ECVET Units as Initial or Additional Training to the European Veterinary Assistant Diploma
No. 2016-1-LV01-KA202-022652

Artificial Insemination

Congenital disorders

In relation to reproduction

Gymnázium a SOŠ Plasy

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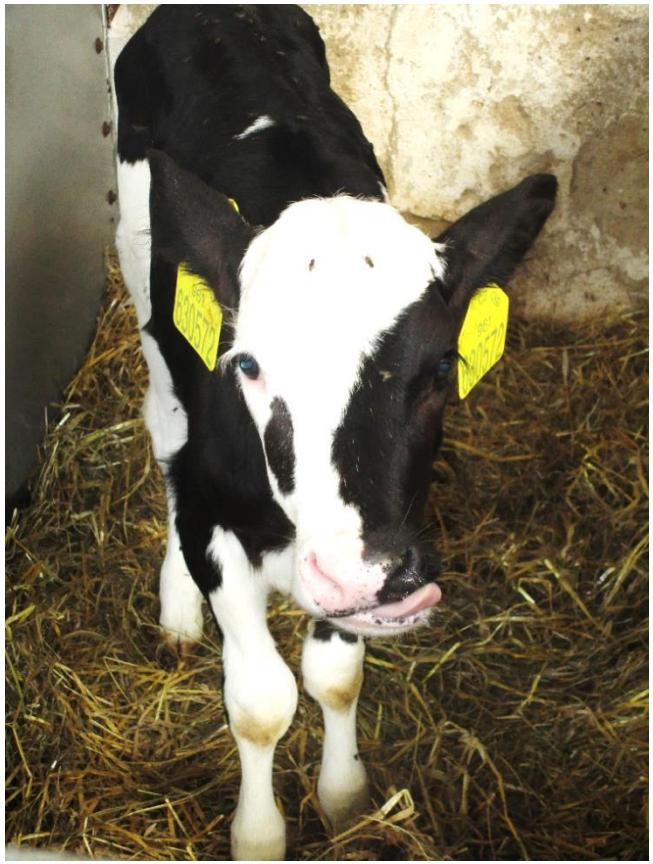
Funded by the European Union 2016-1-LV01-KA202-022652

Sexual differentiation, individual development

- **Sex is genetically determined by two chromosomes – sexchromosomes X and Y**
- **At mammals male sex is determined by chromosome Y**
- **Male diploid cells contain sexchromosomes XY**
- **Chromosome Y at mammals is necessary for creation of testicles**
- **Female cells contain chromosomes XX.**

Embryonic period

- **On dorsal side of abdomen near adrenal glands differentiation of primitive gonads in so called genital groove**
- **Cortex and medulla are developed in gonads**



Embryonic period

- **Under the influence of chromosome Y**
  - **(on the short shoulder of Y - gene which conditions testicles)**
- **Testicle is created from medulla and cortex degenerates**
- **In testicles – Leydig‘s cells**
  - **synthesize hormone testosterone**
  - **at males they help to change Wolfian ducts into outlet sexual pathways**

Embryonic period

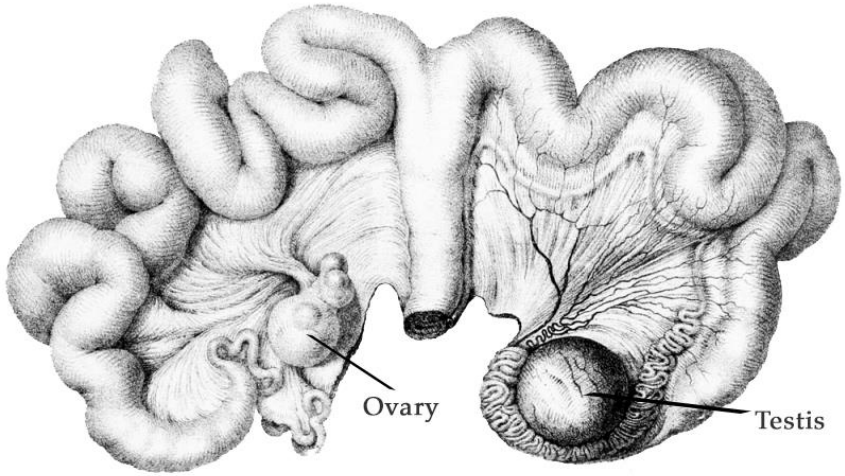
- **At genetical females medulla disappears**
  - **cortex is developed and primary genitals – ovaries are formed**
  - **outlet sexual pathways of females are differentiated from Müller‘s ducts**
  - **their differentiation happens passively (without hormonal effects)**
  - **their differentiation happens later than at males**
  - **a change accurs at females**

Developmental anomalies of genitals

- **During intrauterine life**
  - **Hereditary predisposition**
  - **Unfavorable conditions**
    - **Physical noxy**
    - **Chemical effects**
    - **Infectious effects**
    - **Toxic effects**
  - **Disability of genitals**
  - **Disability of the whole individual during its development**

Hermaphroditism verus

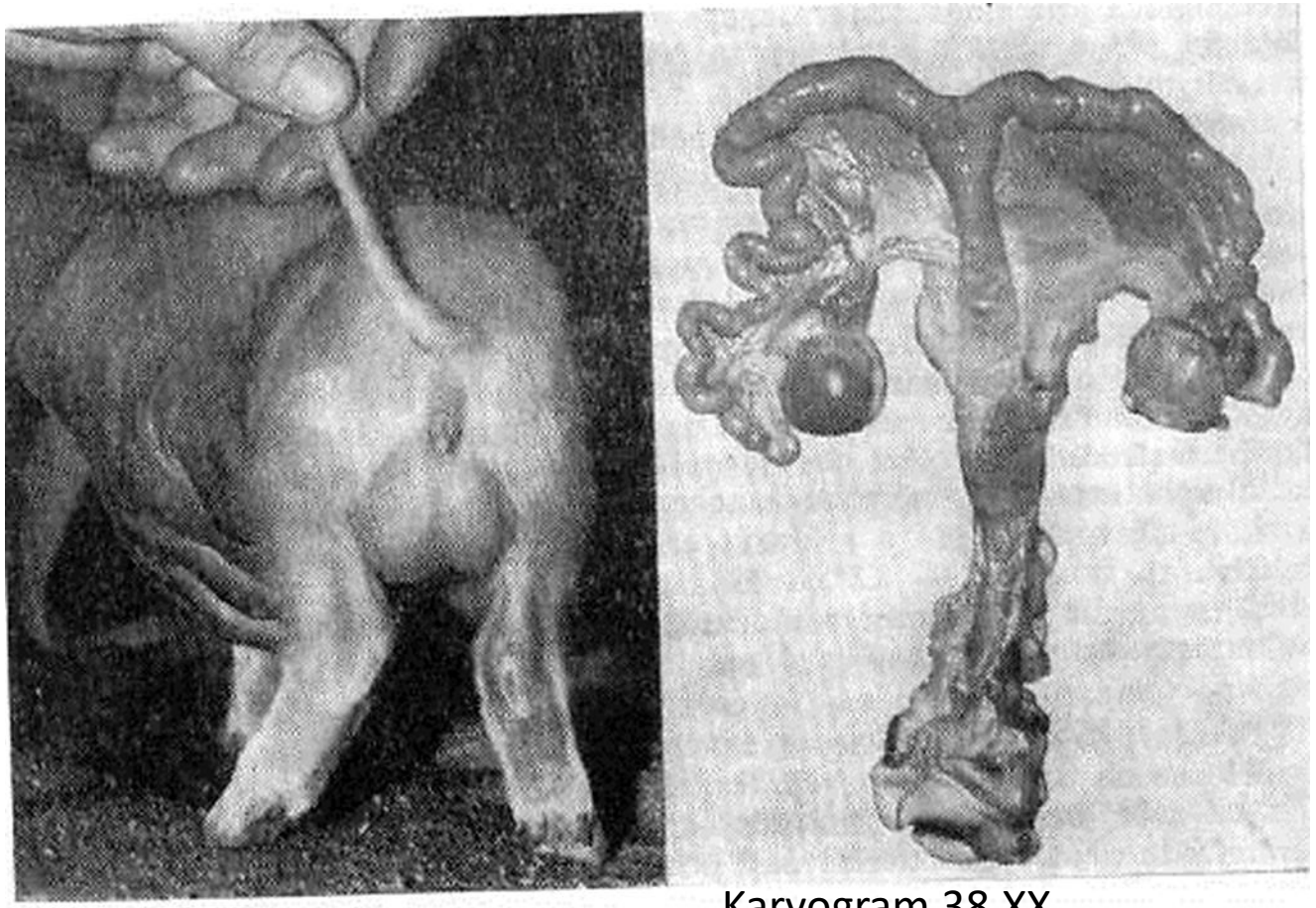
- **Presence of male and female genital glands**
- **Sexual pathways and secondary sexual signs – bisexual character**
- **Pathogenesis**
  - **Hereditary conditioned– autosomally recessive gene**
  - **Most often – pigs, goats**
  - **Genetically based XX**



https://embryology.med.unsw.edu.au/embryology/index.php/File:Corner1920_fig01.jpg

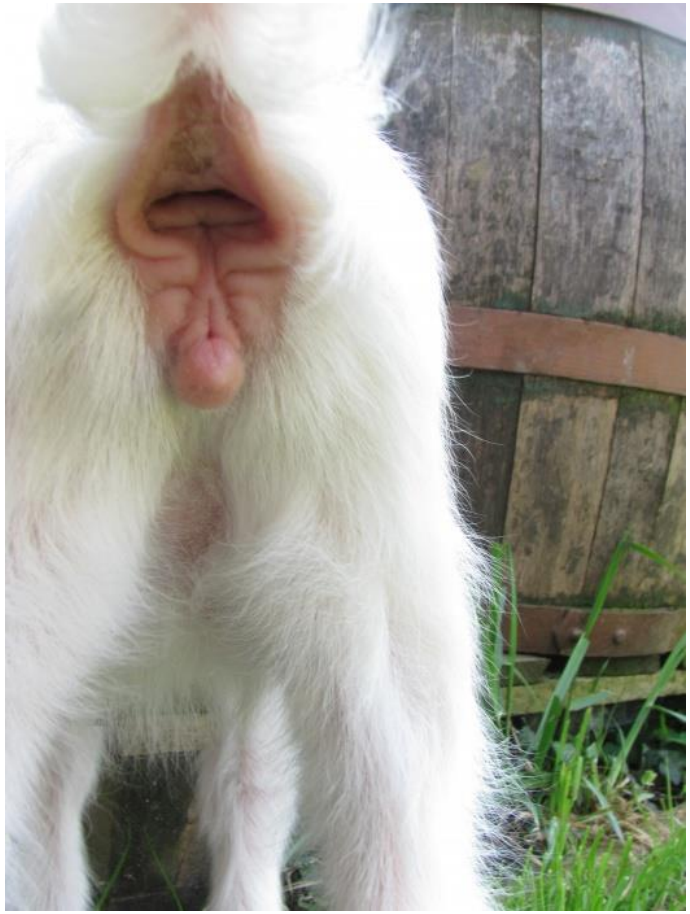
Hermaphroditism glandularis unilateralis at cattle

Hermaphroditism testicularis - S



Karyogram 38,XX

Hermaphroditism of goats



Pseudohermaphroditism

- **On both sides of gonads of the same sex**
- **Outlet pathways and secondary sexual signs are opposite**
- **Reason**
  - **Fetal gonads are not able to create sufficient amount of hormone**
  - **Bad differentiation of ducts (Müller's, Wolfian)**
- **It accurs mainly at pigs, cattle, horses**

Pseudohermaphroditism

- **Male hermaphroditism**
  - **Phenotype - male**
- **Female hermaphroditism**
  - **Phenotype - female**

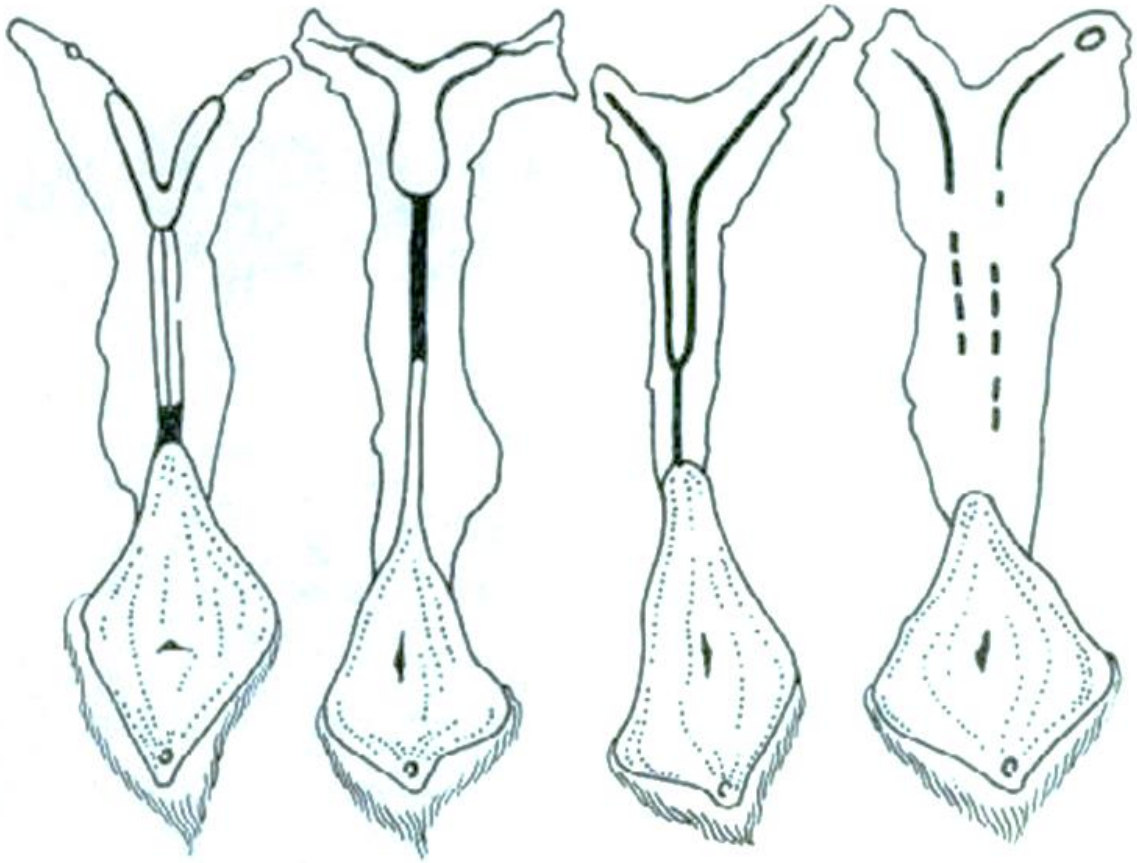
Freemartinism

- **Varying degree of undeveloped ovaries**
- **They are similar to male gonads**
- **Different degree of agenesis, hypoplasia of Müller's ducts, current development of Wolfian ducts**
- **Creation of female external genitals**
- **Most often at heifers from various-sex twins**
- **Total infertility**

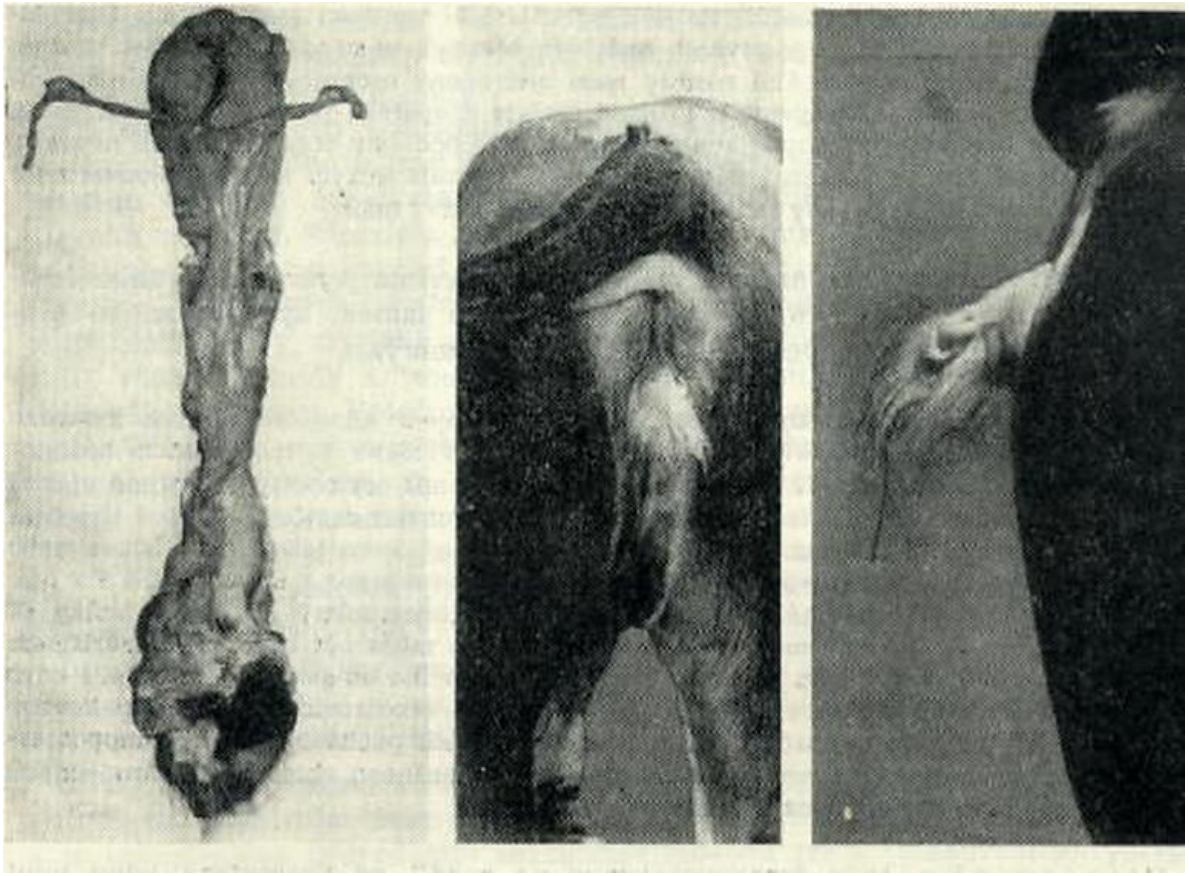
Two theories of the origin of freemartinism

- **Hormonal theory**
  - **Hormons of male individual from twins, which get through vascular anastomosis between connected placentas towards the female individual cause masculinization of female gonads. After all this statement was not experimentally proven.**
- **Cellular theory. According to hormonal theory**

Freemartinism - schema



Freemartinism



Freemartinism

https://www.rroij.com/articles-images/veterinary-sciences-Freemartin-heifer-enlarged-clitoris-2-1-28-g002.png

Hypoplasia of gonads

- **Different degree of undeveloped gonads**
  - **One-sided (left 87%) or double-sided**
  - **Subsequently, insufficiently developed secondary genitals**
- **Inherited – conditioned by simple recessive gene**
- **Afflicted animals with predominantly white colour**
- **Cattle, goats (male kids of white hornless breed)**
- **In the case of hypoplasia of lower degree – possibility of spread of this inderited diseasse**

Infatilism

- **Anatomically intact organs**
- **Noticebly small and with no function**
- **Reason**
  - **Insufficient creation of gonadotropic hormons of embryonic pituitary glands**
  - **Disorders of the whole endocrine system**
  - **Deficiences in nutrition**
  - **Mistakes in breeding**

Permanent heat - nymphomania

- **Permanent sexual excitement**
- **Standing heat**
- **Changing of long heats**
- **Reason**
  - **Permanent estrogen production**
  - **Cystose degeneration of ovaries**
  - **Adenohypophysis dysfunction – surplus of follicle stimulating hormone, lack of lutein hormone**
  - **Hereditary foundation as well**

Abnormal spermiogenesis

- **High percentage of abnormal sperms accur at testicular hypoplasia**
- **At males with testicular photoperiodism more common**
- **It is increased by frequency of certain type of abnormal sperms at males regularly used for reproduction.**

Abnormal spermiogenesis

- **Anomaly of sperms - affected acrosome of deformations - acentric narrowing of acrosome – infertility of bulls**
  - **Acrosome of defective sperms shows acentric narrowing , which was formed at differentiation of proacrosome. Than we cannot fully cover nucleus by acrosome**
- **It is caused by one autosomally recessive gene**

Abnormal spermiogenesis

- **At boars with the same defect**
  - **Sperms are able to get towards ovocyte, but they cannot grip it. These defective sperms are not able of capacitation and acrosomal reaction**

Abnormal spermiogenesis

- **Different form of abnormal sperms accured at bulls breed Guernsey and they were decapitated sperms**
- **At Danish bulls Jersey with very low fertility accured twisting flagella behind the connecting part of flagella and one more abnormality at which the central part of flagella is extended**

Aplasia of Wolfian ducts

- From Wolfian ducts are created outlet sexual pathways – epididymis, ductus efferens and seminal vesicles
- They are not fully developed
- The defect can be find out at males of all farm animals
- Malformations can be double-sided or one-sided
- Hereditary background but the degree and way of heredity is not still known
- Next defect is stenosis of epididymis ducts
- It often accures at bulls, deer, fallow-deer and rams
- Sperms cumulate in ductus efferens, it leads to creation of spermatocoele in the head of epididymis

Impotence

- **Impotence was watched at the bulls of Frisian breed**
- **During erection the S-shaped loop of penis does not straighten, this defect was watched at the pair refractor of penis**
- **Persistence of the bridle of penis, which prevents from ejecting of penis during erection (breeds Aberdeen, Angus and Shorthorn)**
- **At boars we can often find out retroversion of penis. These defect can be solved using a surgical way but this defect is transmitted covertly further to offspring**

Hypoplasmosis of testicles

- **Testicles which do not have physiological size and show abnormal growth and development are described as hypoplasmic**
- **Testicles of cryptorchids are also described as hypoplasmic**
- **Hypoplasmosis can accur at normally descended testicles as well**
- **Very often at bulls, billy goats and boars**
- **Recessive hereditary illness**

Cryptorchism

- At cryptorchism testicles do not descend into scrotum
- It is the most common type of disability of male genitals
- It often occurs at boars, billy goats, stallions and occasionally at bulls
- It exists in lots of forms
- At boars – cryptorchism is hereditary
  - Line breeding showed, that the illness is autosomally recessive
- At rams – accurence of cryptorchism is rare
  - at Australian breed Merino it is connected with hummel males
- At bulls – low frequency of cryptorchism
  - Bilateral cryptorchism was described at breeds Shorthorn and Hereford