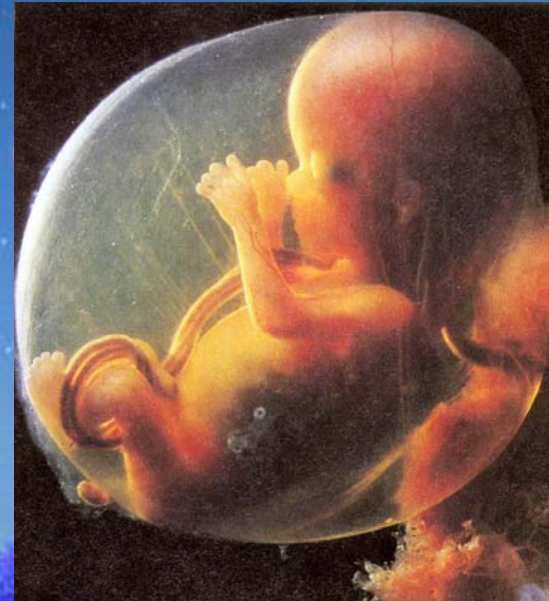


HUMAN EMBRYOLOGY

Department of Histology and Embryology
Jilin University



Chapter 2

General Embryology

Twins, multiplets and conjoined twins

Twins

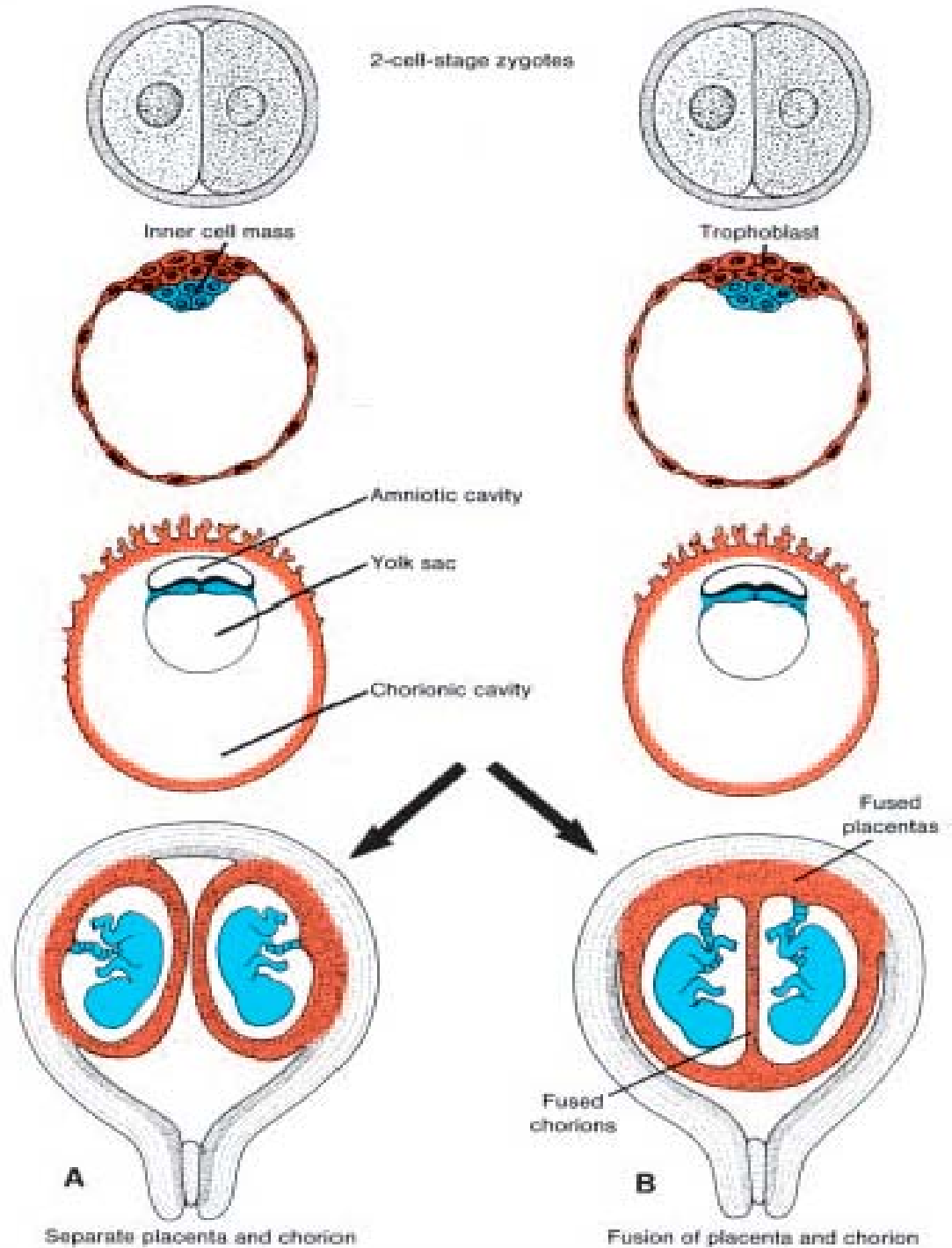
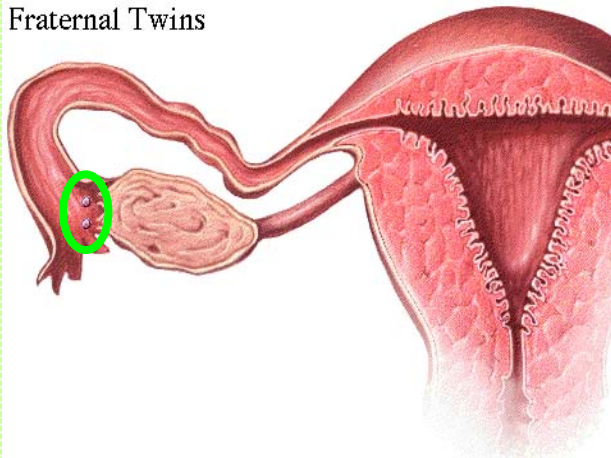
□ dizygotic or fraternal twins:

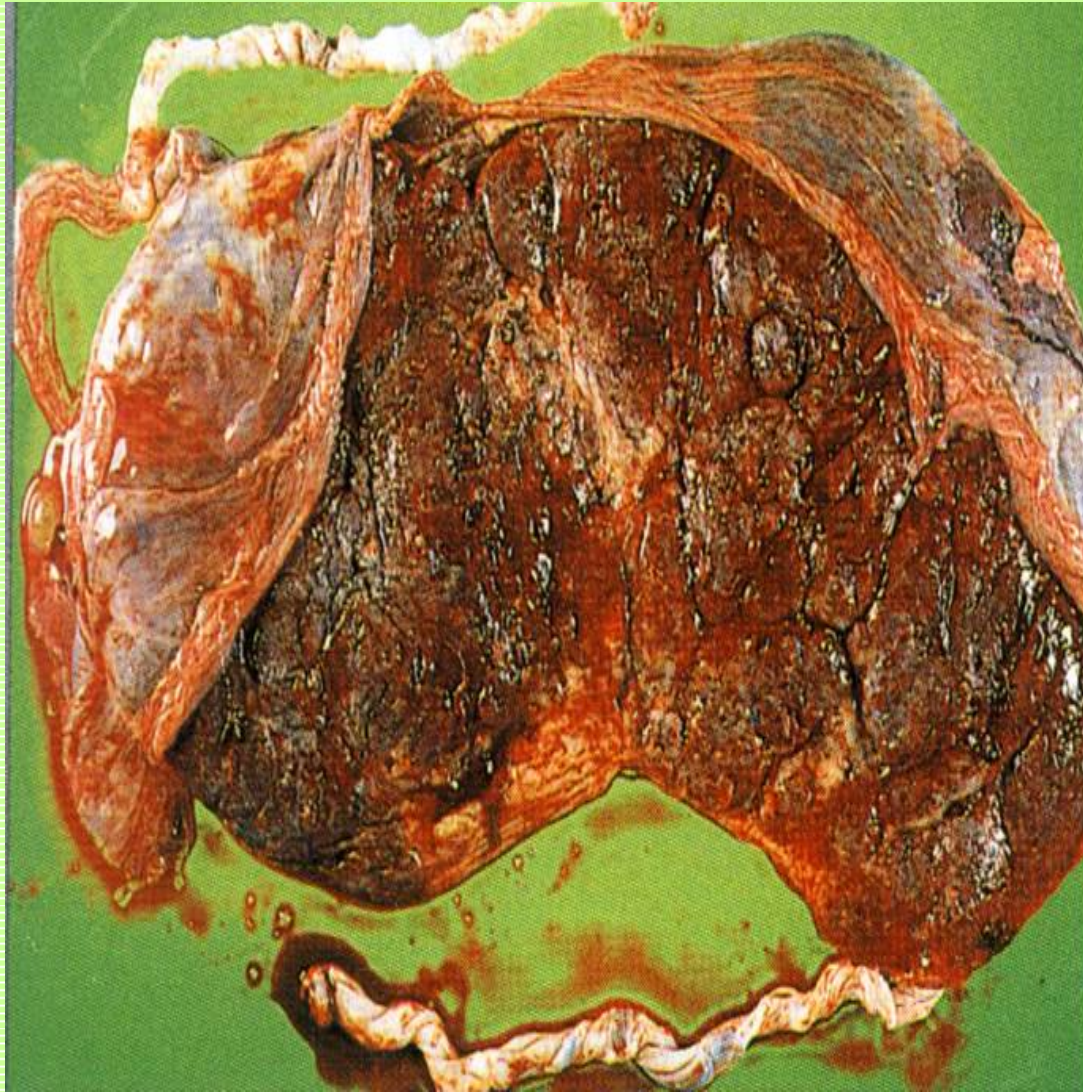
- Two zygotes
- Different genetic constitutions
- Same or different gender
- Respective amnion, chorion and placenta. Sometime, the chorions and placentas may be fused. (erythrocyte mosaicism)
- Family hereditary tendency

□ Monozygotic or identical twins:

- one zygote
- Identical gender, appearance and genes

Fraternal Twins

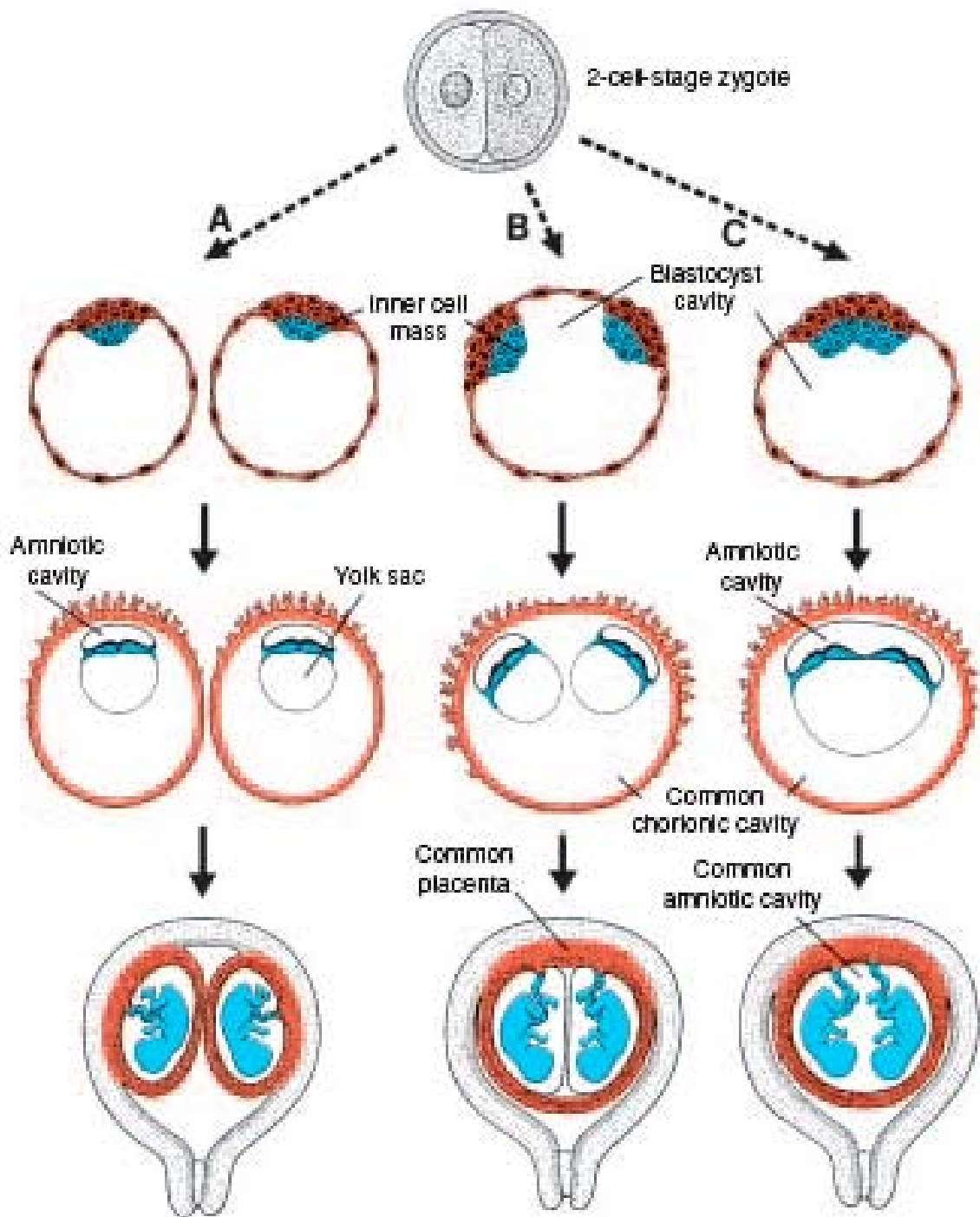


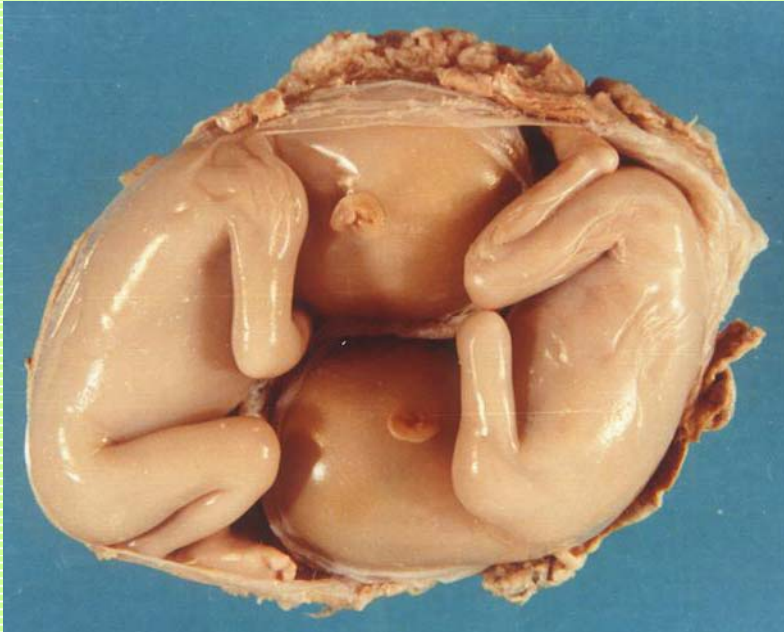


the fused chorions and placentas of dizygotic twins

Monozygotic twins **

- Forming two blastocyst
respective placenta, amnion, and chorion.**
- Forming two inner cell mass in one blastocyst
common placenta and chorion, separate amnion**
- Forming two primitive streaks and two notochords
on one germinal disc
common placenta, amnion, and chorion**





two primitive streaks
and two notochords



two inner cell mass

Multiplets



Monoovular triplets



Polyovular quadruplets (four zygotes)



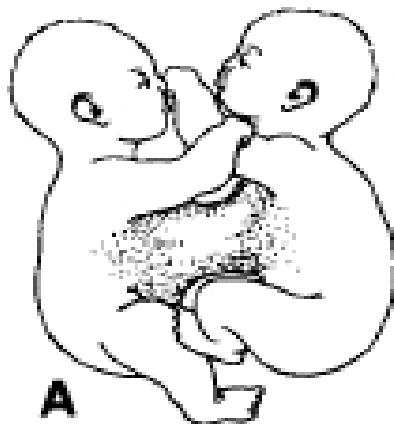
Mixed multiplets(dyzygotic twins and monoovular triplets)



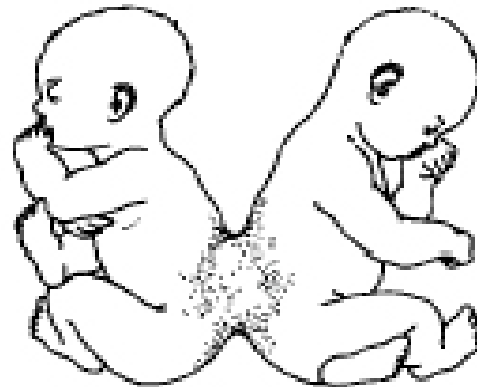
Mixed multiplets(dyzygotic twins and fraternal fetus)

Conjoined (Siamese) twins

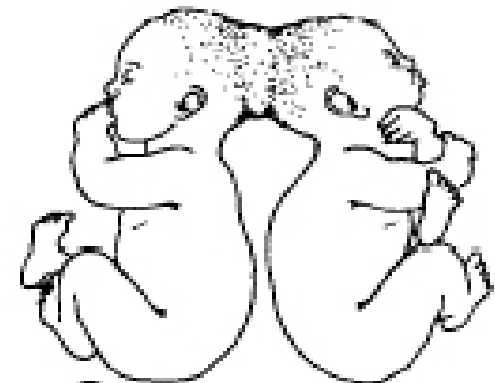
- Partial splitting of the primitive node and streak
- Symmetrical type:
 - according to the nature and degree of union
 - thoracopagus (*pagos*, fastened); pygopagus; craniopagus



A Thoracopagus



B Pygopagus



C Craniopagus

Figure 6.21 Thoracopagus, pygopagus, and craniopagus twins. **Conjoined twins** can be separated only if they have no vital parts in common.



In 1811, the most famous pair of conjoined twins with Chinese blood lineage, Chang Bunker and Eng Bunker, were born in Siamese (Thailand). They were joined at the abdomen and traveled to England and the United States on exhibitions in the mid-1800s. Finally settling in North Carolina, they farmed and fathered 21 children with their two American wives.



thoracopagus



craniopagus

□ Unsymmetrical type



parasitic fetus



fetus in fetu

Key points

- Three reasons of monozygotic/identical twins
- Reason of conjoined twins