Embryonic Duplications in Farm Animals

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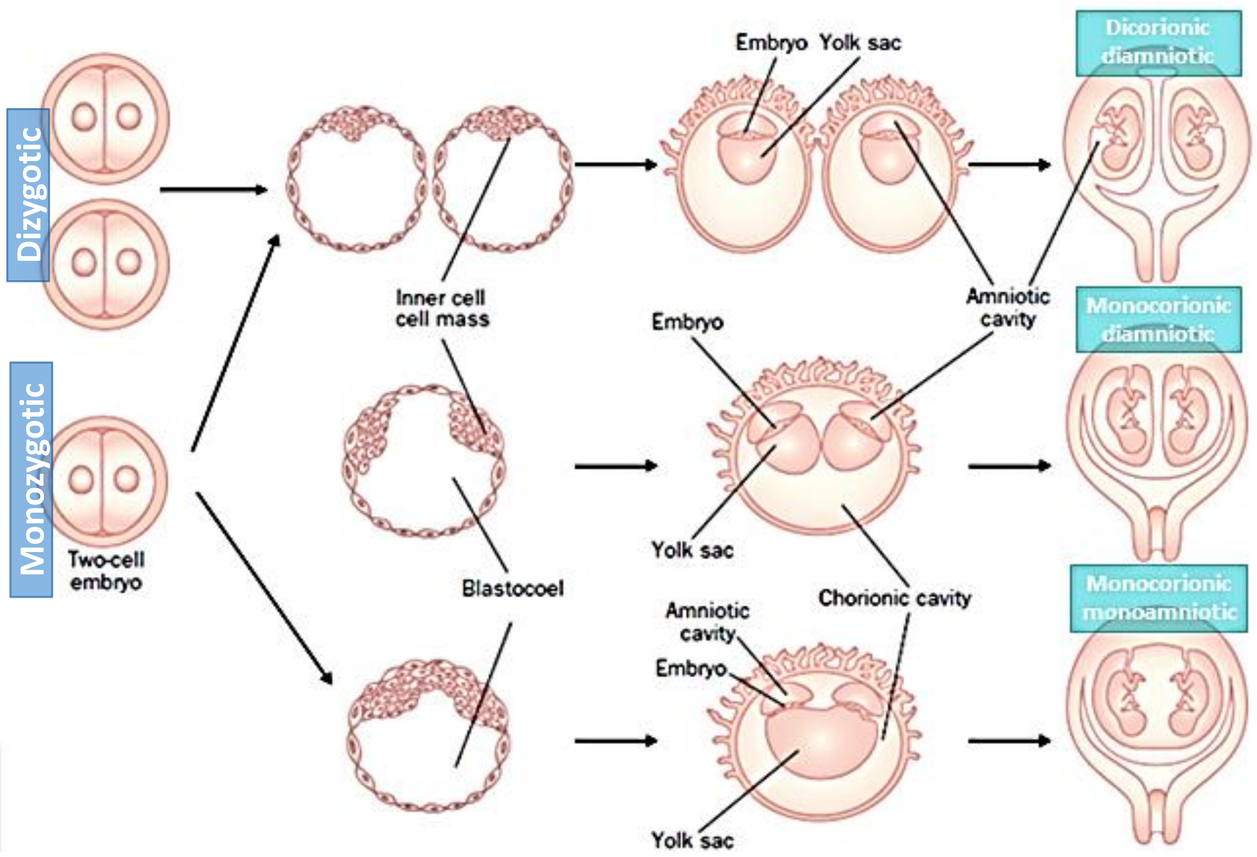
In early development of individuals multiple stages are carried on, the order and coordination of those stages is essential to obtain a morphological, anatomical and functionally normal embryo. If some of these processes go wrong, a wide range of **congenital abnormalities** can be described.

Objectives

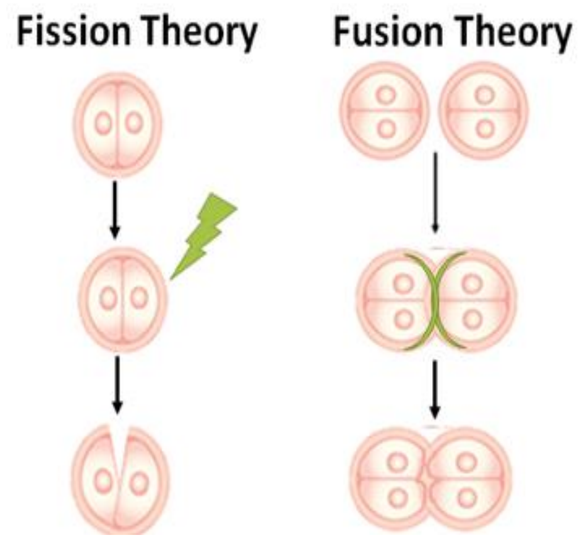
- Expose the embryology of conjoined twins and compare the theories of formation that exist.
- Identify points against or in favour of each theory of conjoined twinning.
- Describe normal twin pregnancies .
- Verify and establish the terminology of different kinds of conjoined twins.
- Estimate the importance of conjoined twins in the livestock production field.

Twin pregnancy



Conjoined twins

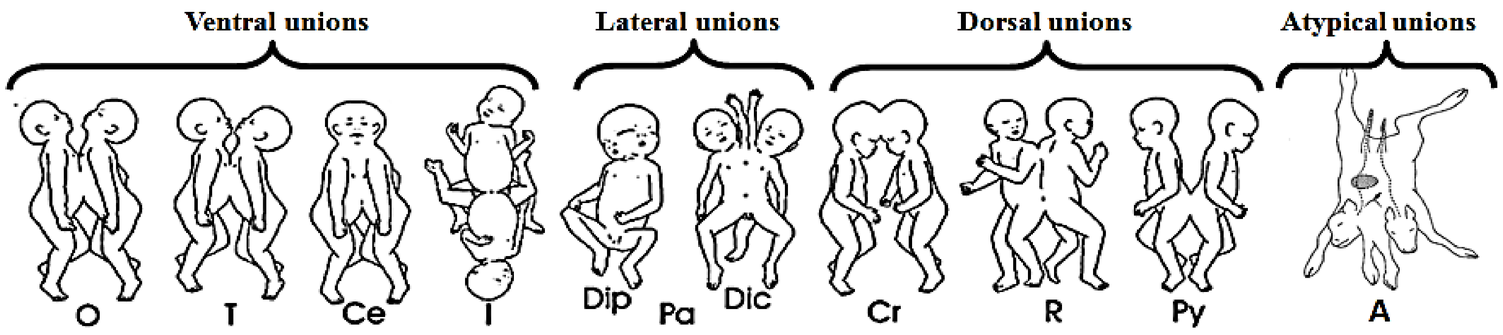
Conjoined twins and embryonic duplications can be defined as a series of progressive deformities ranging from partial duplication of a part of the body to the formation of two fused individuals.



Asymmetric conjoined twins: are formed with the fusion of an autosite, which is the individual with a higher degree of development and autonomy, and a parasitic individual which is united to the autosite and depends on it.

Symmetric conjoined twins: are those which present two fused individuals with the same development degree.

Terminology



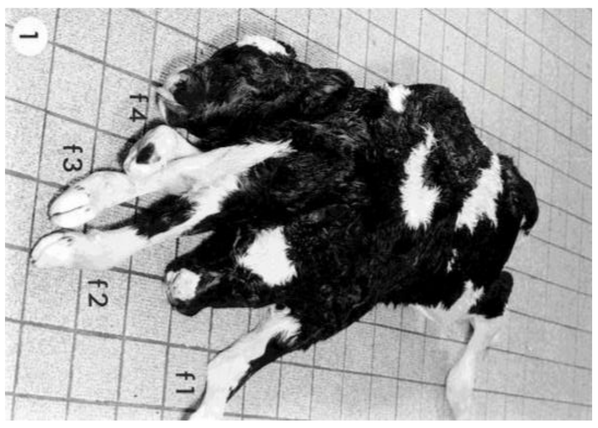
O=*Omphalopagus*, **T**=*Thoracopagus*, **Ce**=*Cephalopagus*, **I**=*Ischiopagus*, **Pa**=*Parapagus*, **Dip**=*Parapagus diprosopus*, **Dic**=*Parapagus dicephalus*, **Cr**=*Craniopagus*, **R**=*Rachipagus*, **Py**=*Pygopagus* , ***A***=*Atypical*

Atypical terminology: Ventral/Lateral/Dorsal union + prefix (*di-*, *tri-*, *tetra-*) and sufix (*–brachius , -pus , -ophthalmia ,...)*
Example: *dicephalus tetrabachius dipus thoracoparapagus* .

Monocephalus tetrabrachius tetrapus thoracoomphalopagus piglets

T*horacopagus* piglets

Tetrabachius tetrapus thoracoparapagus lamb



Dicephalus tetrabachius dipus thoracoparapagus calves

Discussion and Conclusions

- Twins are caused by a multifactorial process therefore it's difficult to establish a general etiological cause.
- The formation theories of conjoined twins are unclear and both are properly checked .
- Naming correctly this kind of abnormalities is difficult, but the use of the adequate terminology can lead to an efficient and correct definition.
- The incidence of conjoined twins might be higher than what is reported in literature because of the lack of reports and interest from the farmers.
- These abnormalities in the gestation can cause dystocia, embryo or pregnancy loss and also damage in the mother due to the dystocia.
- In species which gestate singletons, the economic consequences are more serious than the ones with larger offspring.