take the lecture exam and will be given an open book take home essay exam that will be due electronically by 5 pm of the following day. There will be 3 take home exams associated with each lecture exam. There will not be a take home exam associated with the final exam. Take home exams are worth a total of 75 pts (25 pts each).

Term Paper – A term paper that summarizes research on a specific developmental defect will be due on the last day of class (December 5)

Deadlines:

September 19 – Selection of Topic

October 24 – Outline and Bibliography

November 21 – Rough Draft

December 5 – Final Draft

Grades

Undergraduate Students: 375 total points

- Exams: 300 points
- Lab/Service Learning: 75 points

Graduate Students: 475 total points

- Exams: 300 points
- Take home: 75 points
- Term paper: 100 points

Final Grades for undergraduate and graduate students will be assigned separately

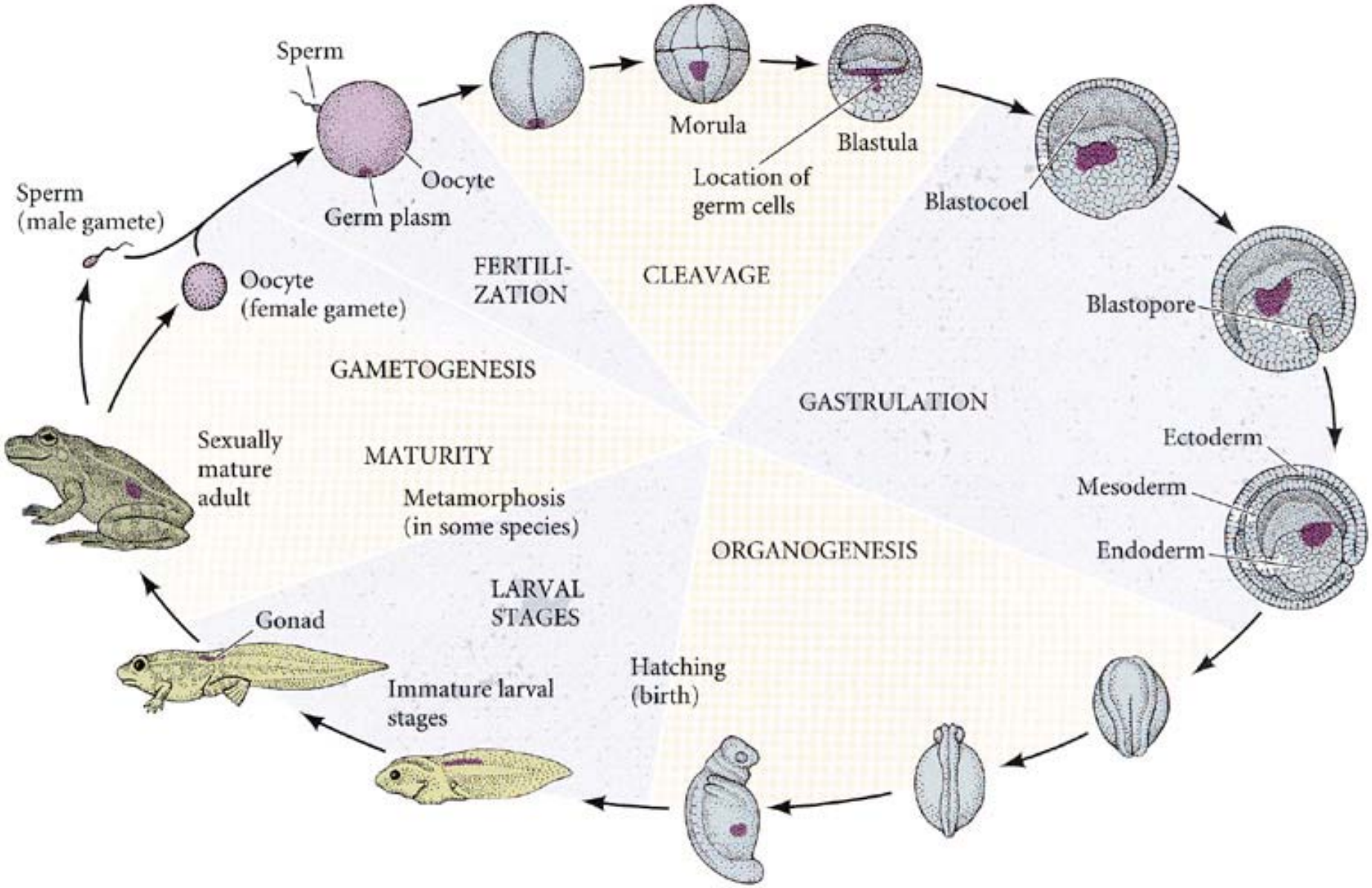
Honor Code

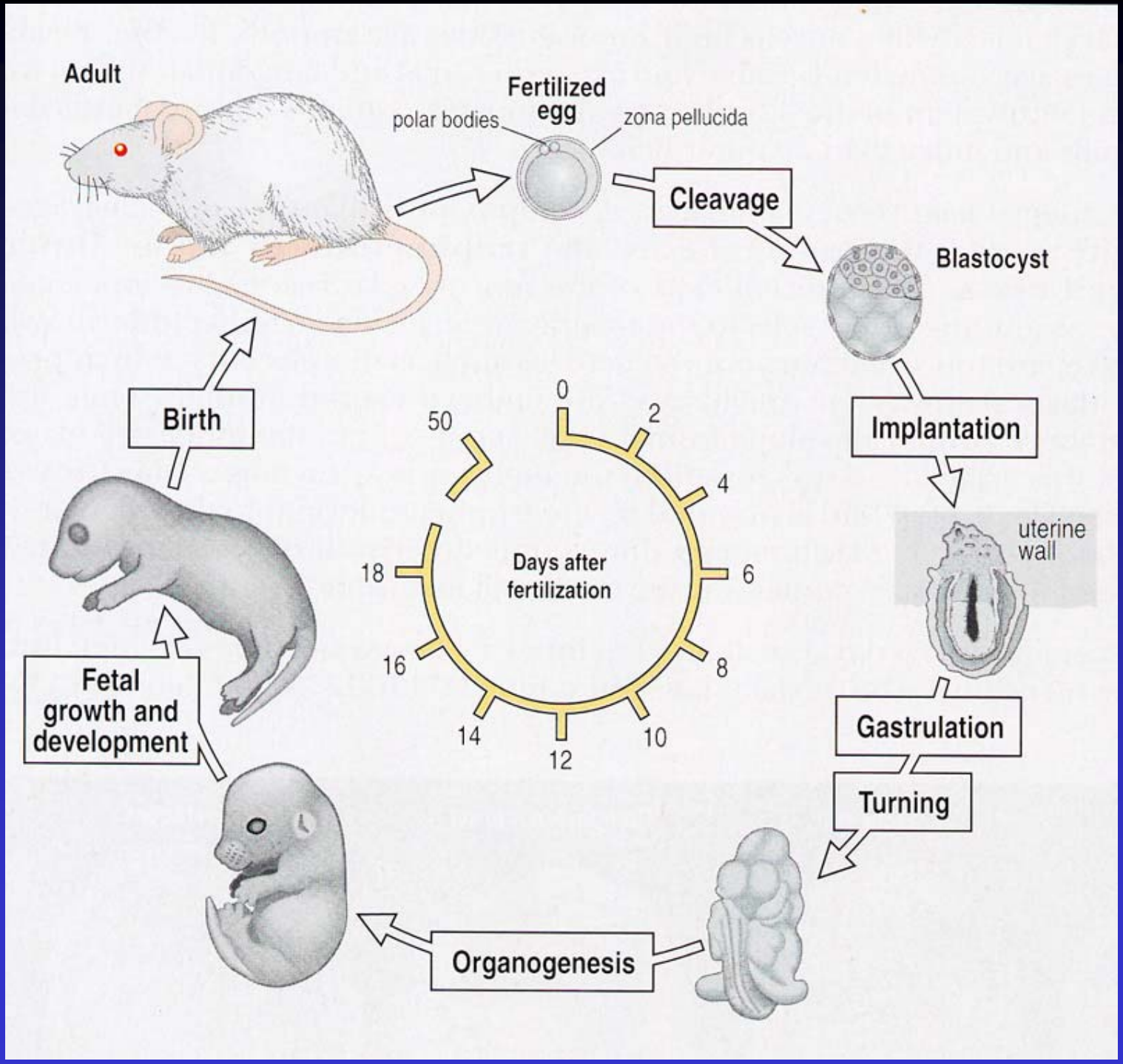
All students are expected to be familiar with and are required to adhere to all tenets of the Honor Code of the College of Liberal Arts and Sciences at Tulane University.

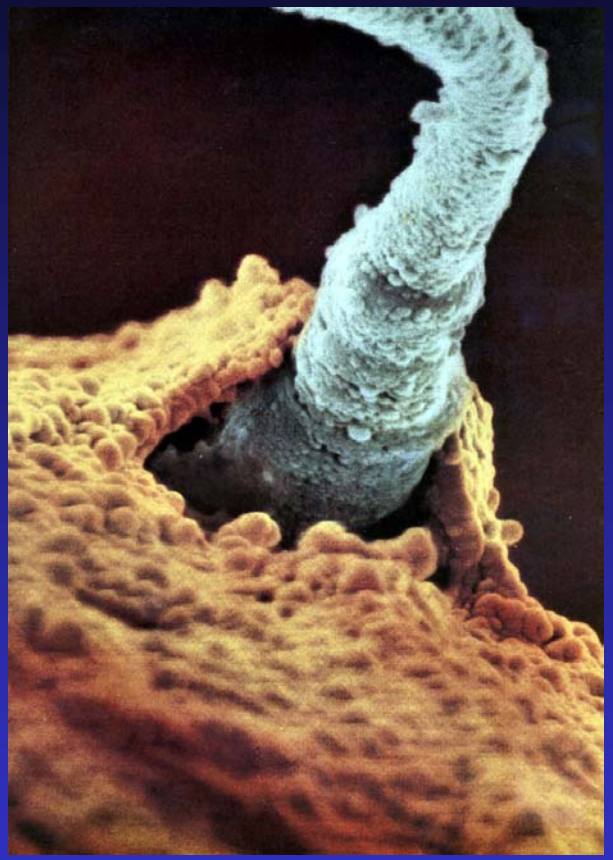
8/29	Introduction
9/3, 9/5	Reproductive Physiology / Fertilization
9/10, 9/12	Cleavage / Implantation
9/17, 9/19	Physiology of Pregnancy/Birth
9/24	Review
9/26	**Exam 1 - Lecture**
10/1	Gastrulation
10/3	Neurulation
10/4	**Lab Exam I – Chick 24h, 33h, 48h**
10/8, 10/10	Placenta/Extraembryonic Membranes
10/15	Birth Defects
10/17	**Exam 2 – Lecture**

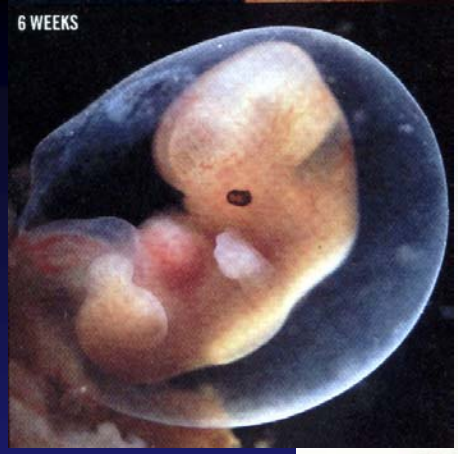
10/22, 10/24	Integument and Musculoskeletal
10/29, 10/31	Limb Development
11/5, 11/7	Pharyngeal Apparatus
11/8	**Lab Exam II – Chick 72h**
11/12	**Exam 3 – Lecture**
11/14	Digestive System
11/19	Respiratory System
11/21	Urogenital System
11/26, 11/28	No Class - Thanksgiving
12/3	Urogenital System
12/5	Review
12/6	**Lab Exam III – Pig 10mm**
12/13 8:00 am	**Final Exam - Lecture**

Life Cycle - Amphibians

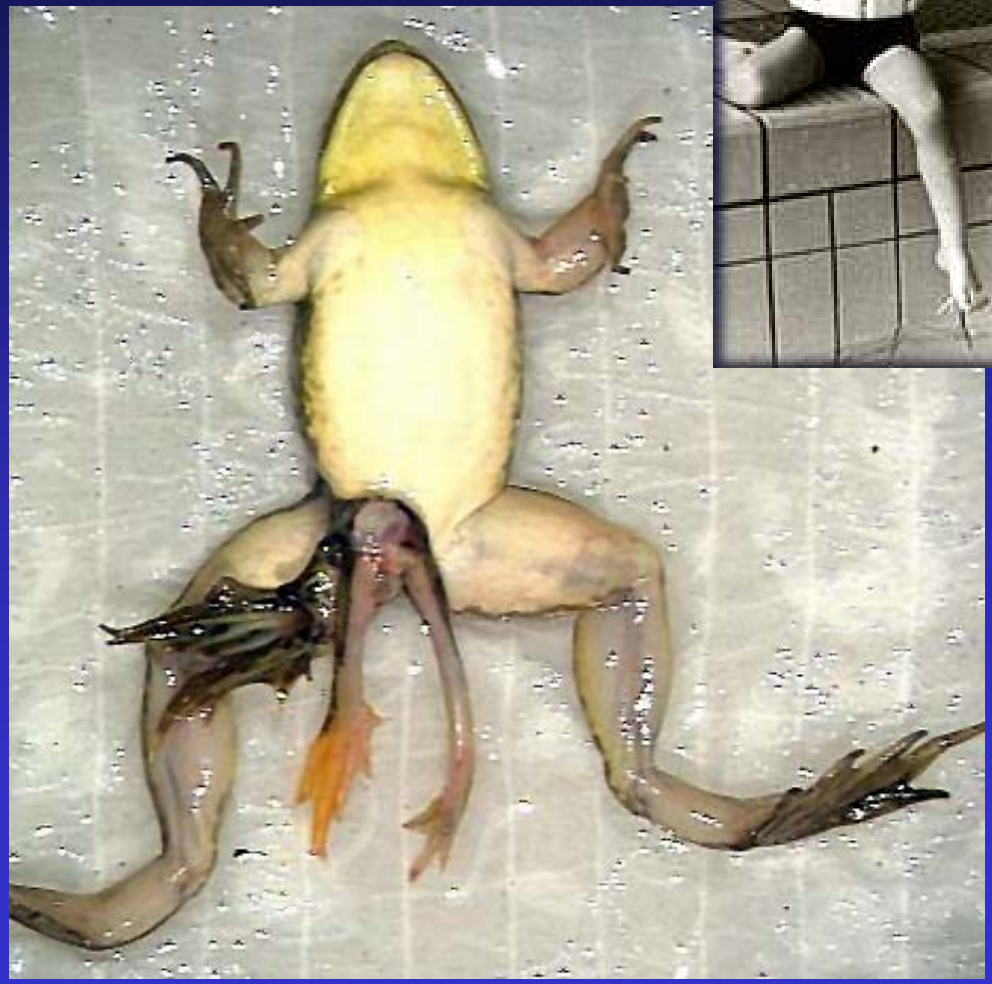



Adult
Fertilized egg
polar bodies
zona pellucida
Cleavage
Blastocyst
Implantation
uterine wall
Gastrulation
Turning
Organogenesis
Fetal growth and development
Birth
Days after fertilization
0
2
4
6
8
10
12
14
16
18
50

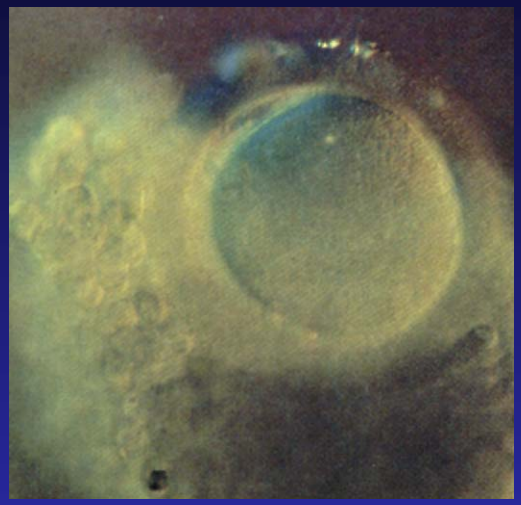


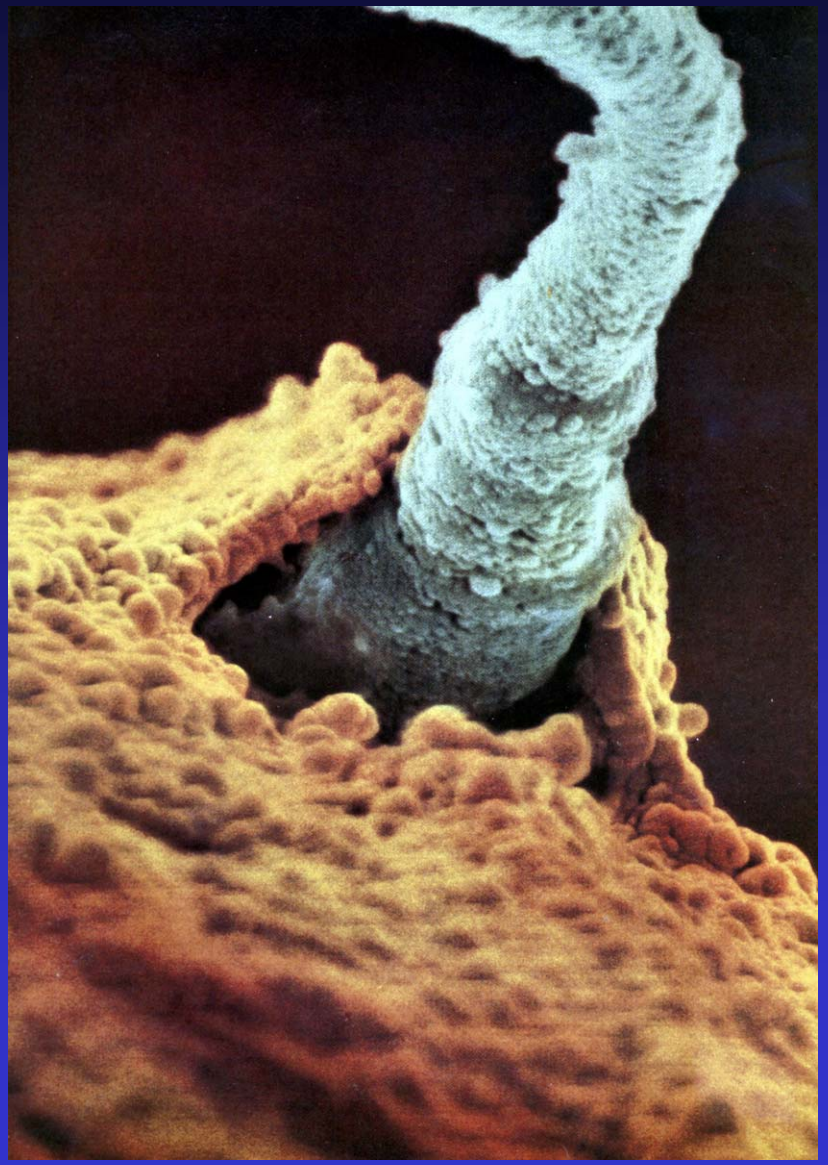

6 WEEKS


a 10 mm
b 10 mm
c 10 mm
d 10 mm
e 10 mm
f 10 mm
g 10 mm



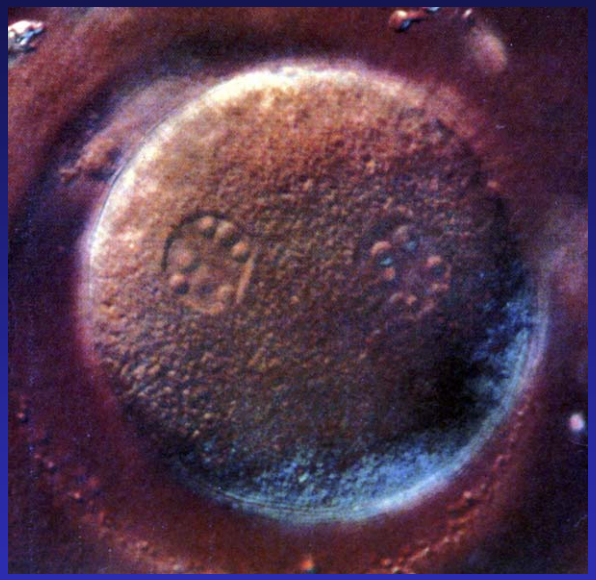
Fertilization

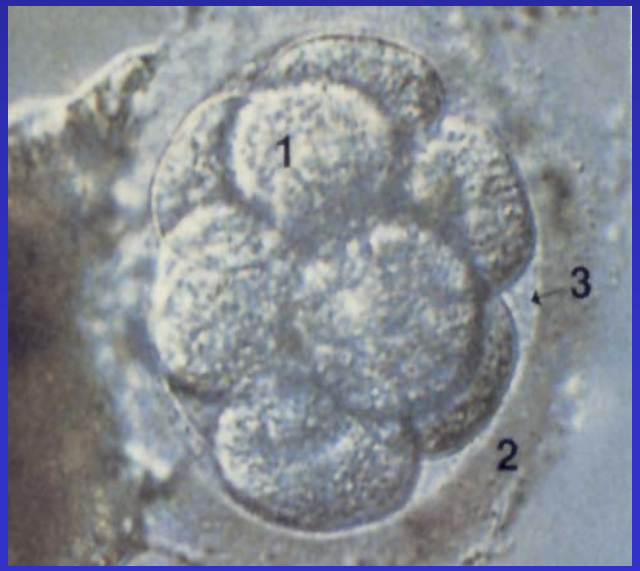




From Life Magazine August, 1990

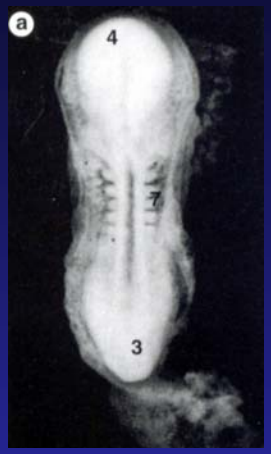
Cleavage



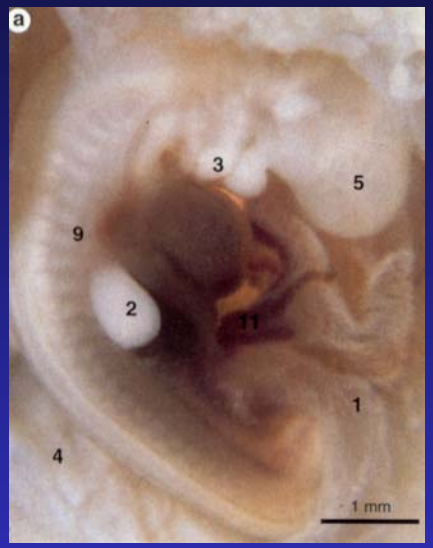


From Life Magazine August, 1990

Morphogenesis/Organogenesis

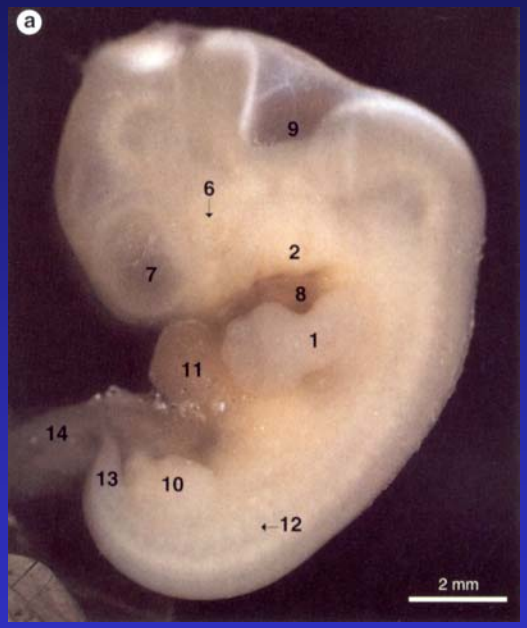


3 Weeks

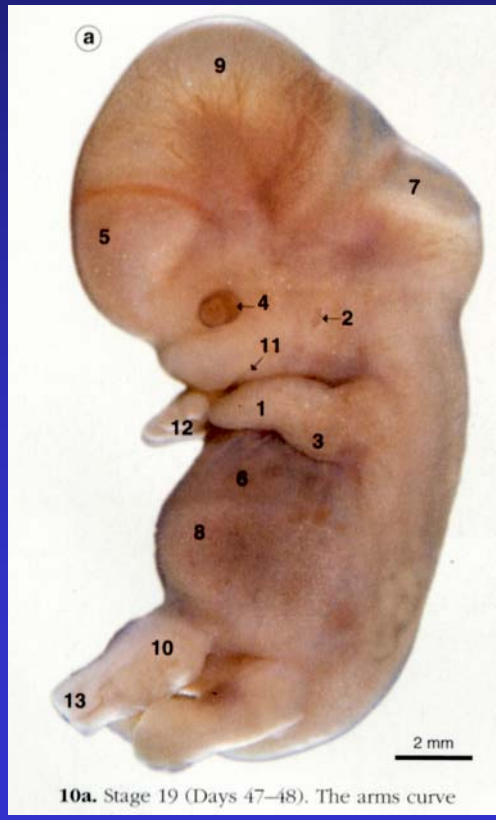


4 Weeks

6 Weeks



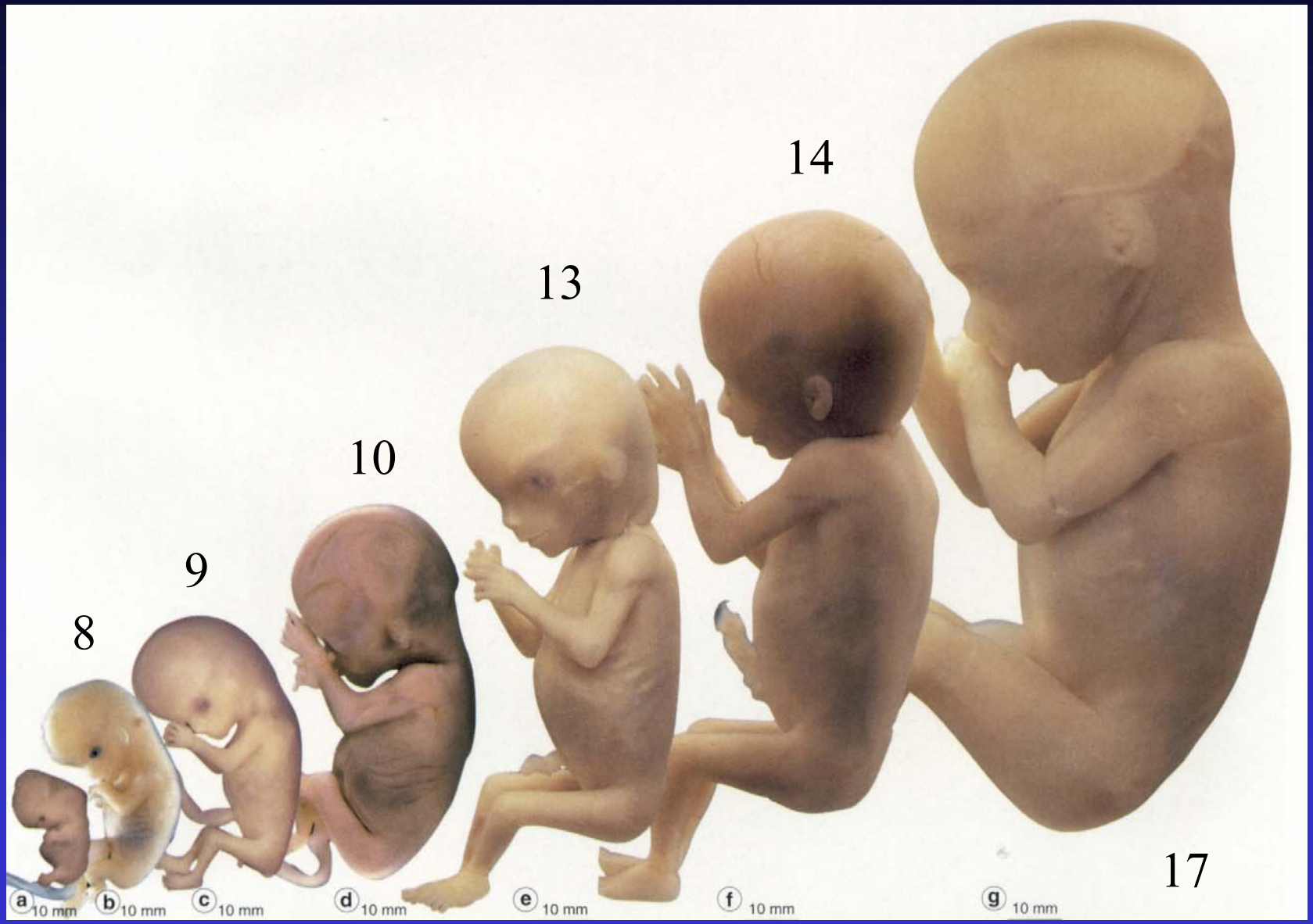
7 Weeks



10a. Stage 19 (Days 47–48). The arms curve

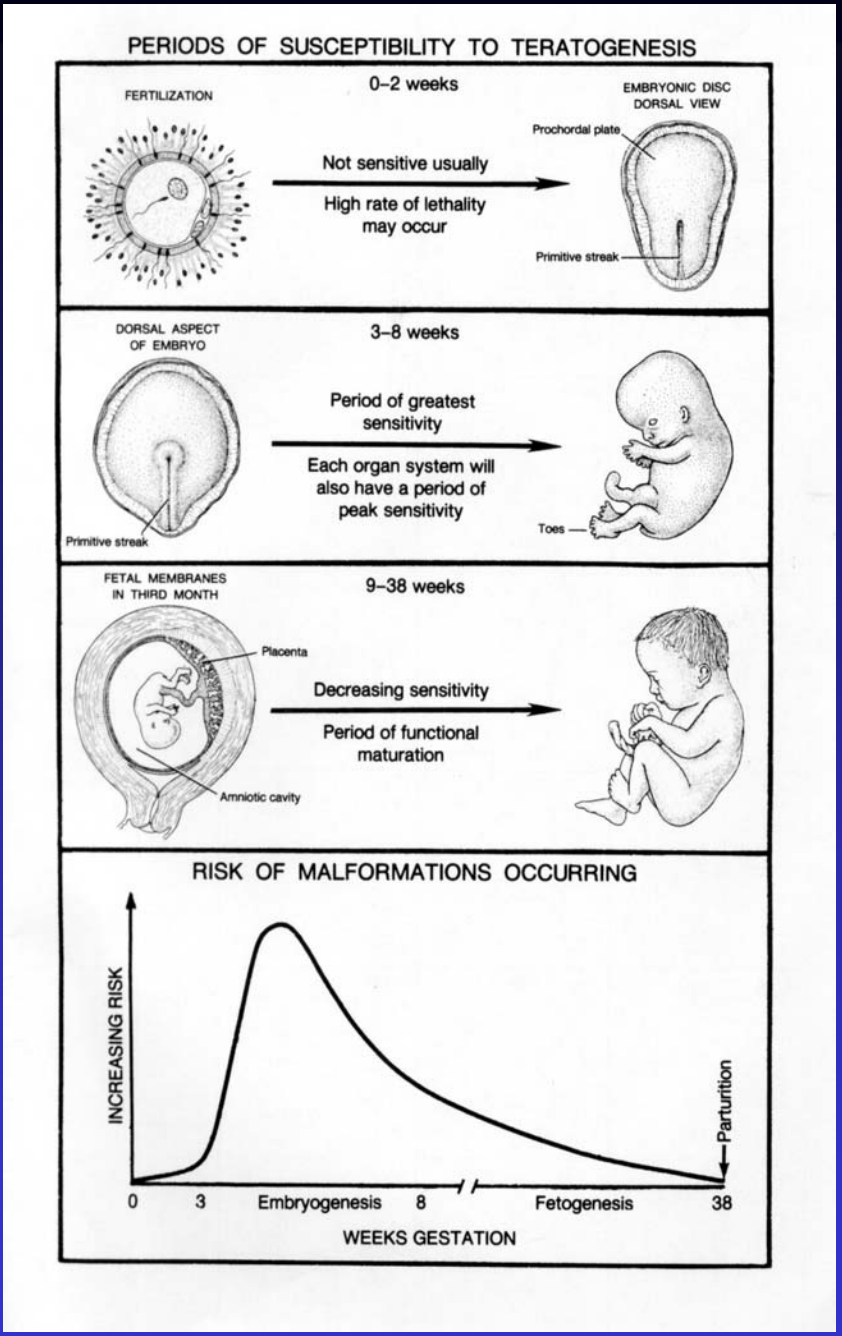
From M.A. England, 1996

Fetal Growth



From M.A. England, 1996

Teratology



From TW Sadler, 2000

Teratology

Cleft Palate

Trisomy 21

Phocomelia

From Brookes and Zietman, 1998

In Utero

12 weeks

18 weeks

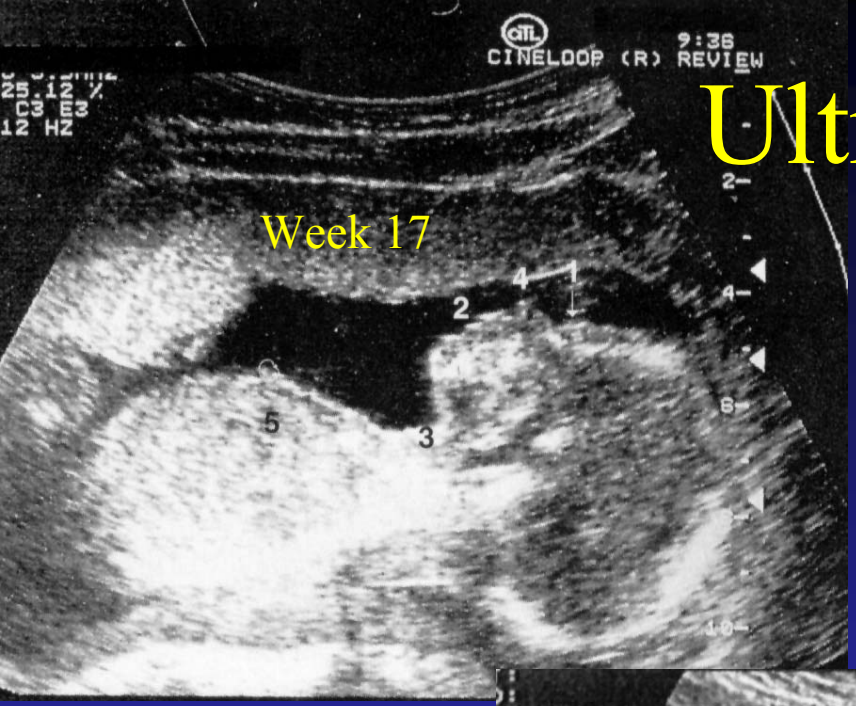
From M.A. England, 1996

In Utero

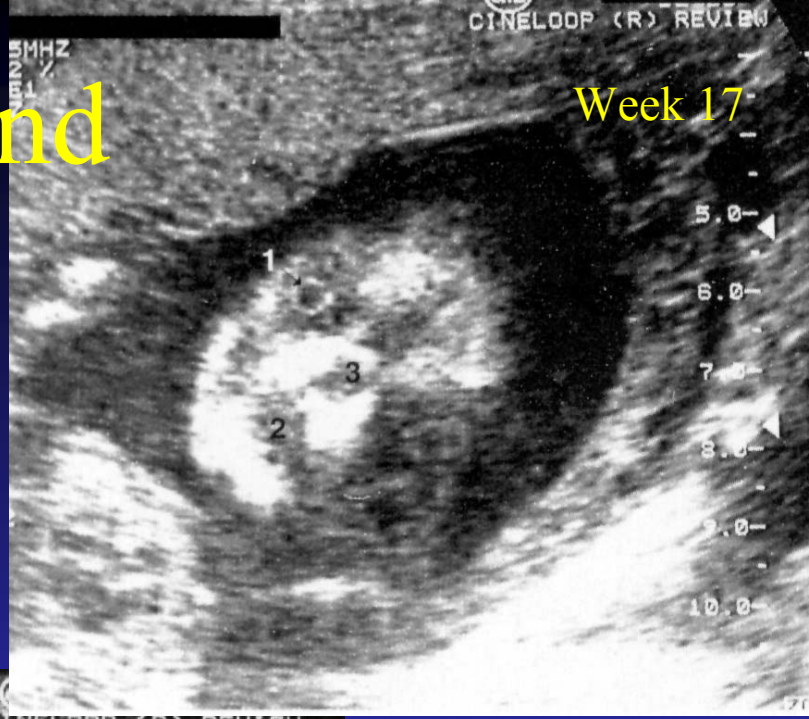
38 Weeks

From M.A. England, 1996

Ultrasound



Face



Profile

Frontal View

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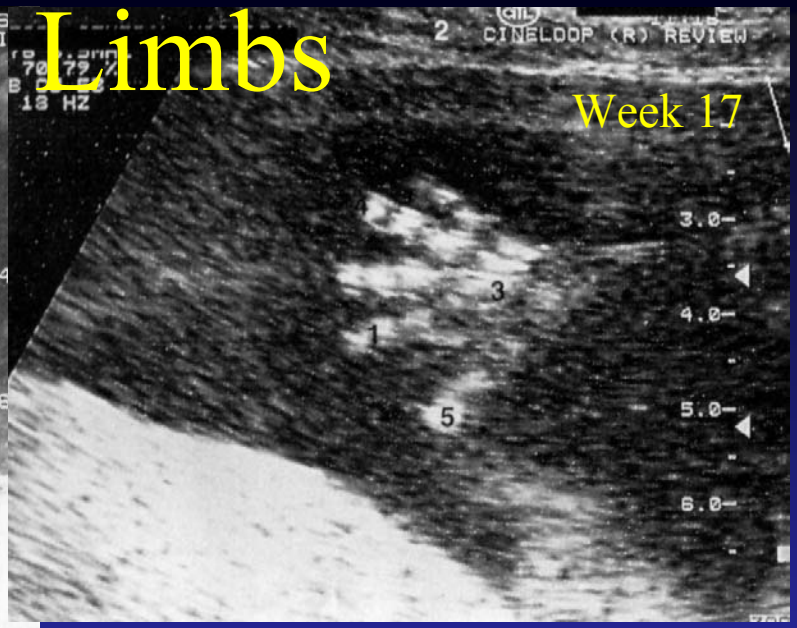
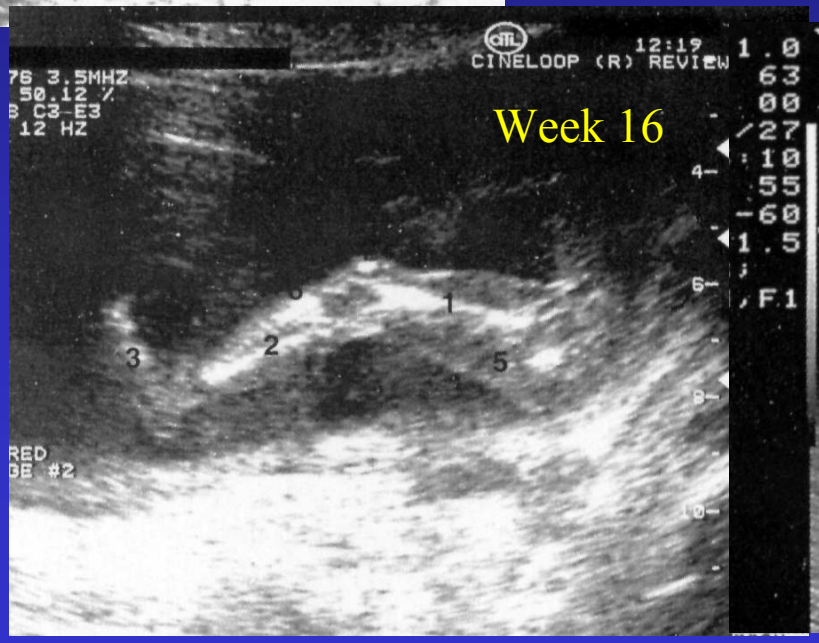
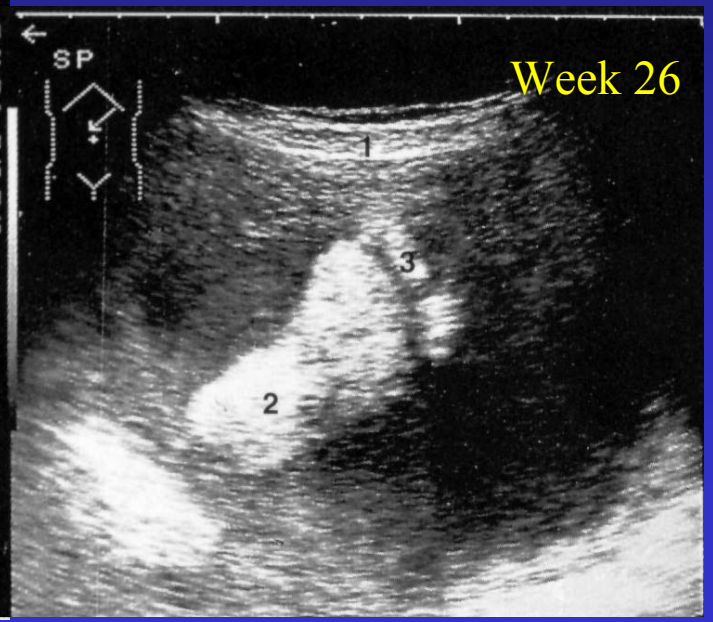
Limbs





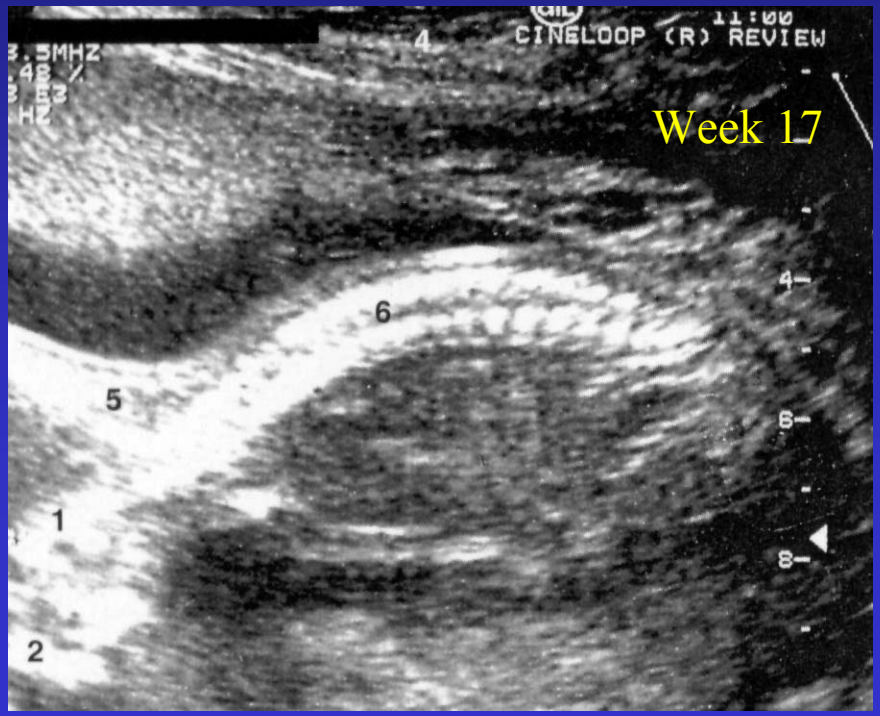


From M.A. England, 1996

Ultrasound

Heart

Spine



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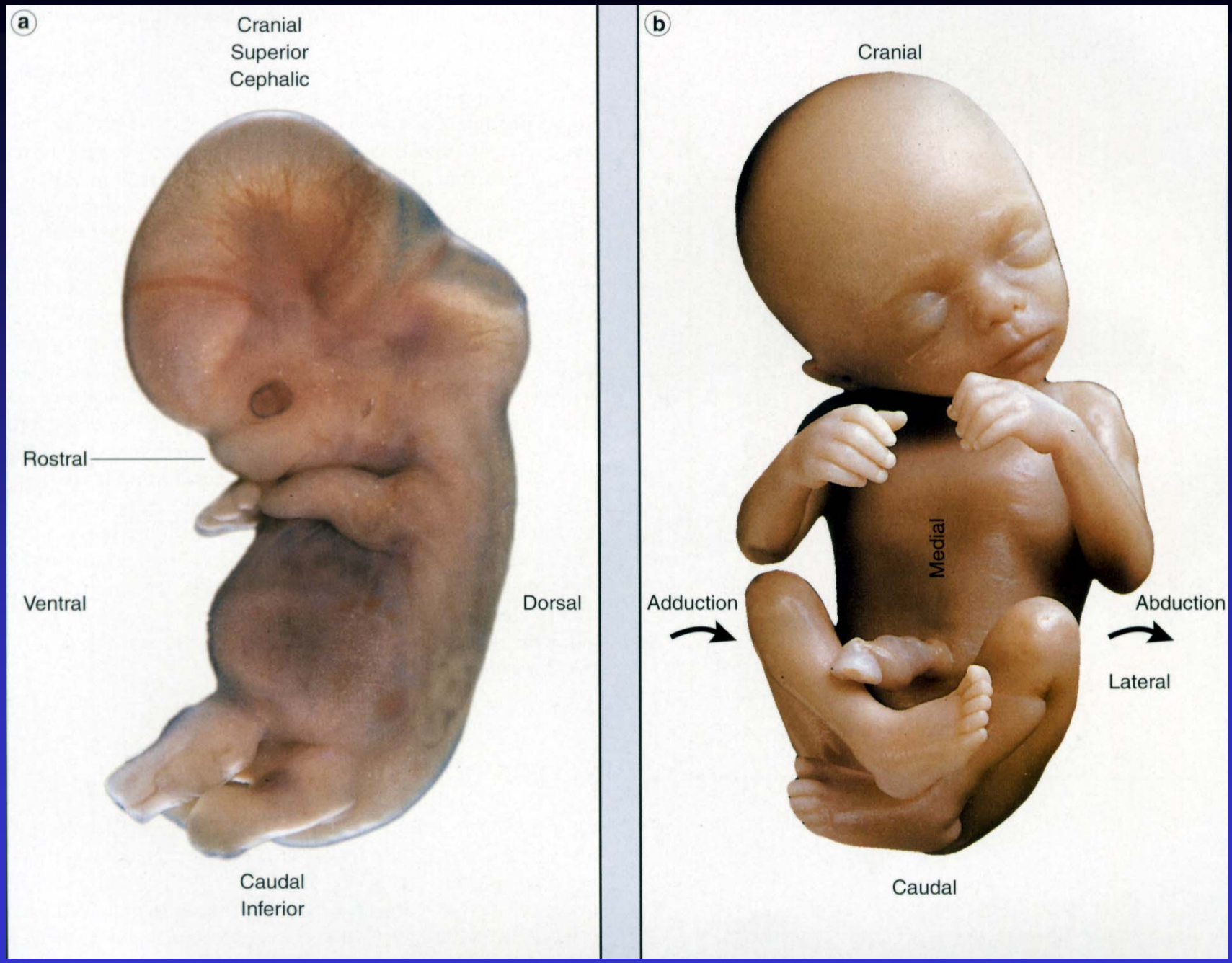

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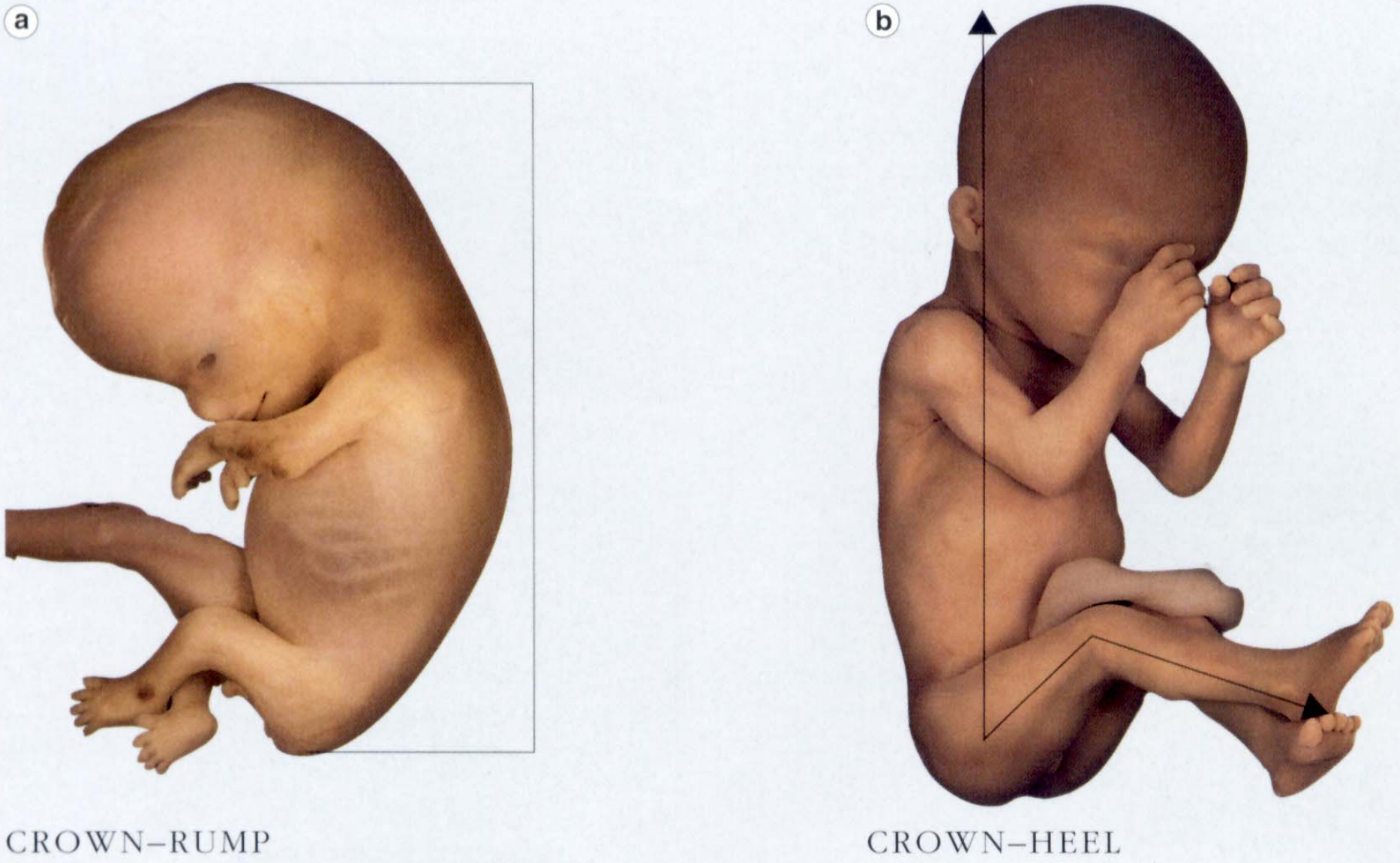

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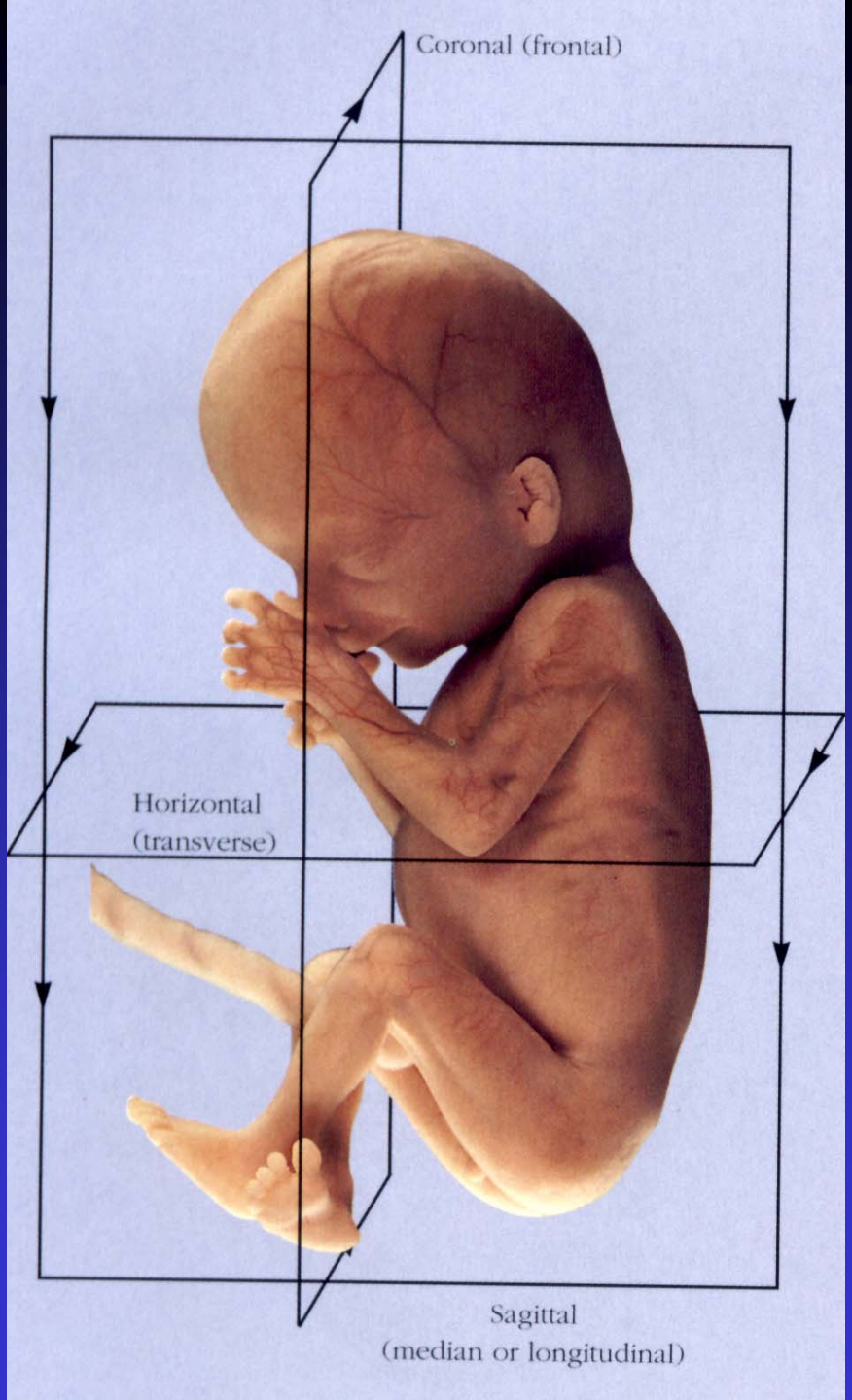

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