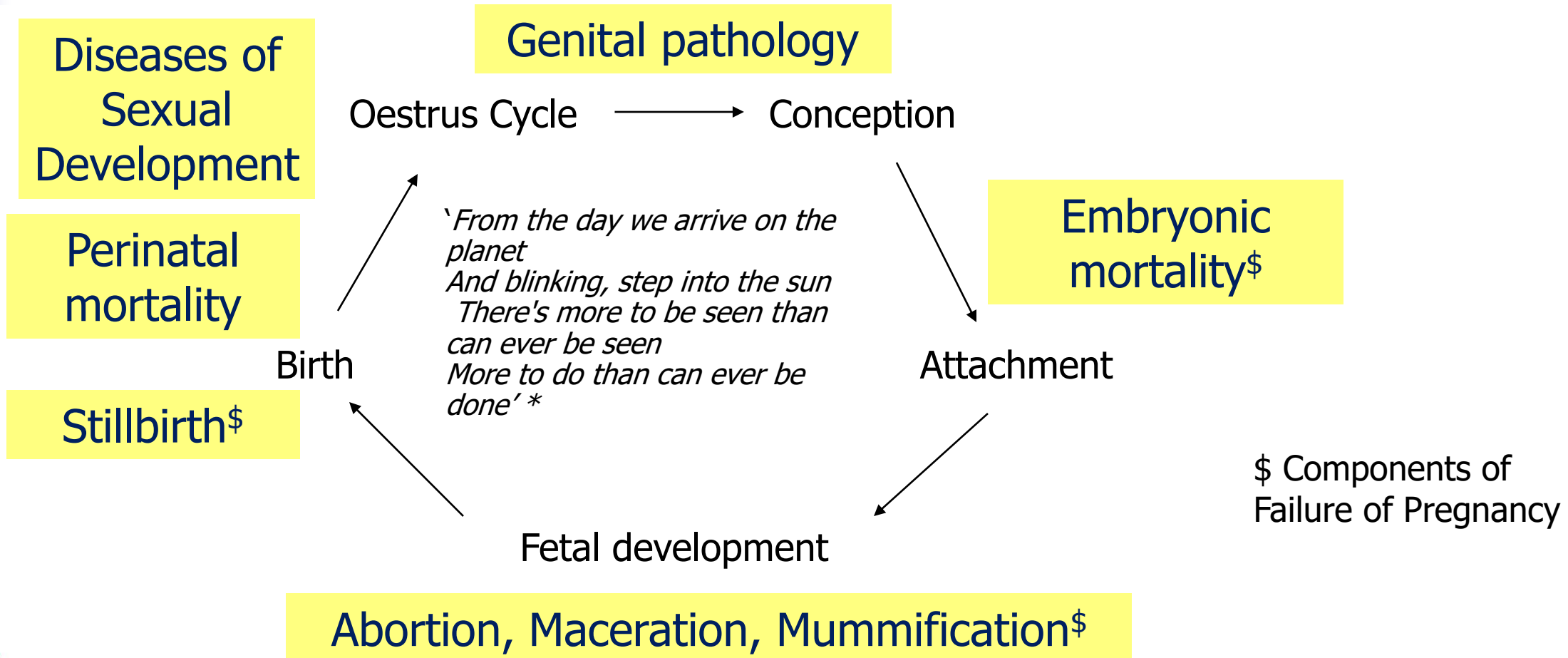




Female Genital Pathology

Dr Rob Foster
rfoster@uoguelph.ca
VetReproPath.com

The Circle of Reproductive Life*





Female Genital Pathology

Ovary

Uterine tube

Uterus

Cervix

Vagina

Vulva

Degeneration - cell death

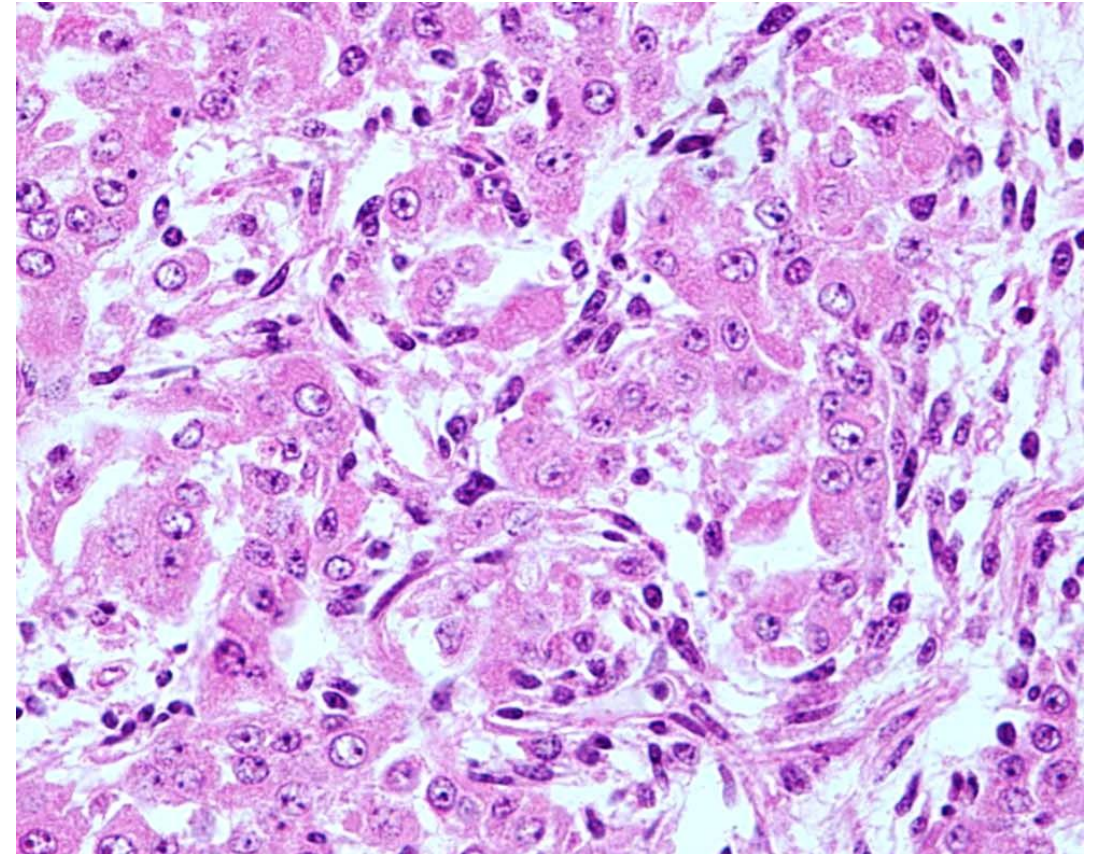
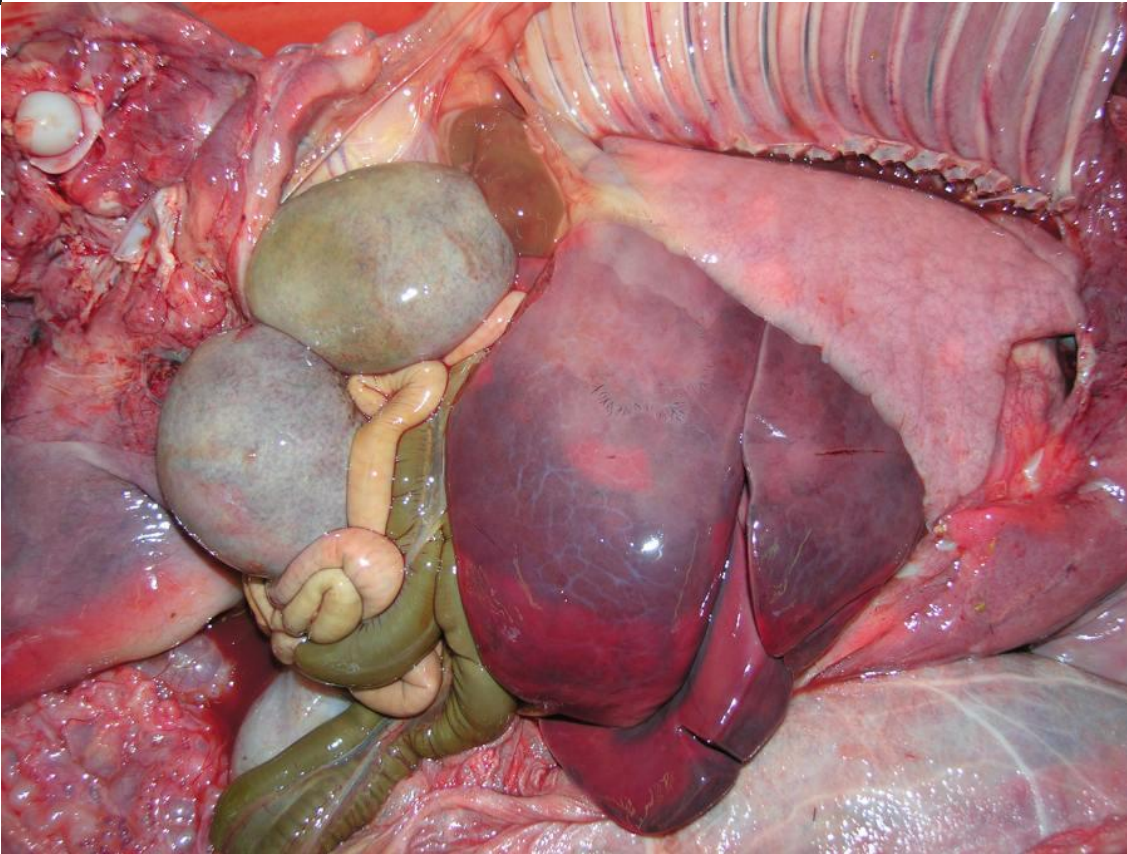
Disturbances of growth

Circulatory disturbances

Minerals and pigments

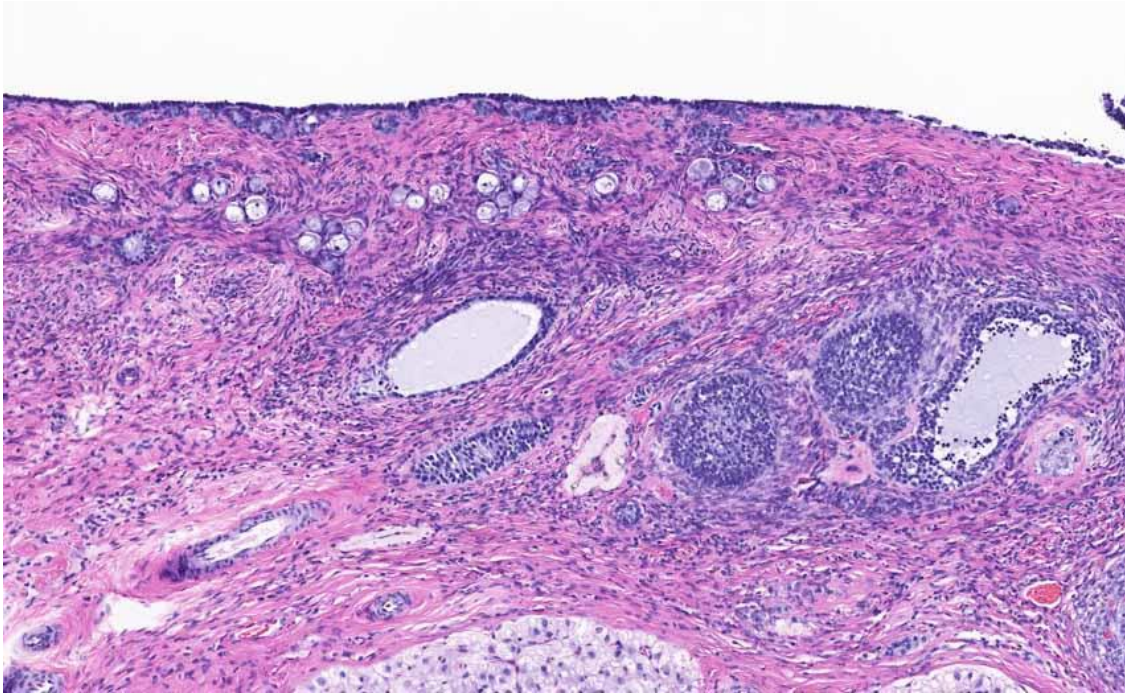
Inflammation

Equid: Normal fetal gonadal hypertrophy

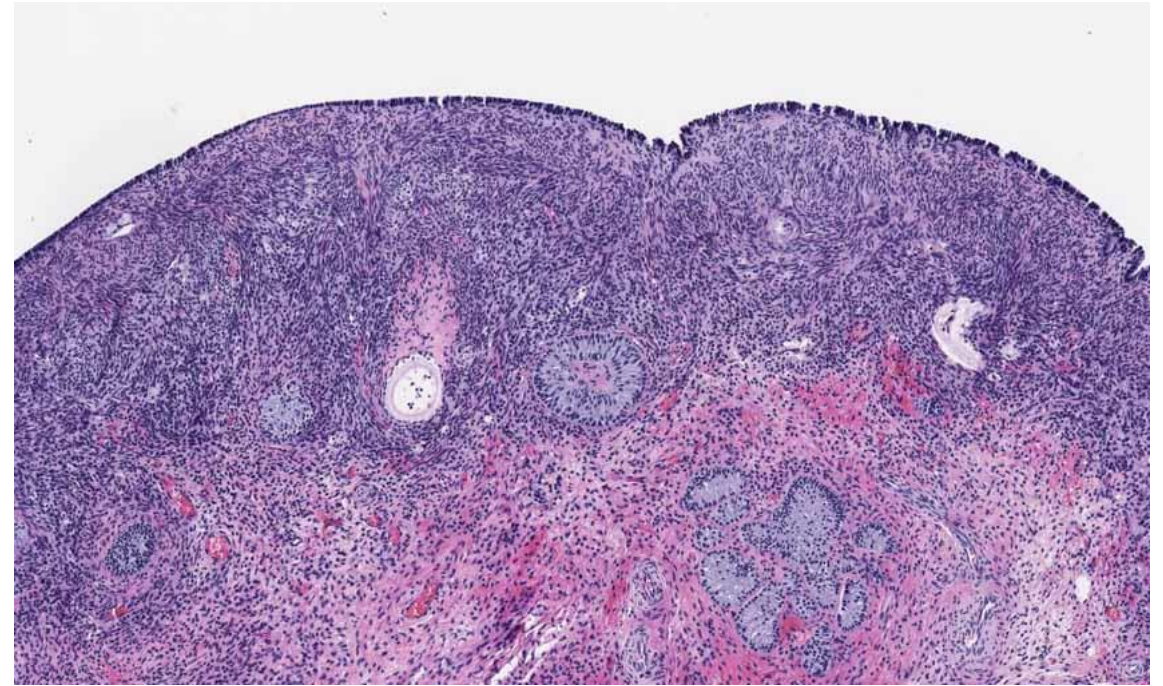


Interstitial endocrine cells undergo hyperplasia and produce dehydroandrosterone (DHA) and dehydroepiandrosterone (DHEA) which is converted to estrogens by the placenta.

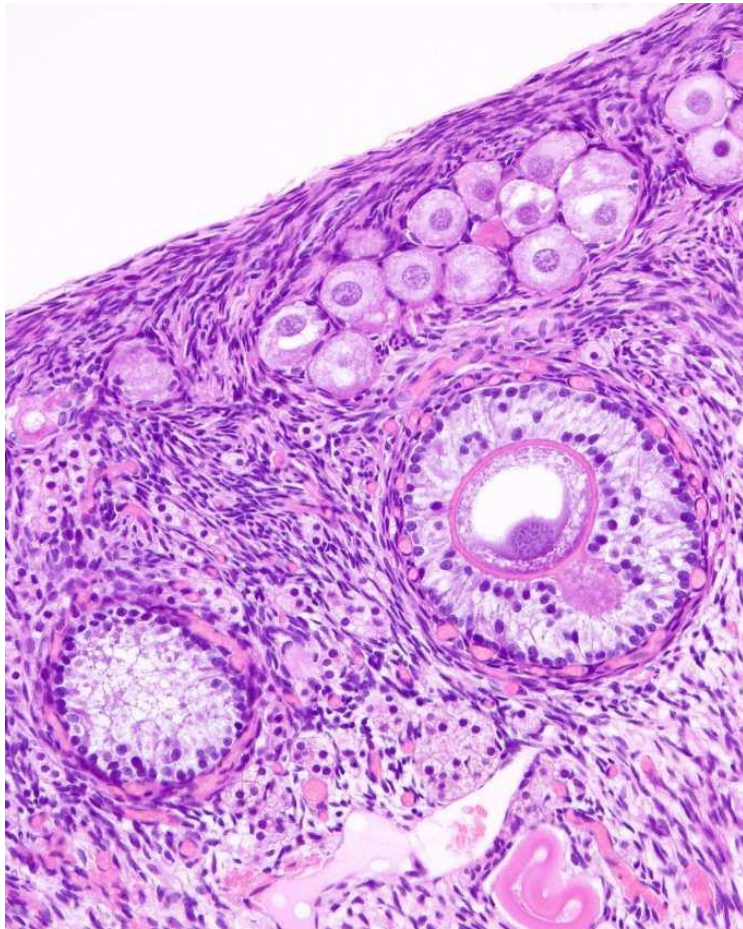
Canid: ovarian atrophy (senescence)



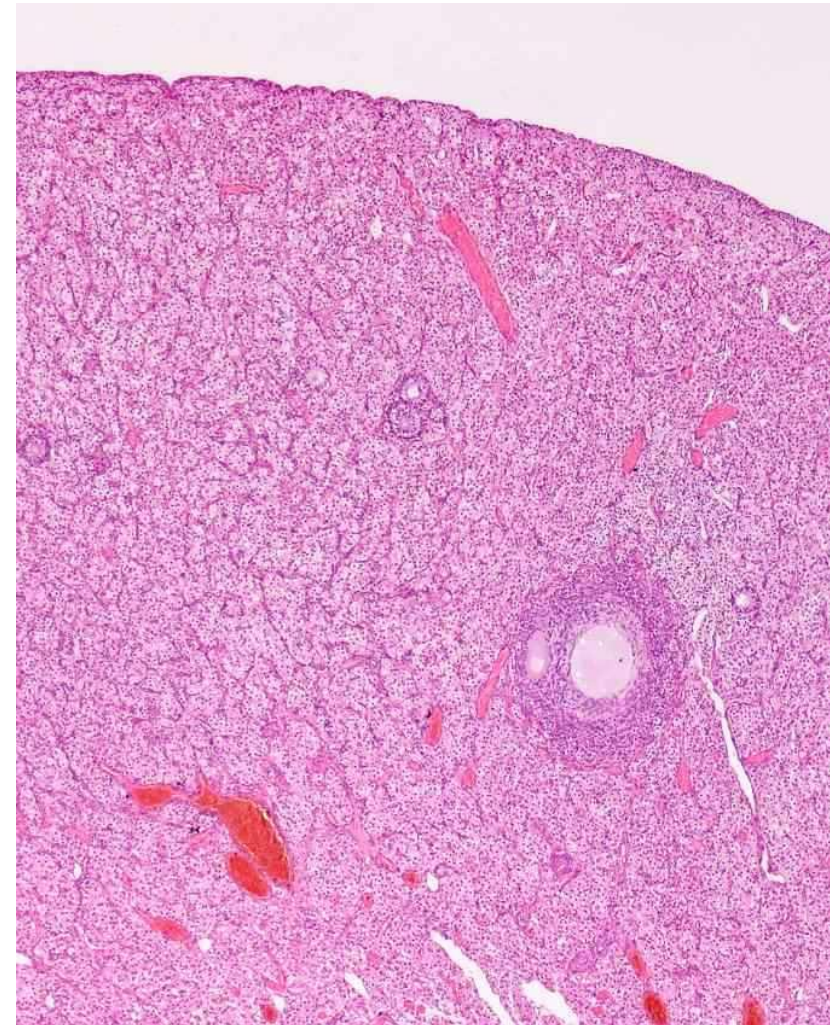
Normal ovary



Felid: ovarian interstitial cell hyperplasia



Normal ovary

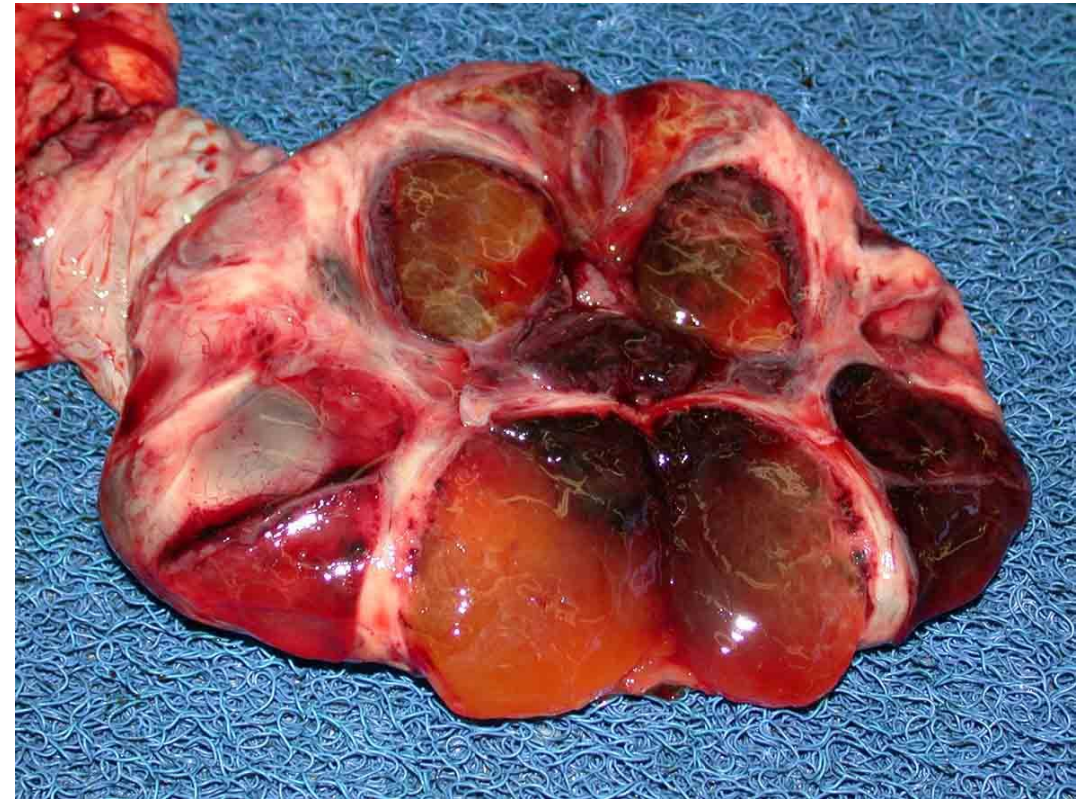
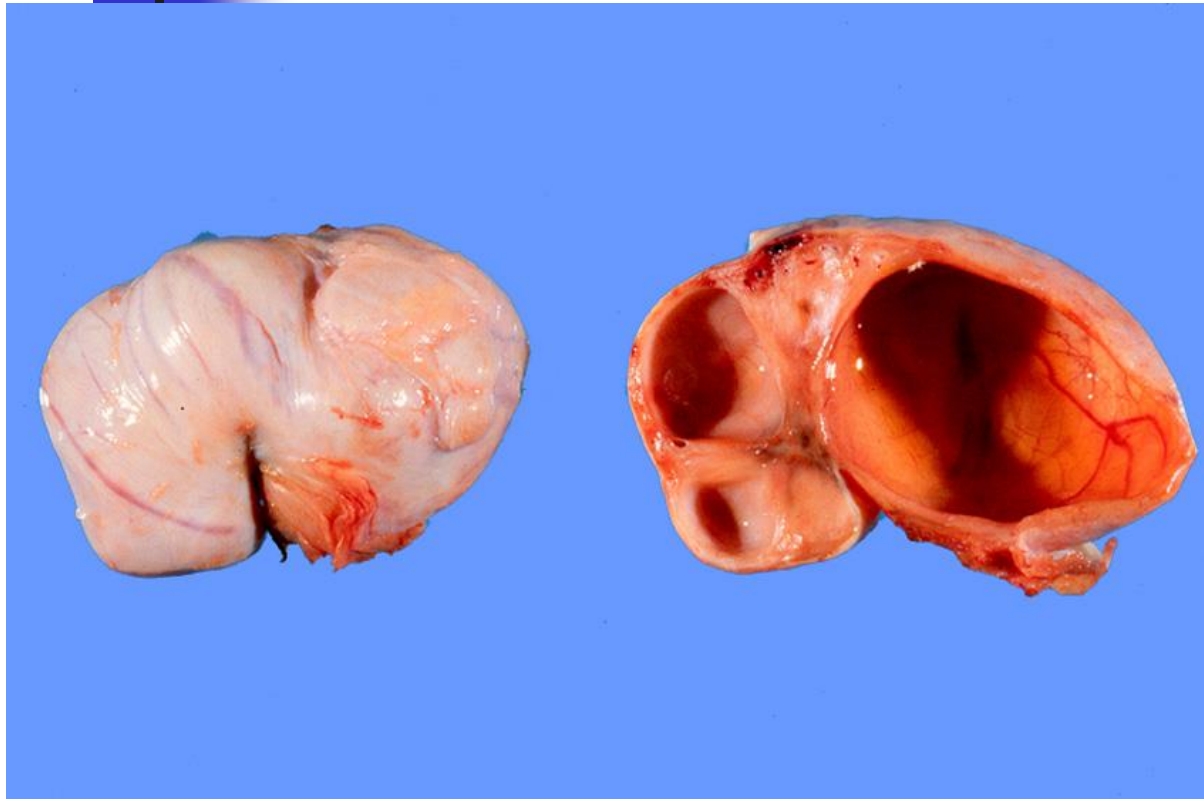




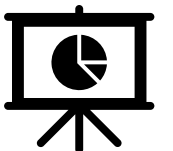
Ovaries of the (night)mare

- Normal follicles
- Anovulatory (transition) follicles
- Hydatid of Morgagni
- Inclusion cysts
- Haemorrhagic anovulatory follicles
- Single large cyst
- Cystic Sex Cord Stromal Tumour (granulosa cell tumour)

Equid: Normal follicles early gestation



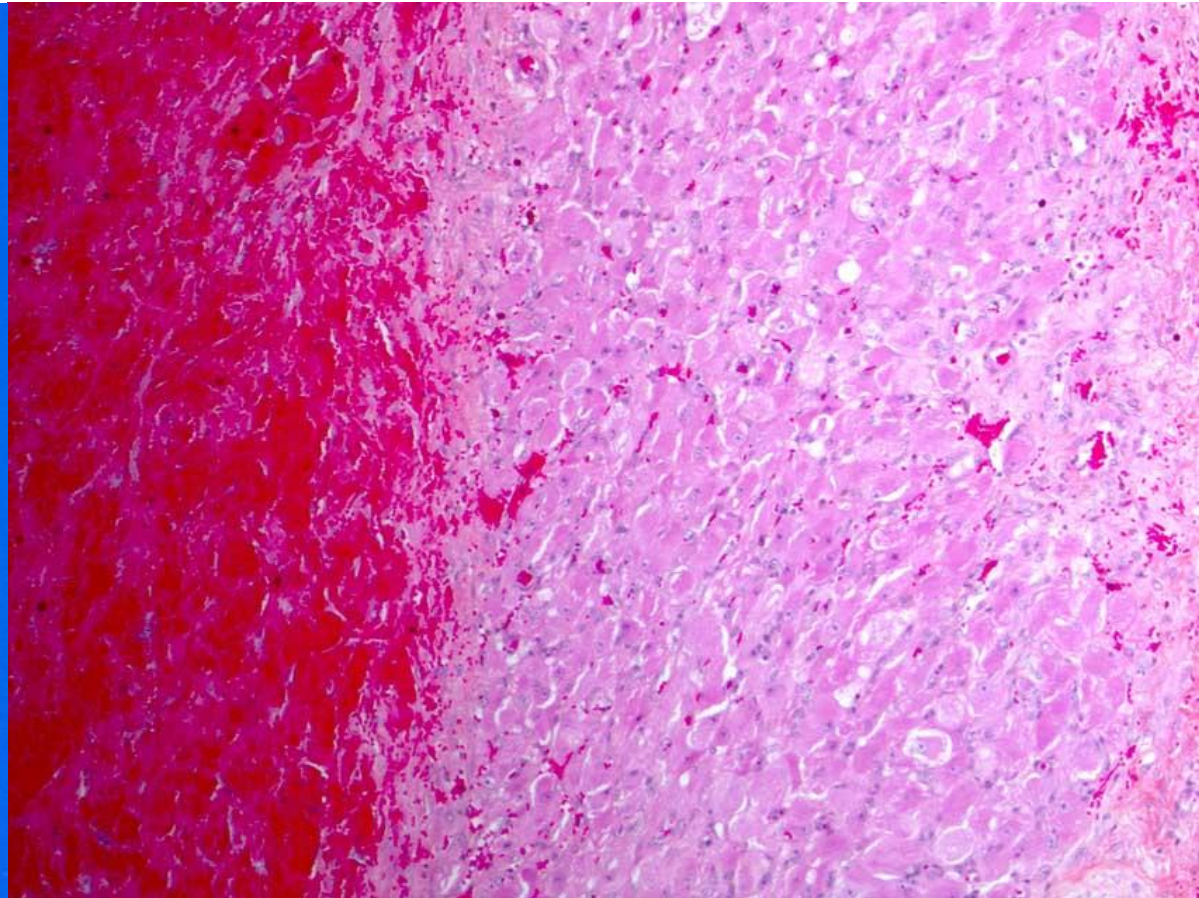
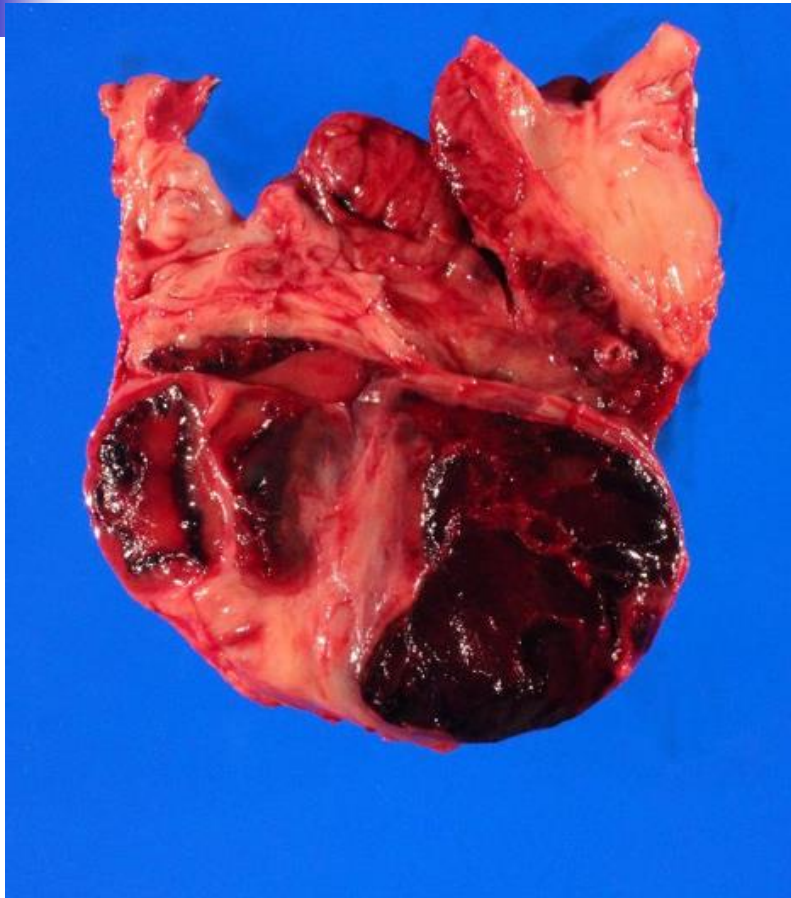
Normal ovary



Equid: Anovulatory follicles



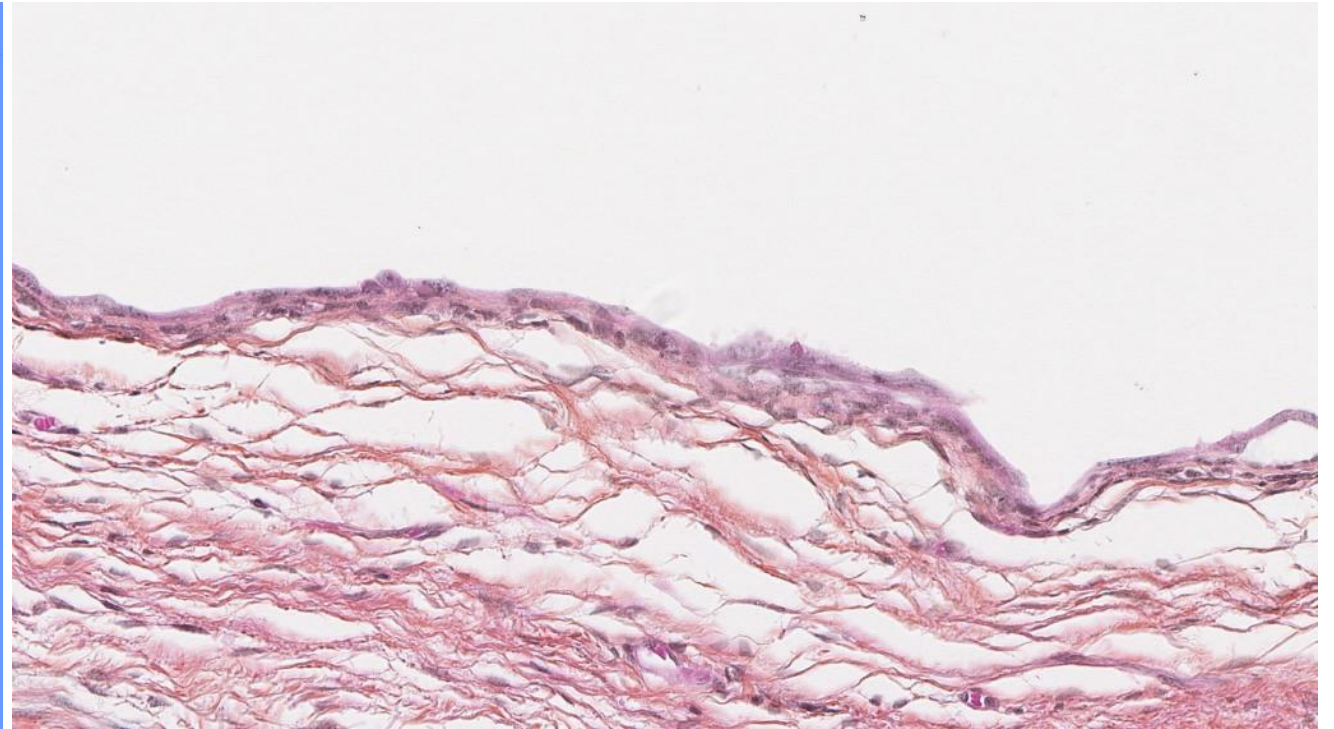
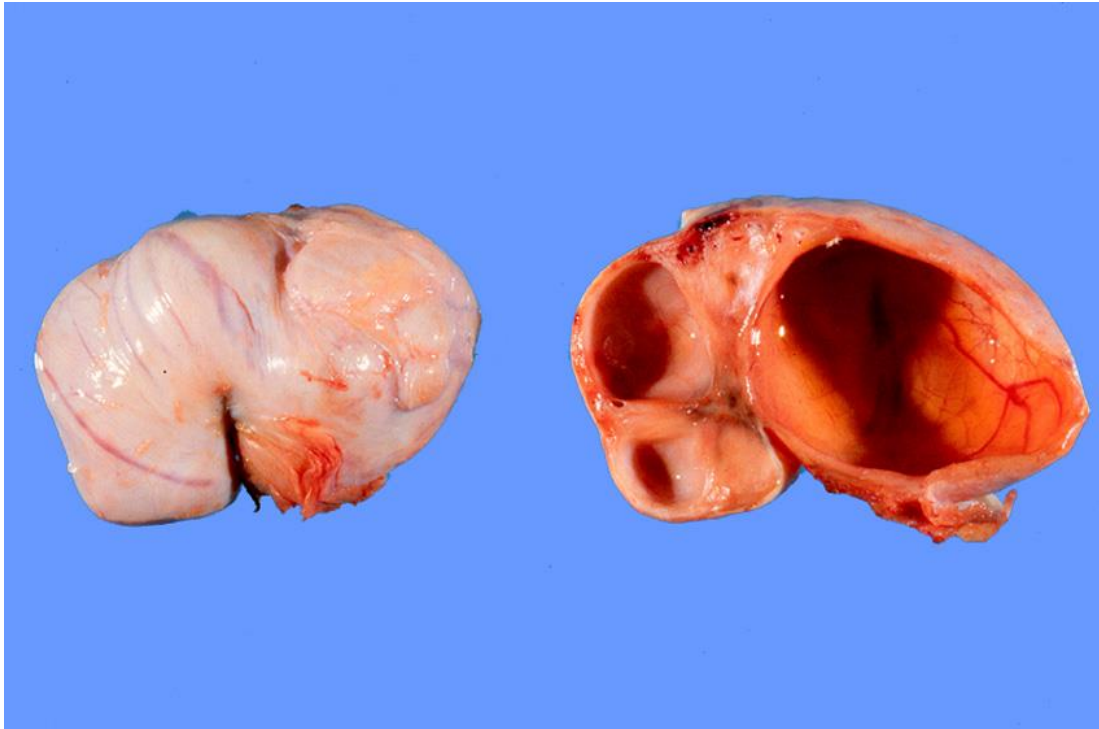
Equid: Haemorrhagic anovulatory follicles



Photograph compliments of
Dr Laura Williams, WSU

Photograph compliments of
Dr Monique Dore, UMontreal

Equid: Epithelial inclusion cysts



Normal ovary



Follicular cyst

- Follicle is larger than normal for the species
- Fails to ovulate
- Unresponsive to luteinizing hormone
- Hormonal dysregulation
- Corticosteroids, stress,
- Produces estrogen – persistent estrus
- Initiate anestrus in sows.

Bovid: Follicular cysts (cystic ovarian disease)

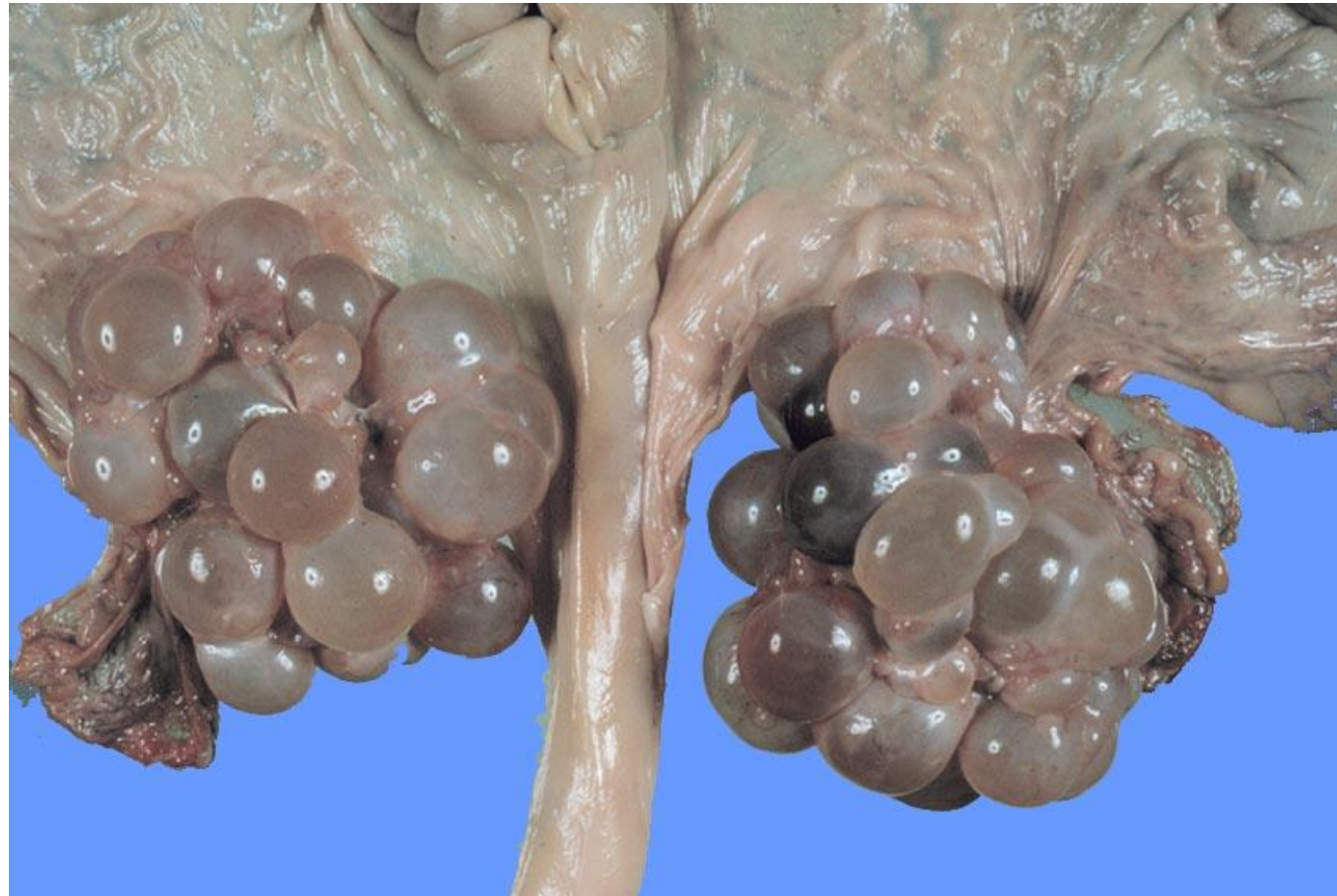


Photograph compliments of
Dr Philip Ladds



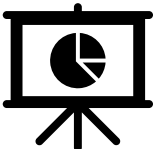
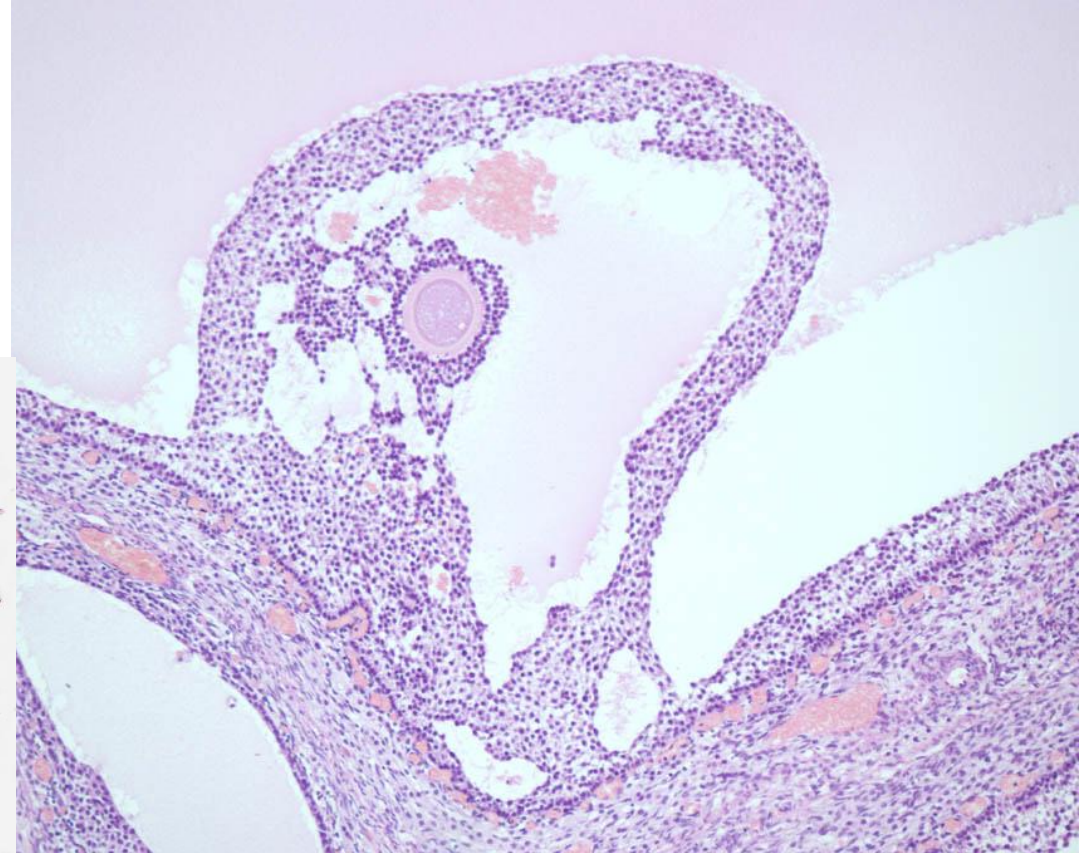
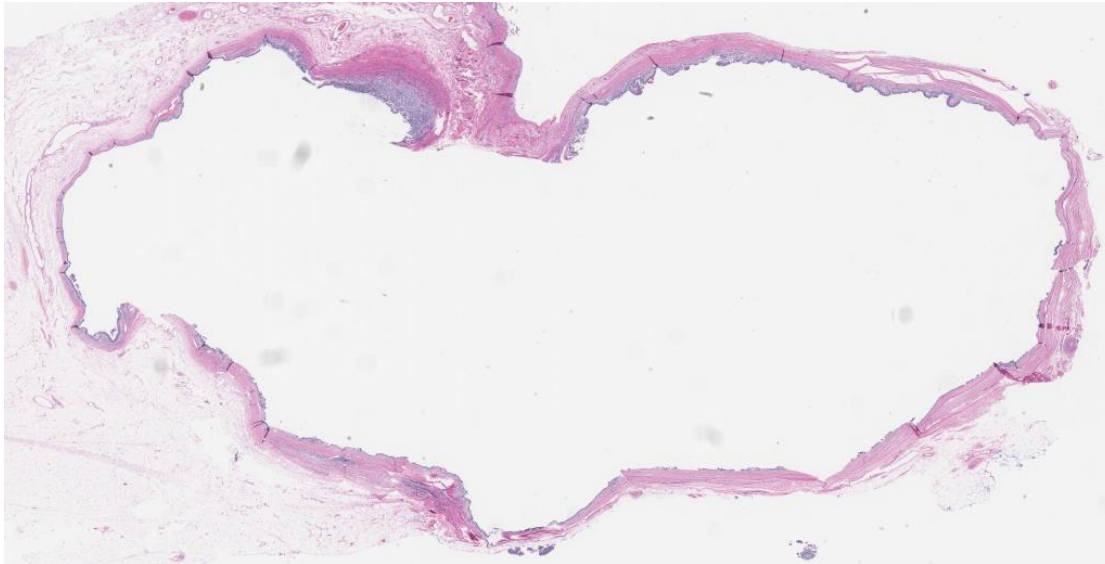
Photograph compliments of
Dr Isabel Gibson

Suid: Cystic Ovarian Disease



Canid: follicular cyst

- All follicles are 'cystic'
- Must be larger than normal reference range

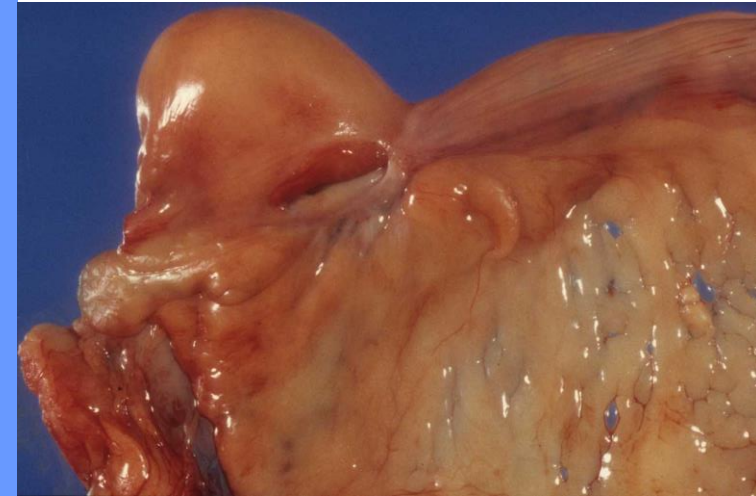


Bovid: Luteinised cyst

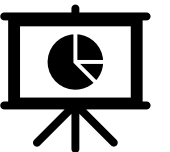
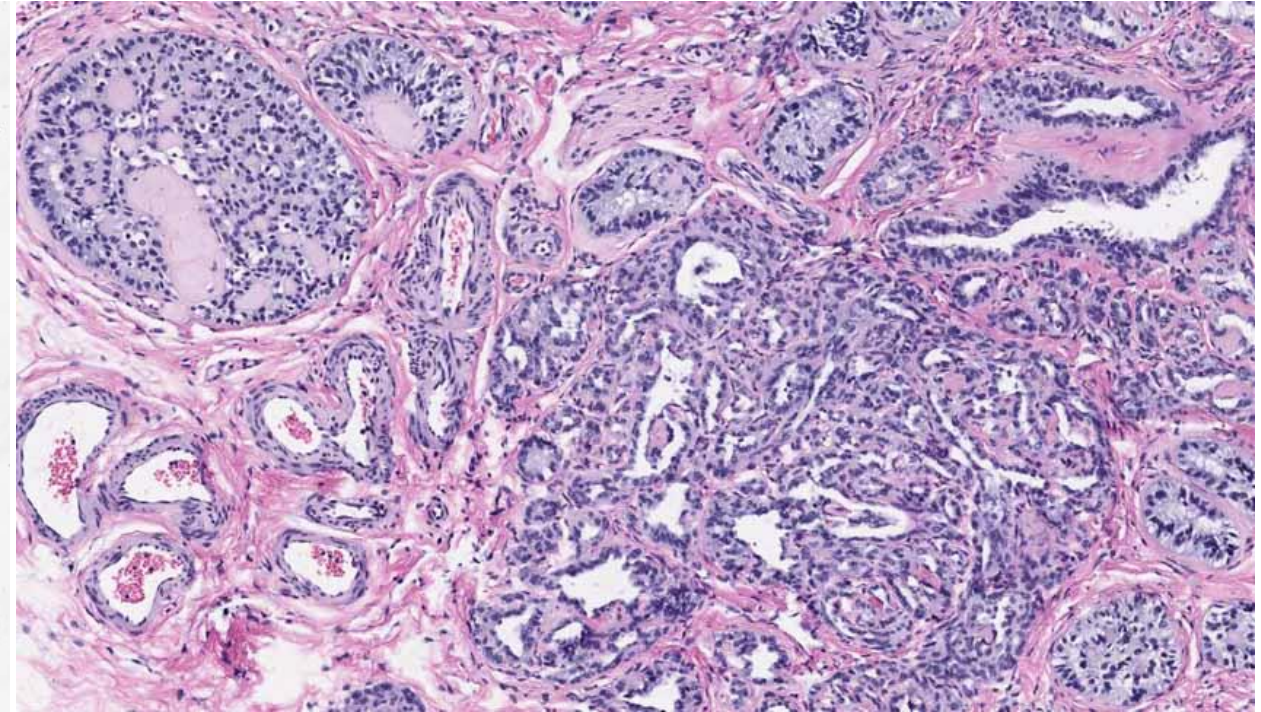
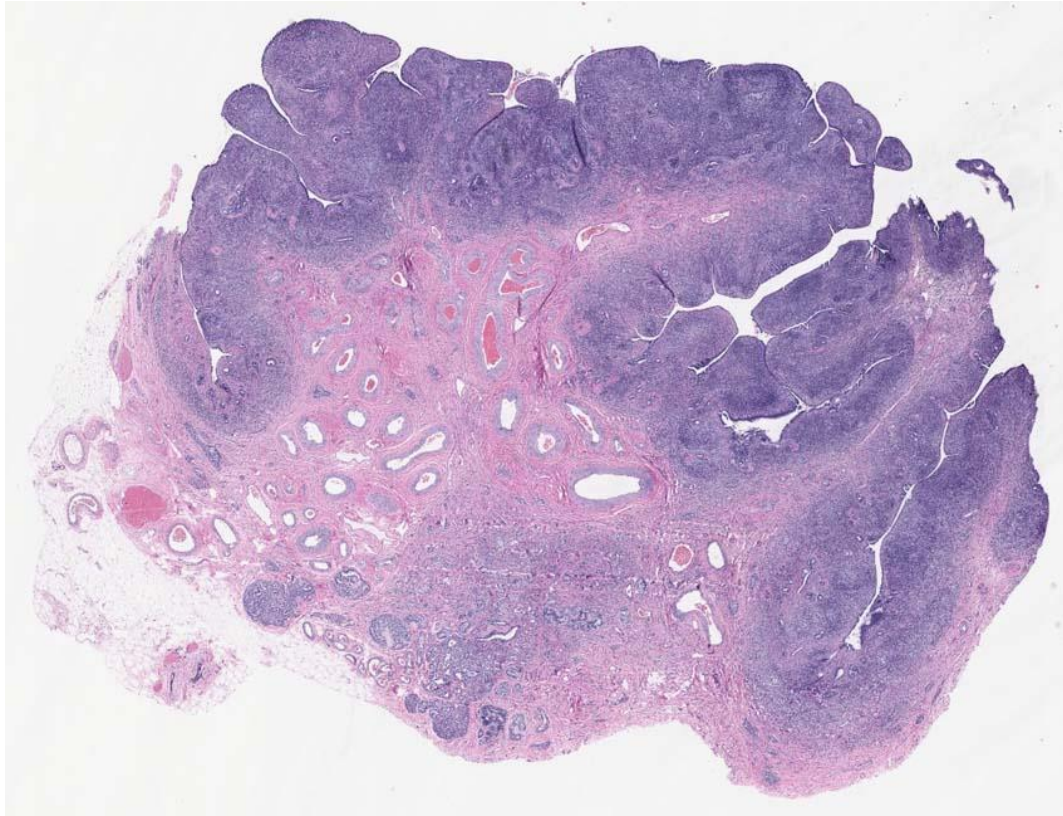
- Follicular cyst with some luteinisation
- Cystic corpus luteum is a normal CL with a cystic center (common in dogs)



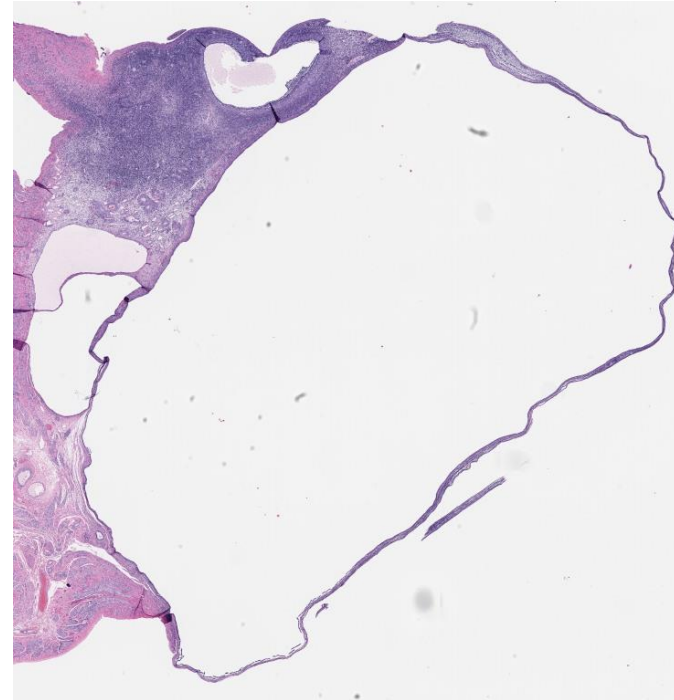
Canid: cystic bursa



Canid: Rete ovarii hyperplasia



Canid: Ovary – cystic rete ovarii



Equid: Paramesonephric duct cyst



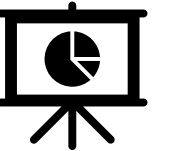
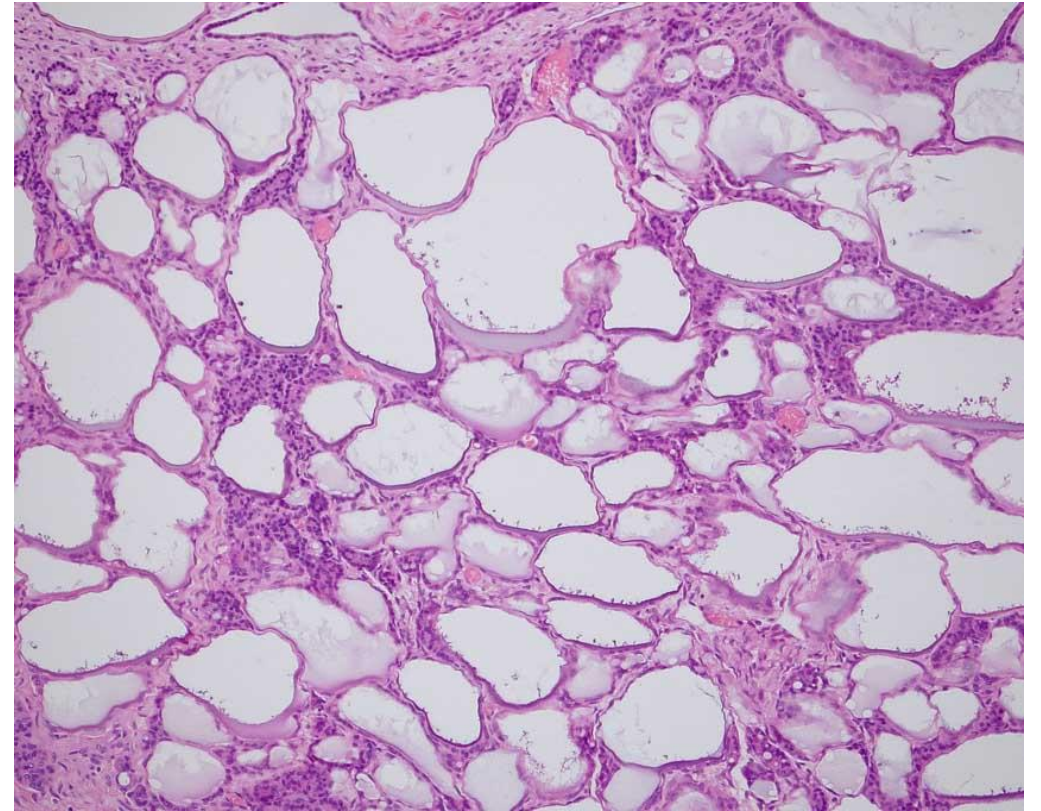
Hydatid of Morgagni



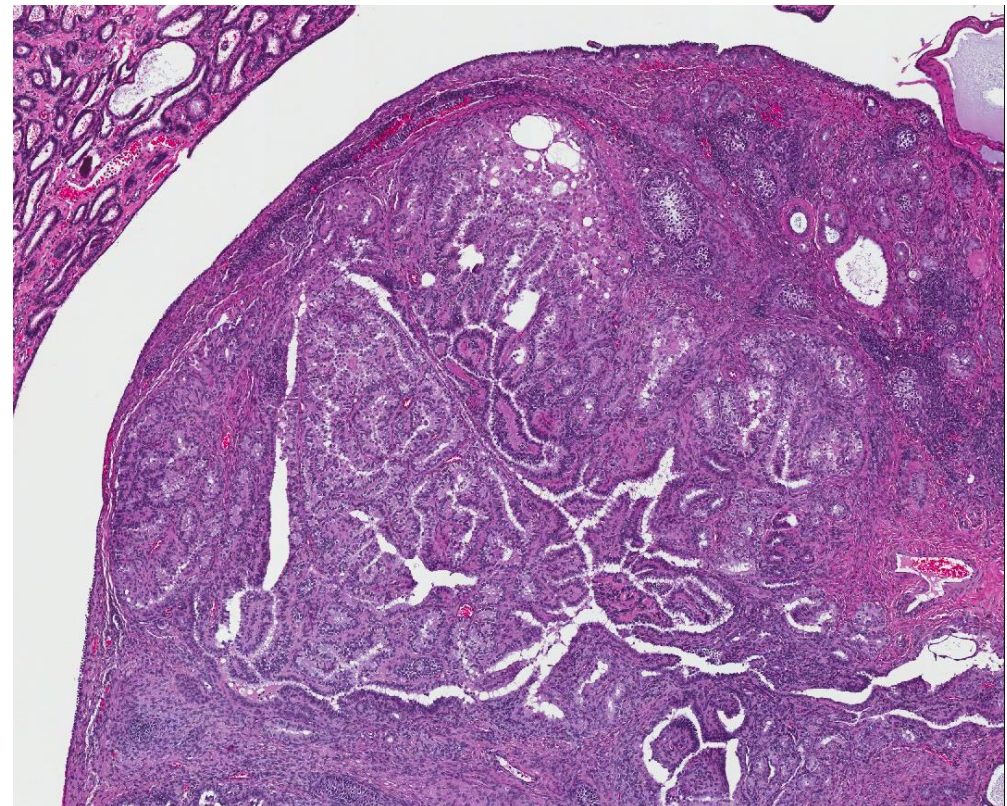
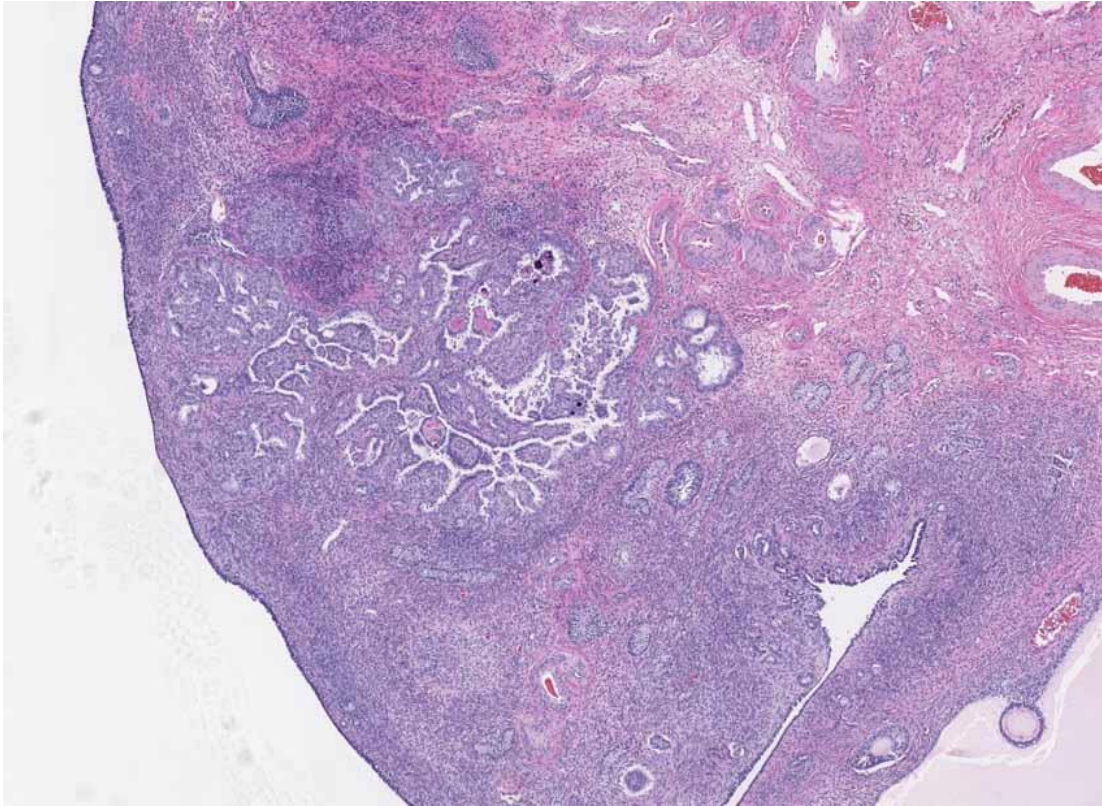
Ovarian neoplasms

- Epithelial
- Sex cord stromal tumor
 - Granulosa cell tumour
 - Theca cell tumour
 - Luteoma
- Germ cell tumors
 - Dysgerminoma
 - Teratoma
- Other

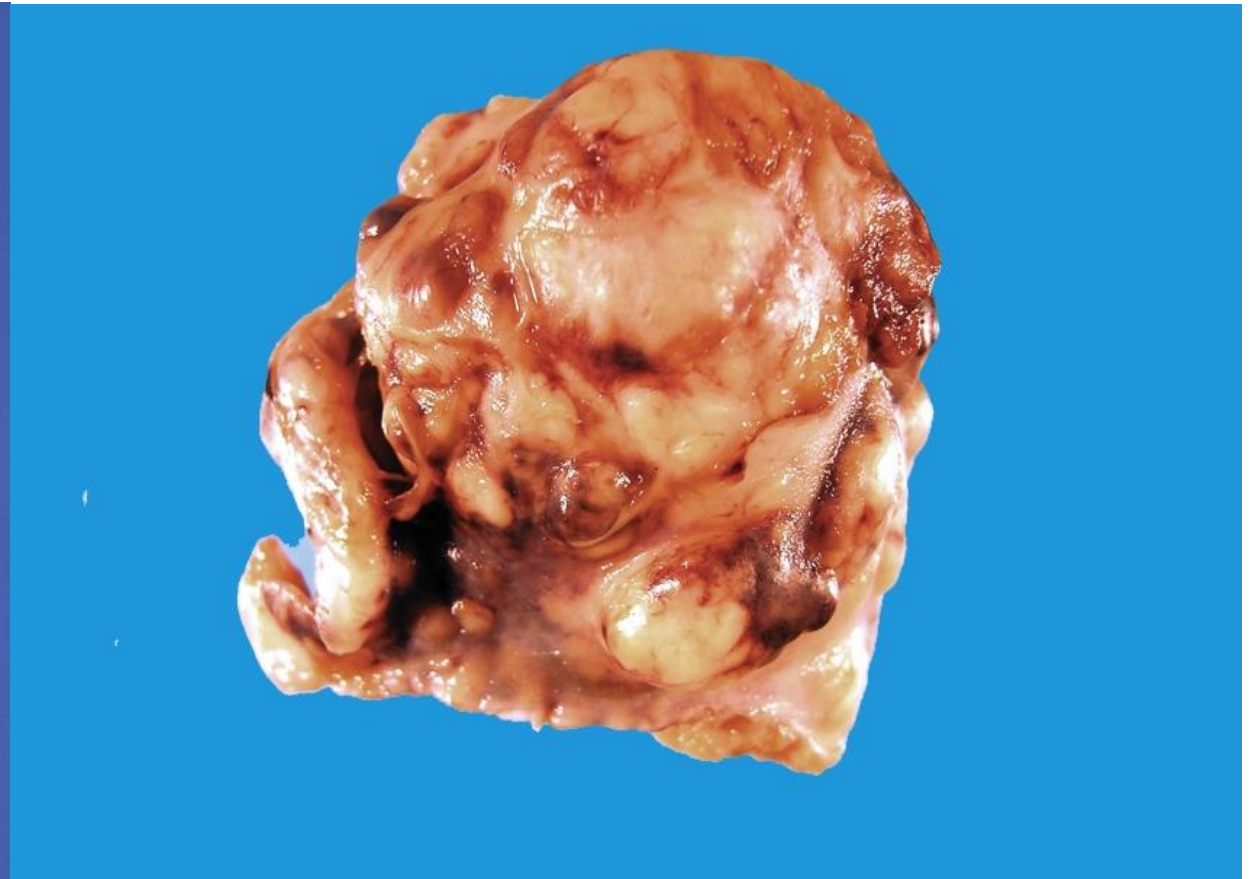
Canid: cystadenoma



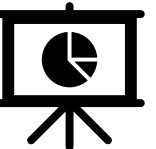
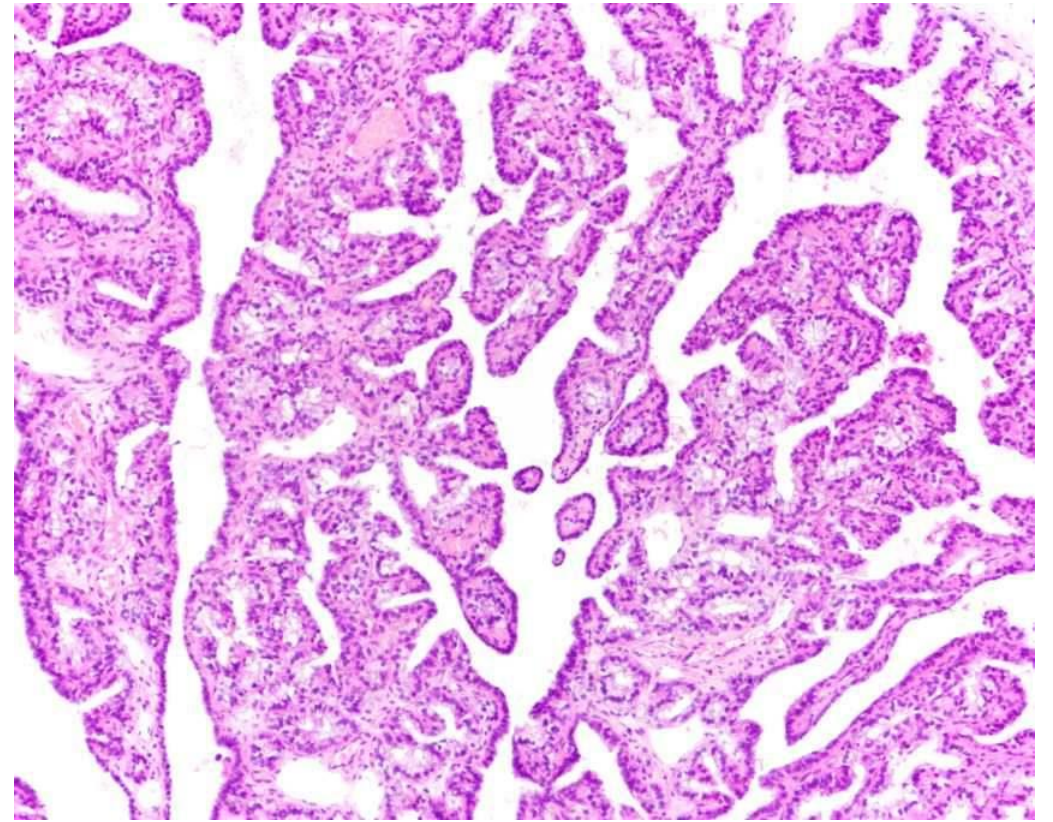
Epithelial tumor: Ovarian adenoma



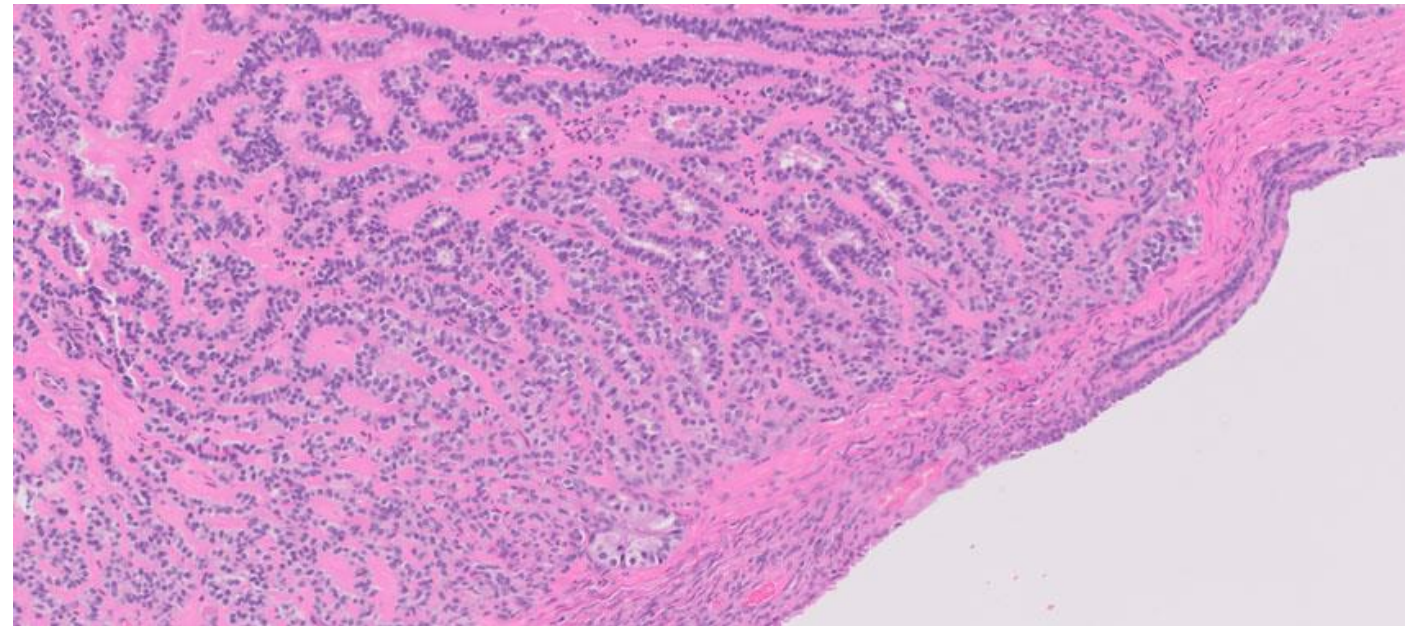
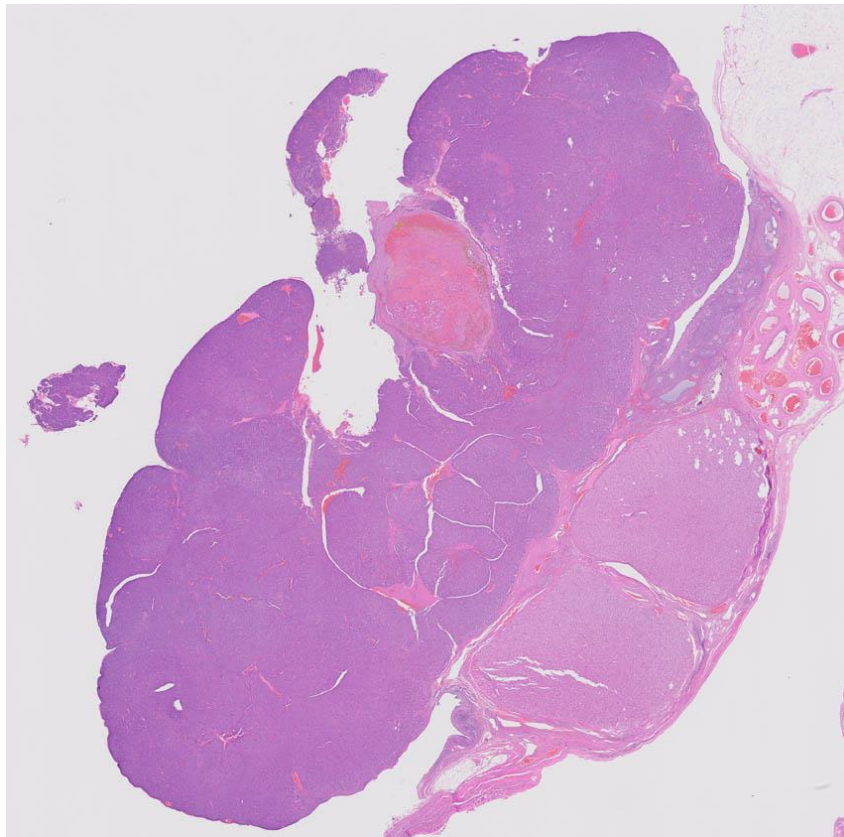
Epithelial tumor - adenocarcinoma



Canid: adenocarcinoma, bilateral

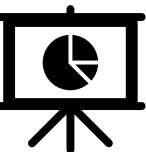
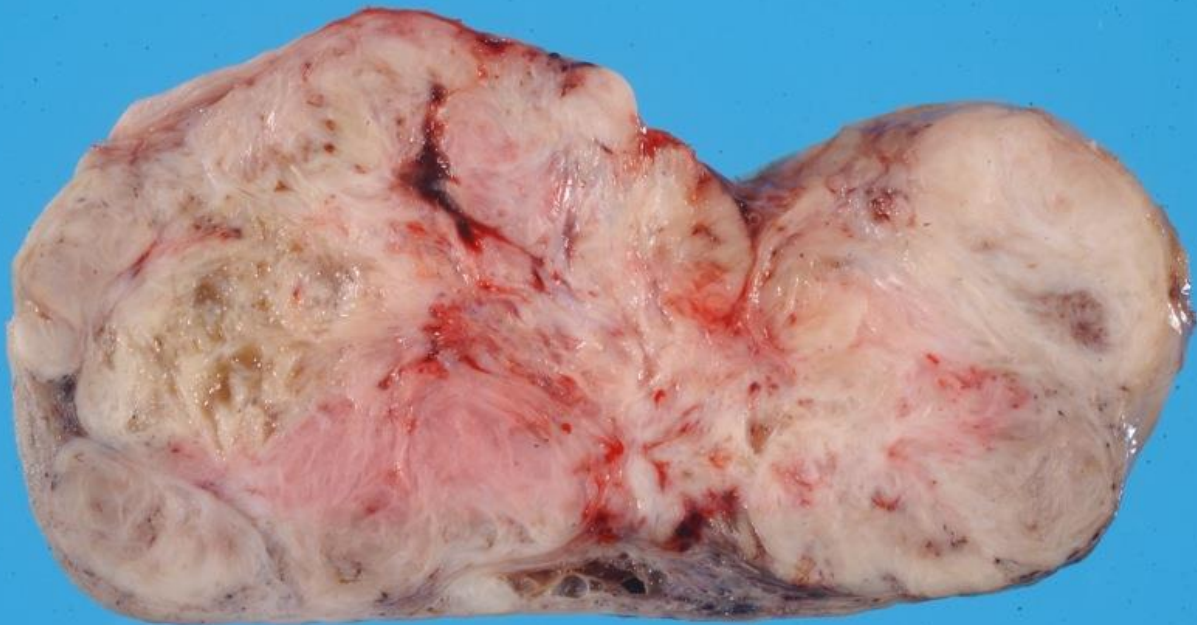
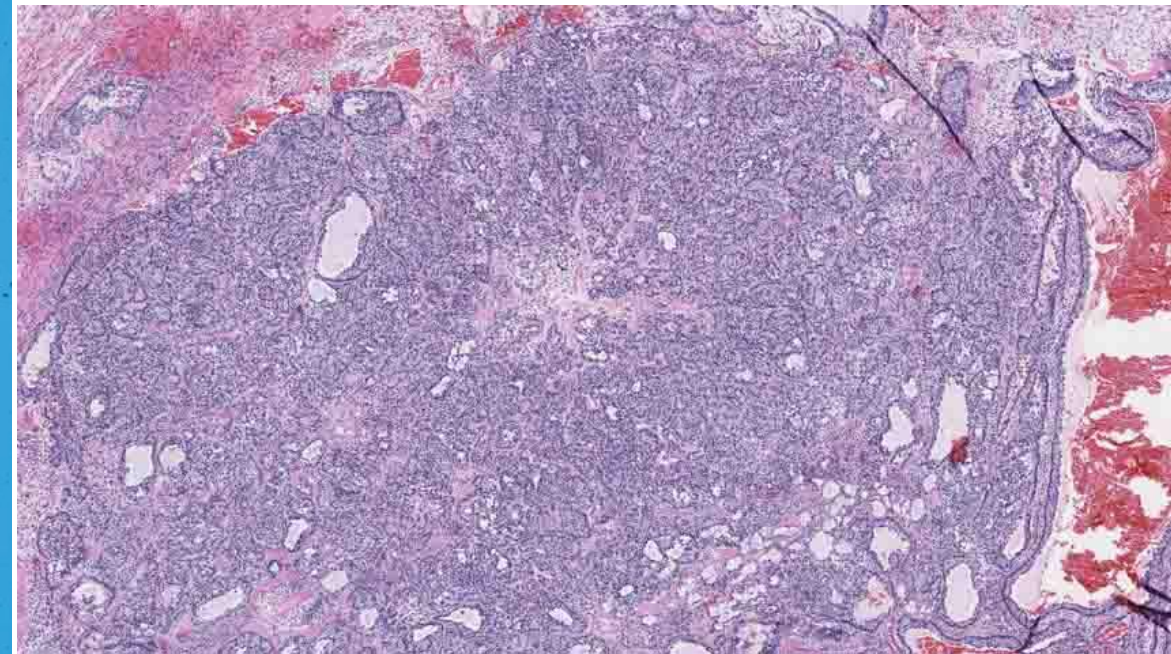
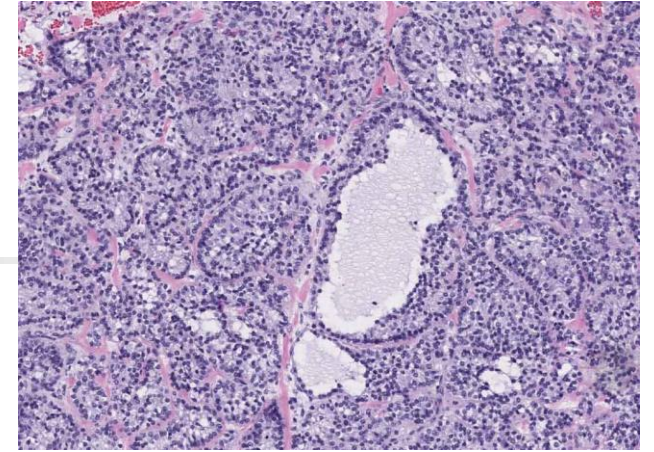


Epithelial tumour; adenocarcinoma



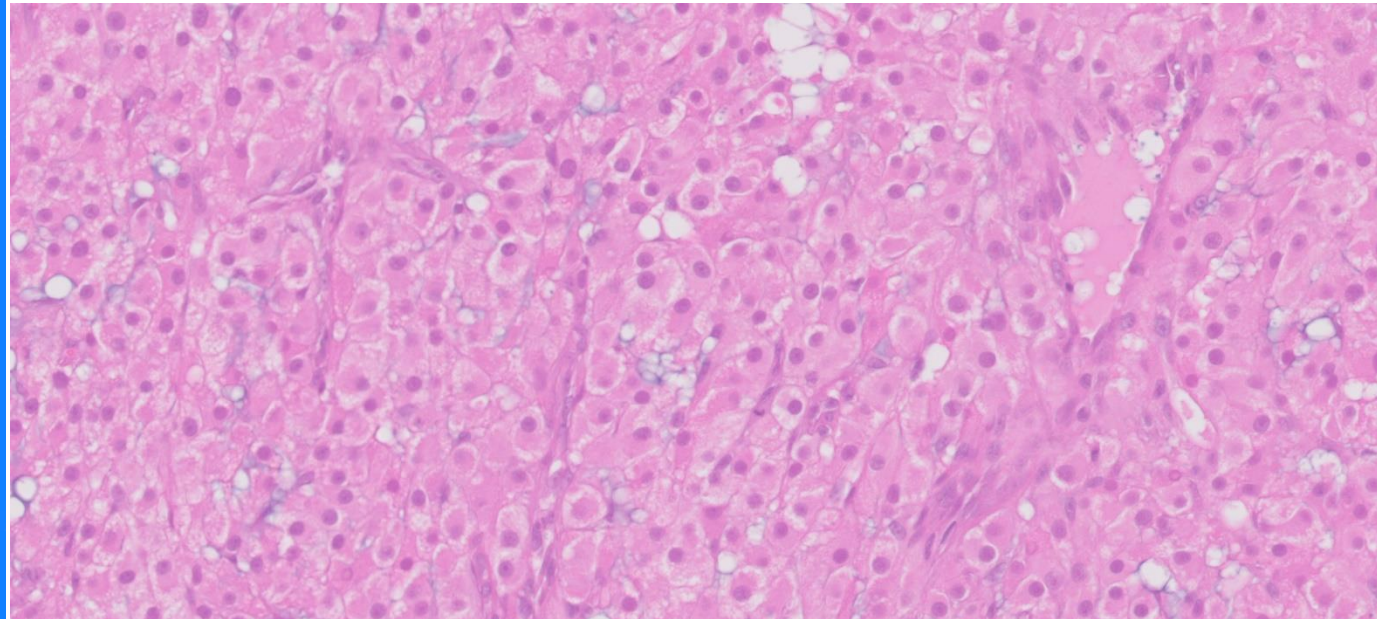
Sex cord Stromal Tumor

Granulosa cell tumor



Sex cord Stromal Tumour

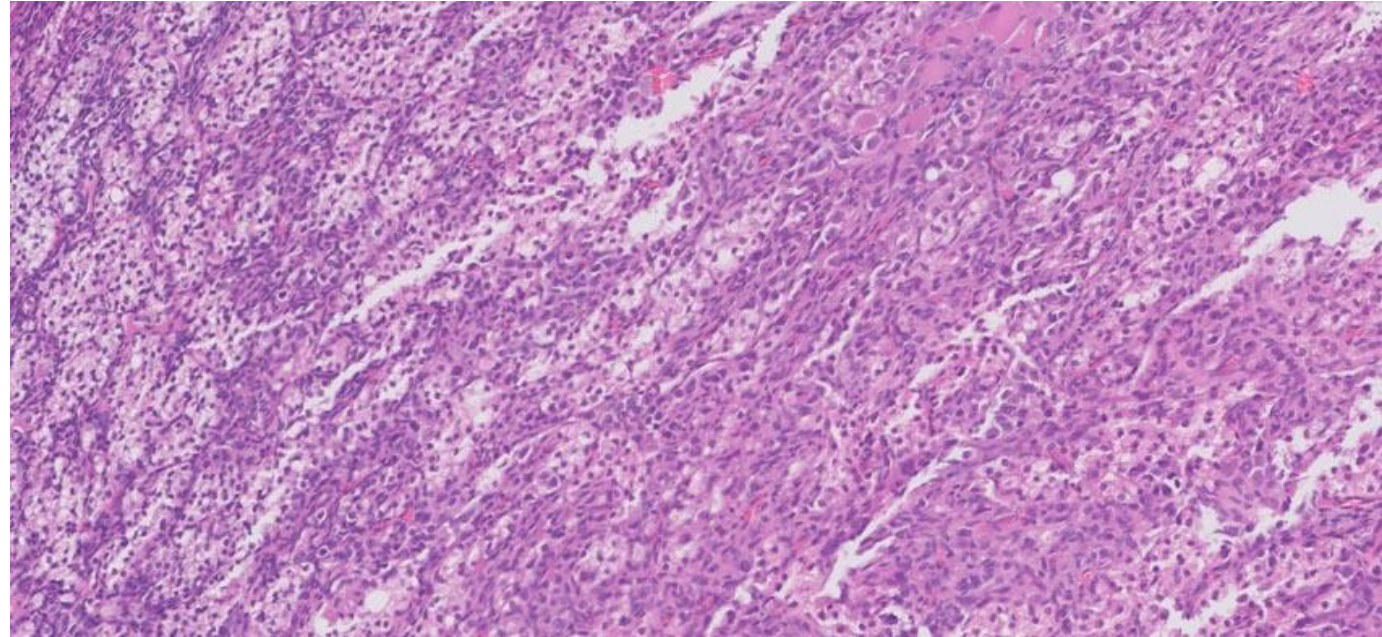
Luteoma



Feline; Luteoma

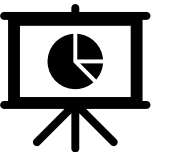
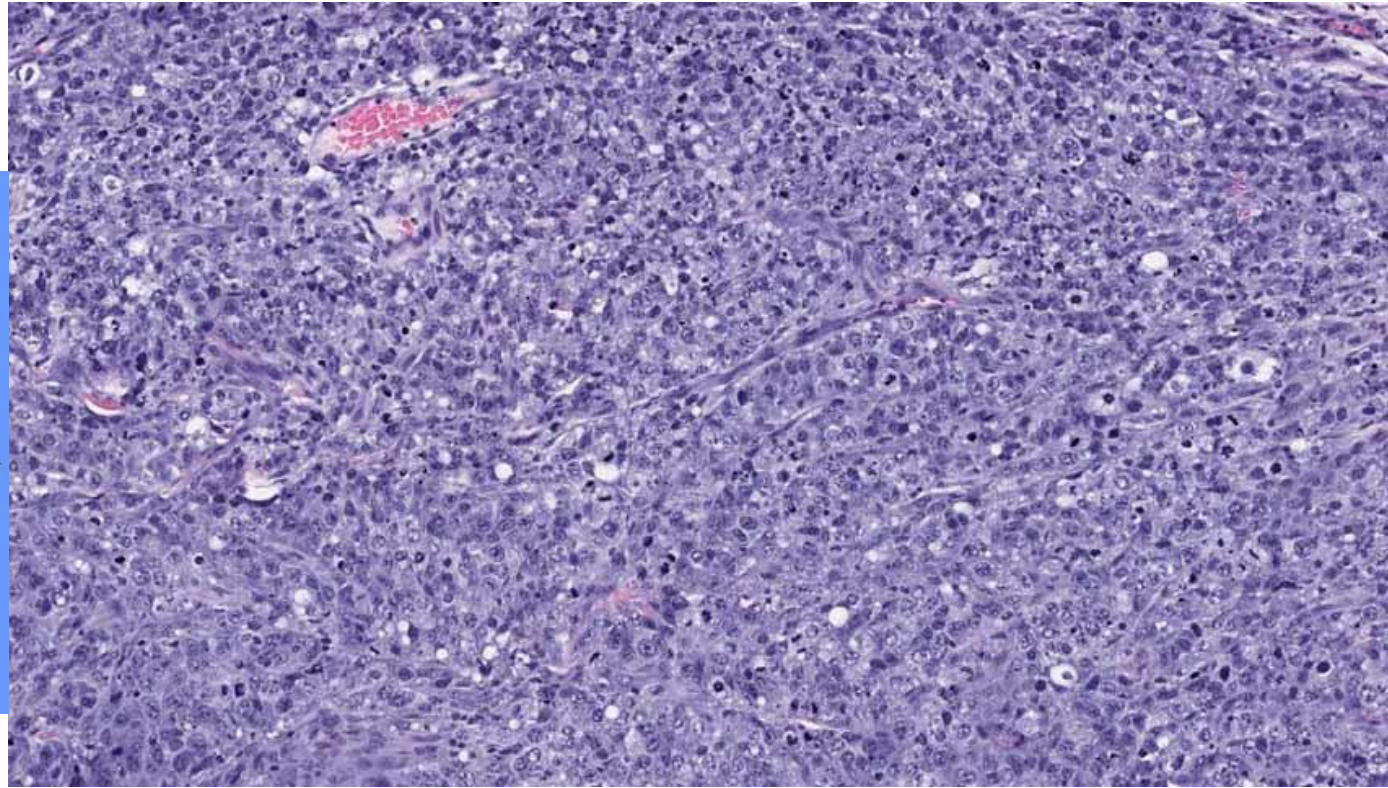
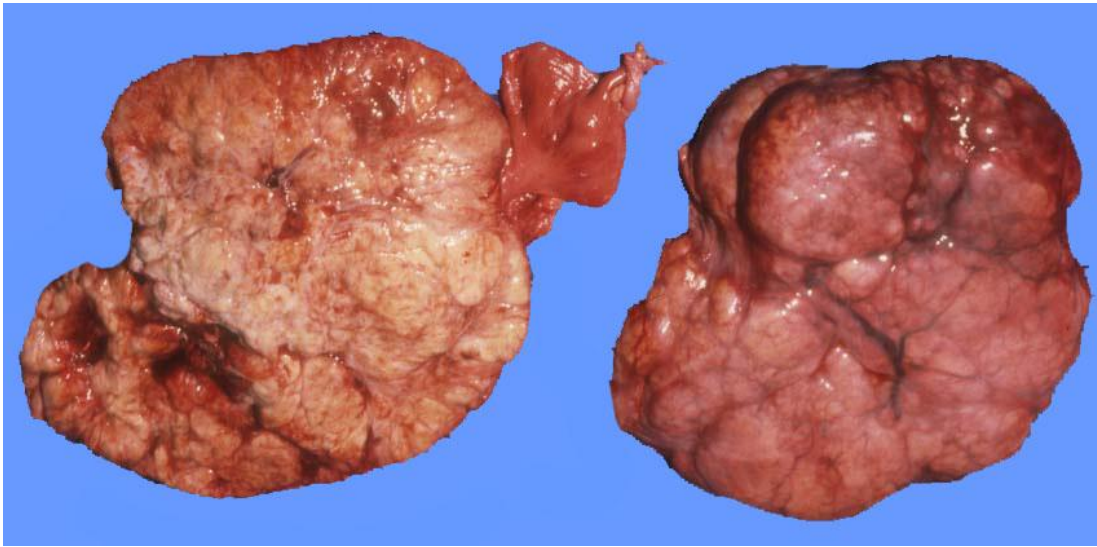
Sex cord Stromal Tumour

Thecoma

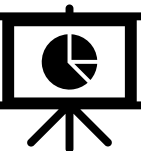
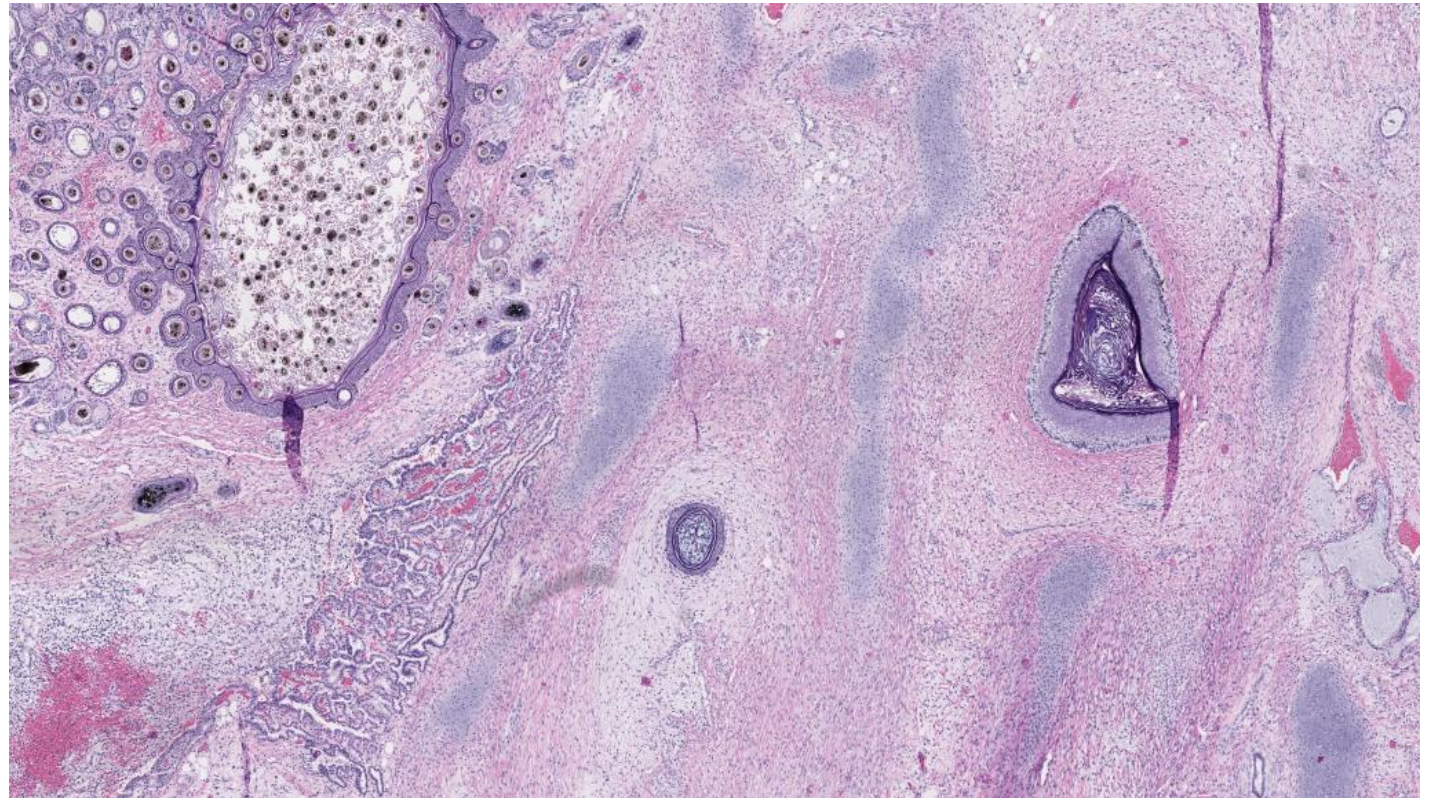
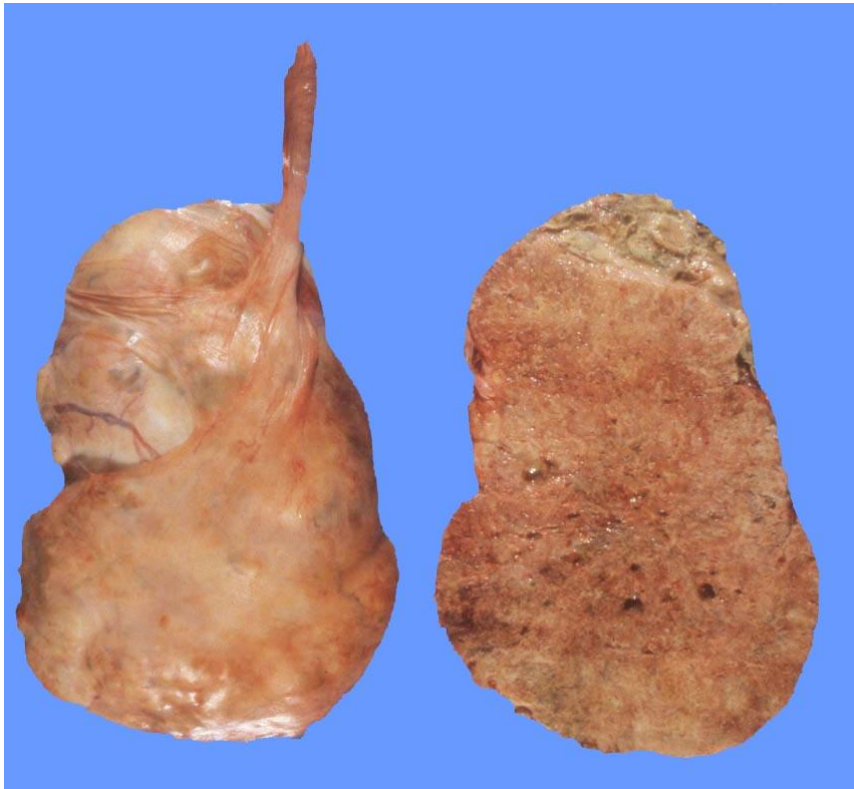
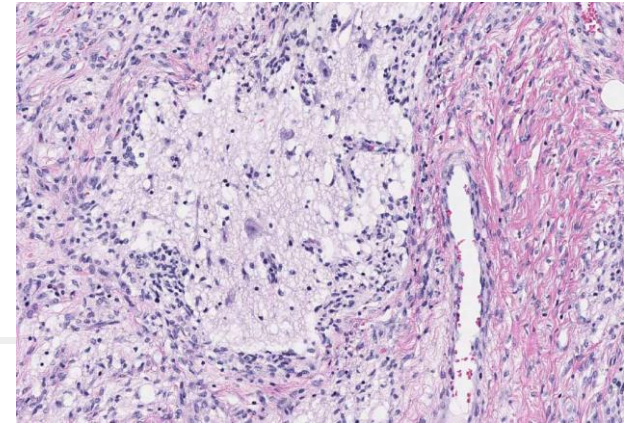


Photograph compliments of Dr
Alexis Berrocal; Histopatovet

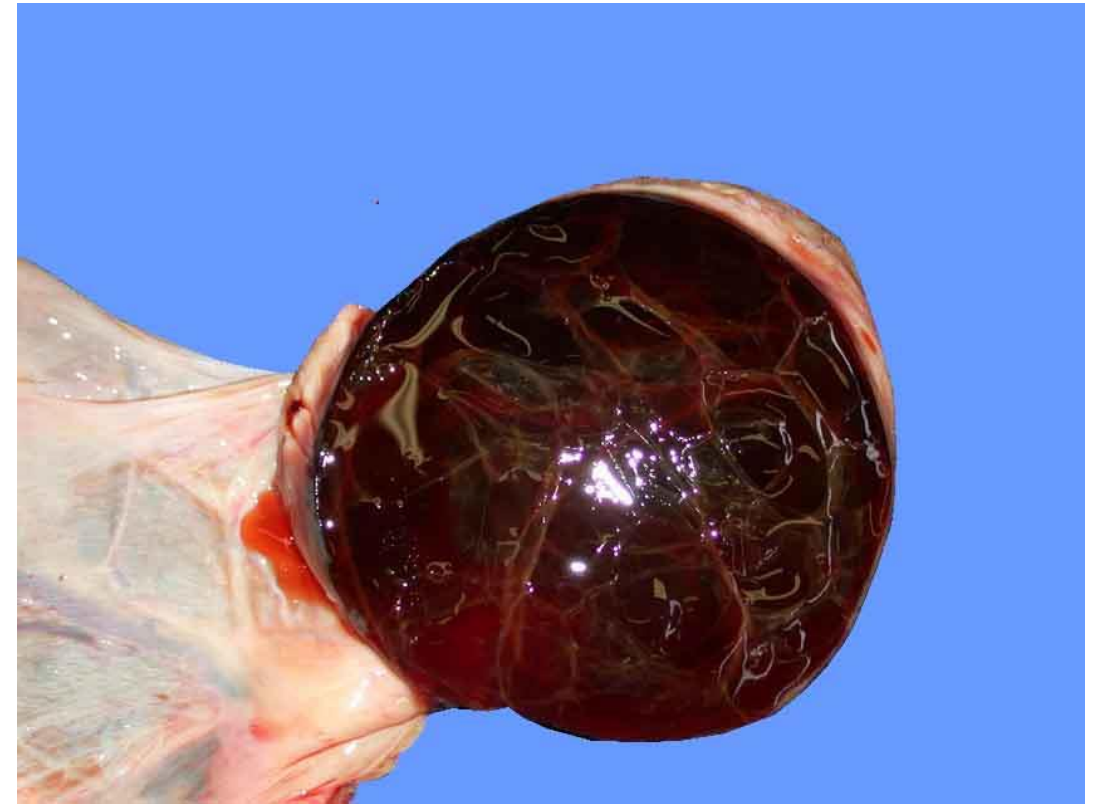
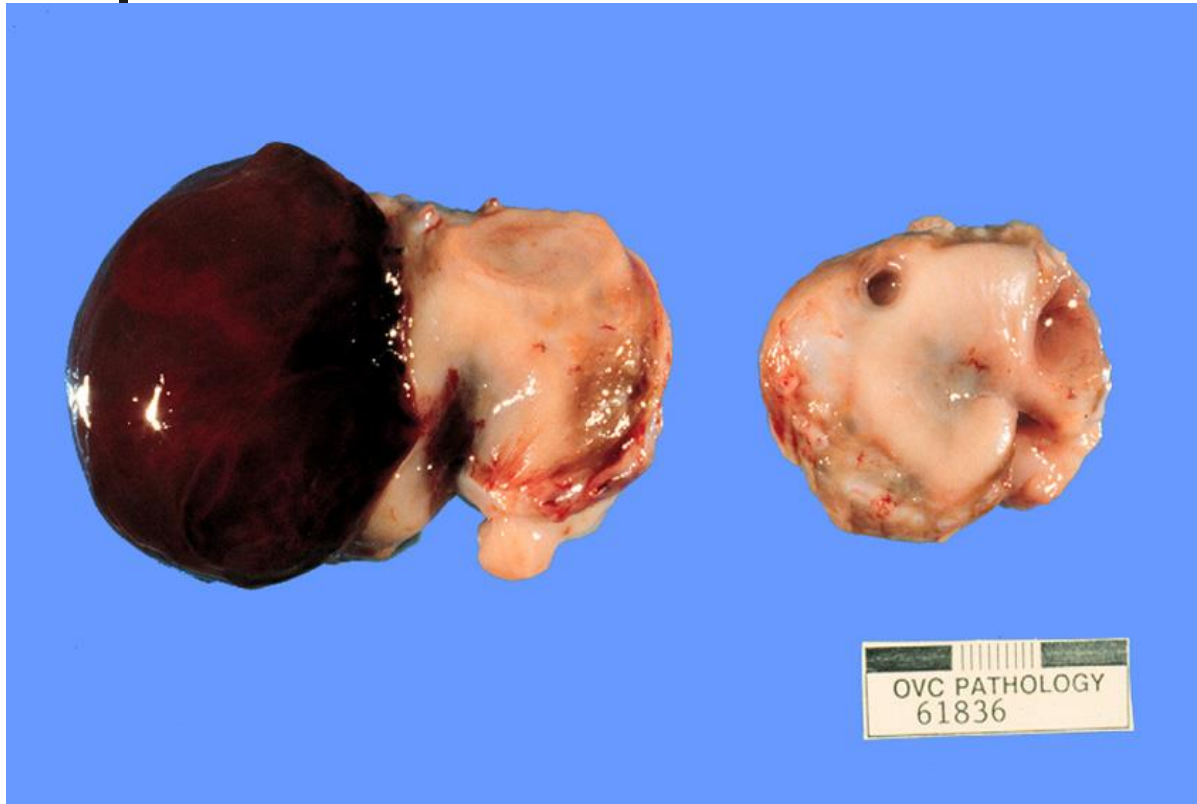
Germ cell tumour: dysgerminoma



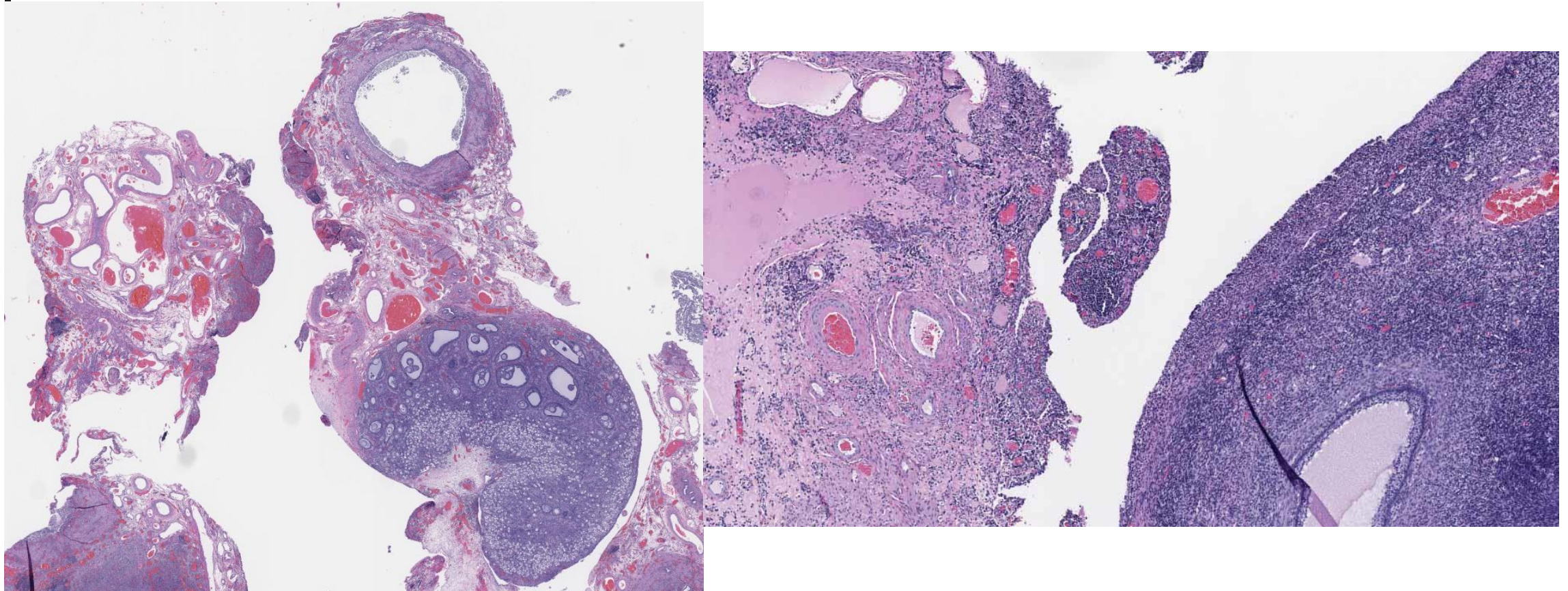
Germ cell tumour: teratoma



Equid: Ovarian haemorrhage



Perioophoritis (periovaritis): Feline





Female Genital Pathology

Ovary

Uterine tube

Uterus

Cervix

Vagina

Vulva

Degeneration - cell death

Disturbances of growth

Circulatory disturbances

Minerals and pigments

Inflammation

Hydrosalpinx



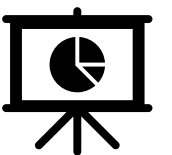
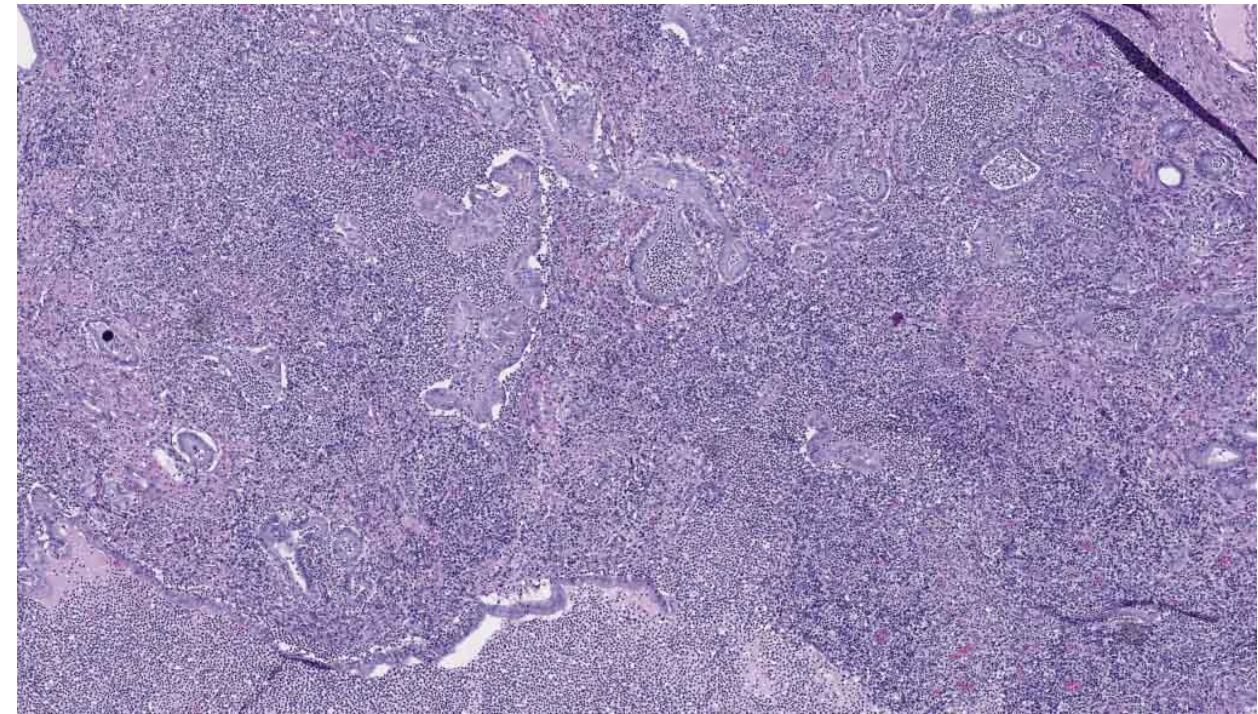
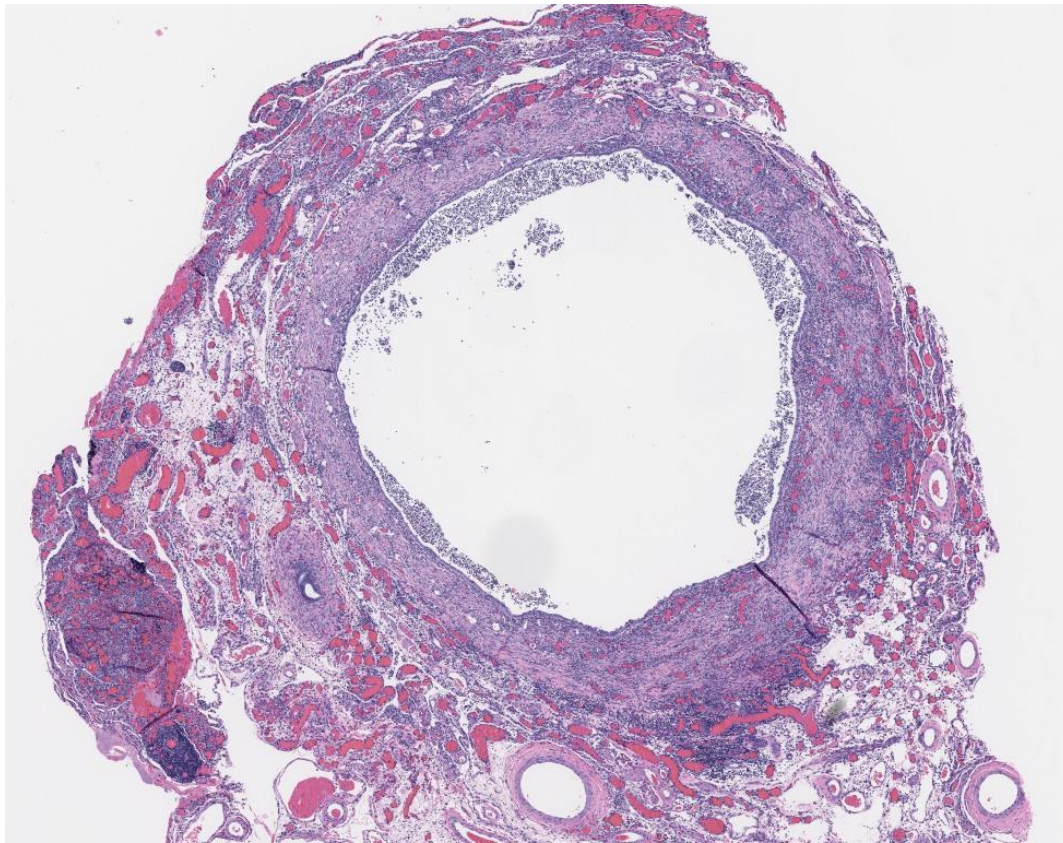
Ovine

Photograph compliments of
Dr Philip Ladds



Feline

Pyosalpinx



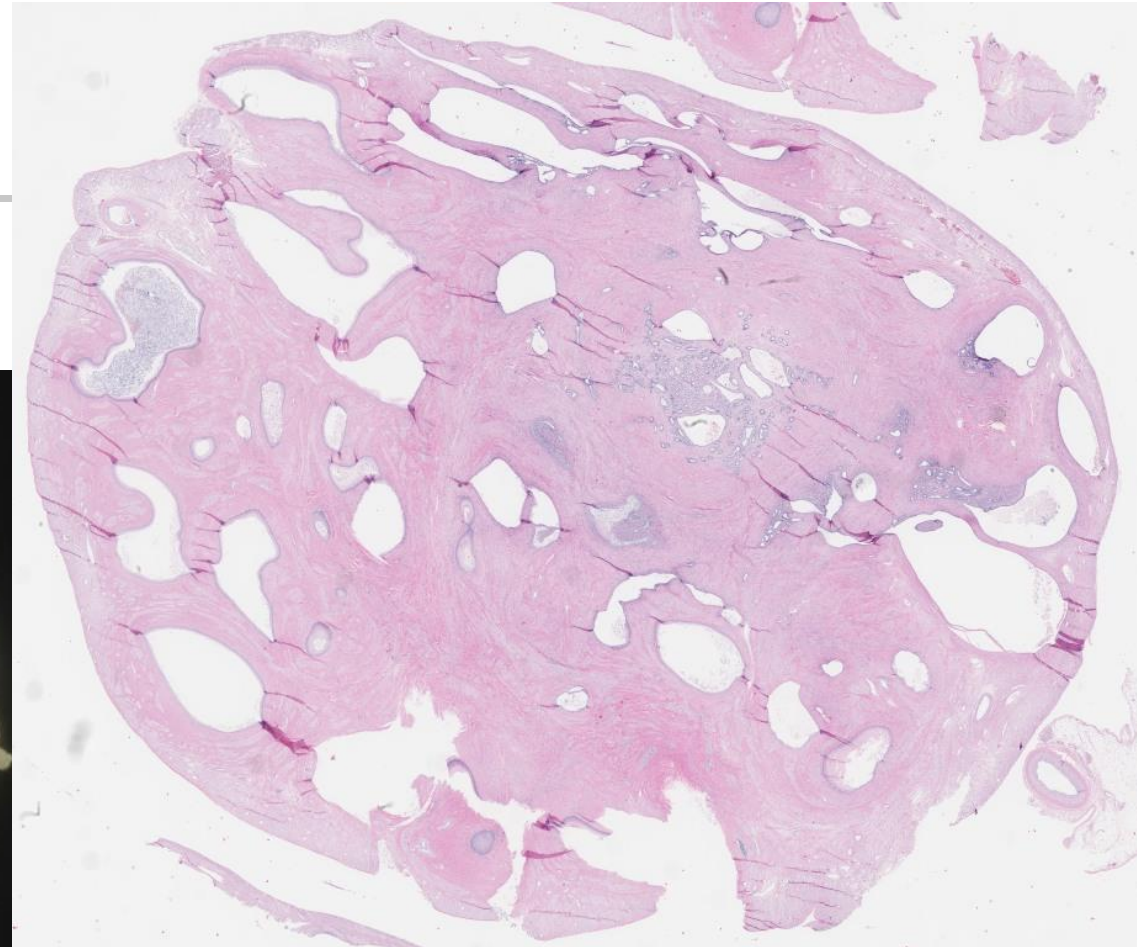
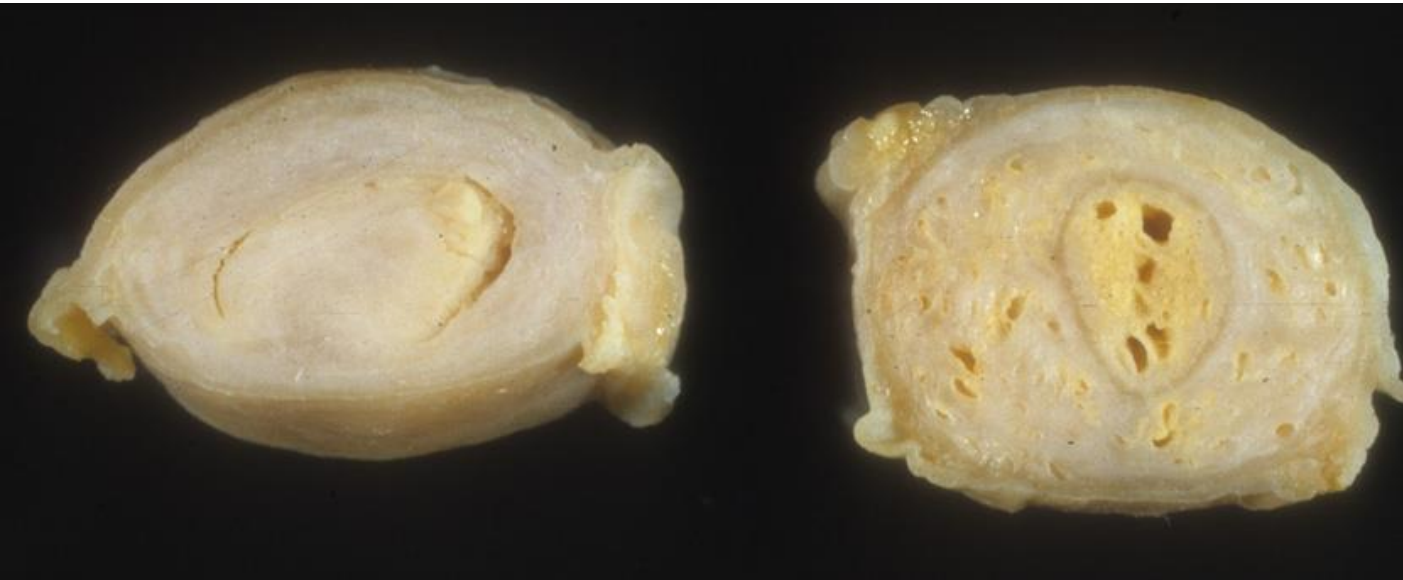


Female Genital Pathology

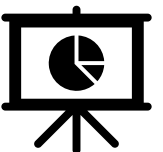
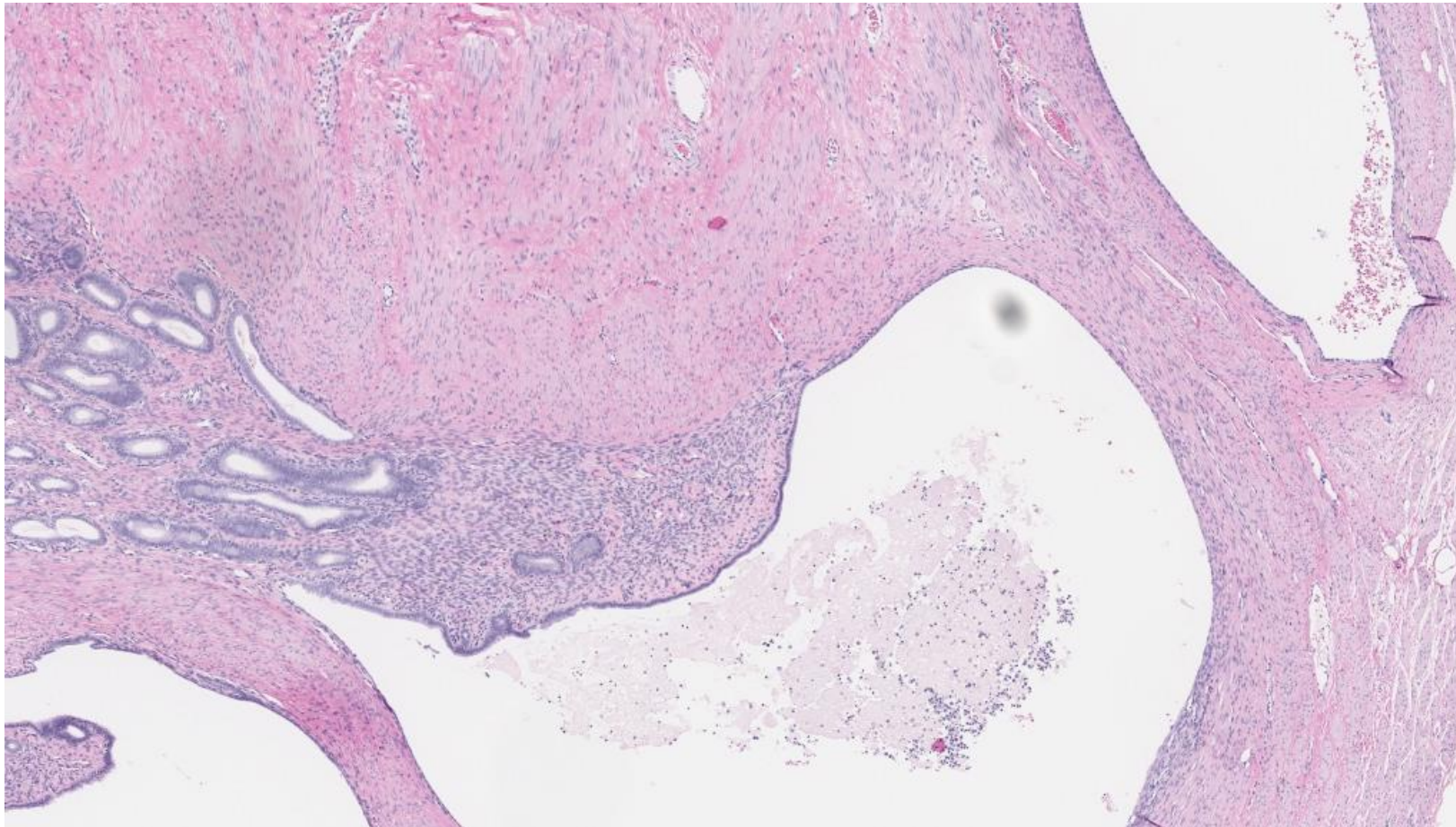
Ovary
Uterine tube
Uterus
Cervix
Vagina
Vulva

Degeneration - cell death
Disturbances of growth
Circulatory disturbances
Minerals and pigments
Inflammation

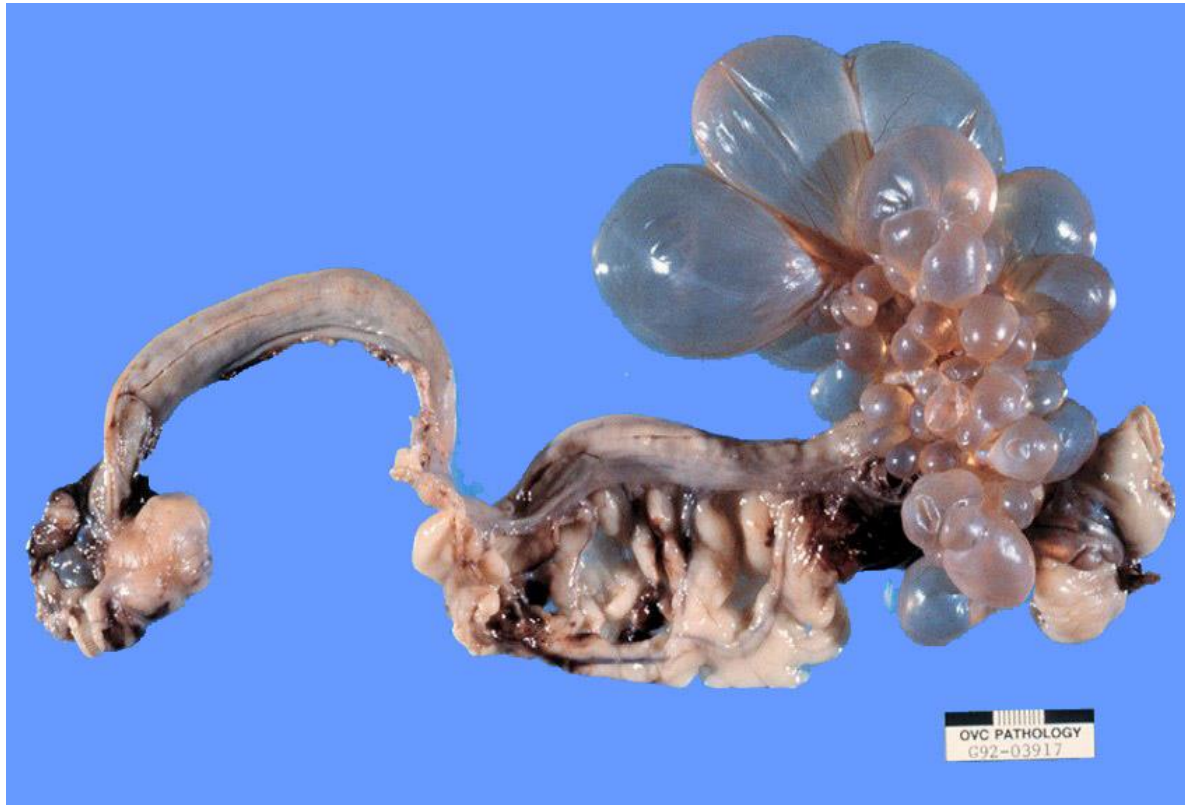
Adenomyosis



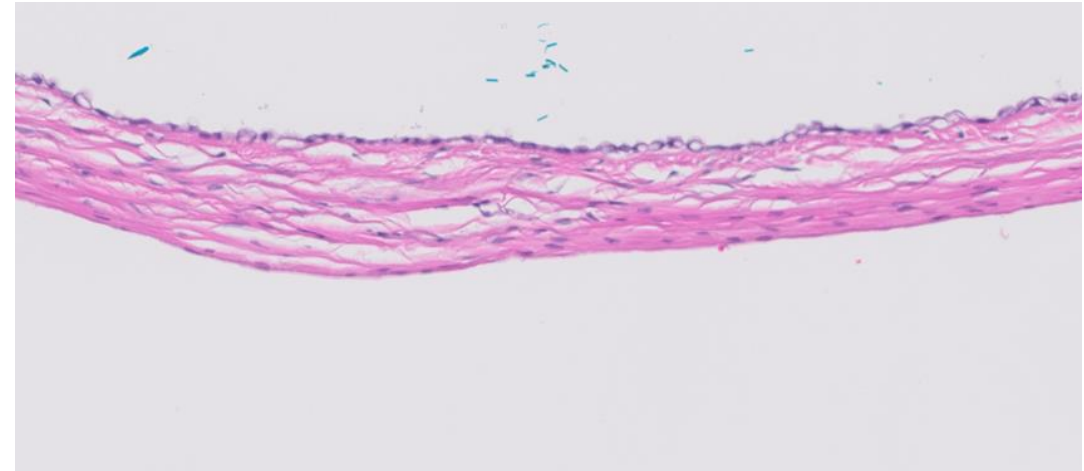
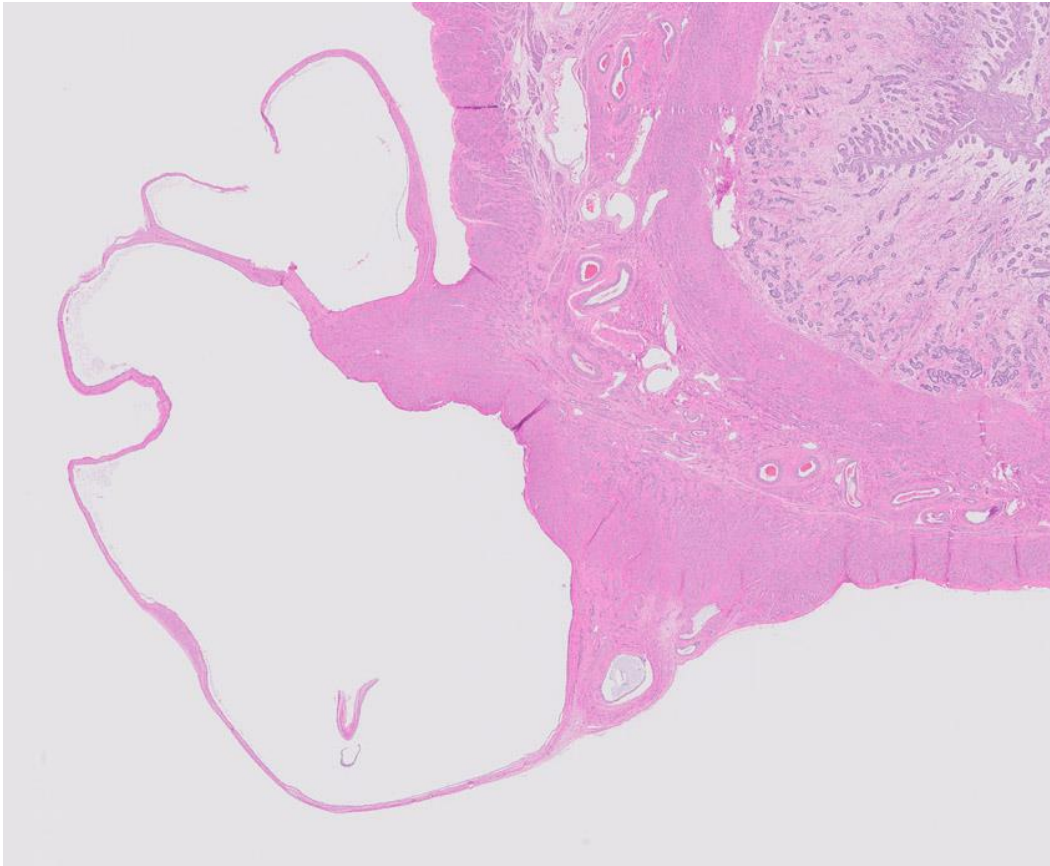
Uterus: Adenomyosis



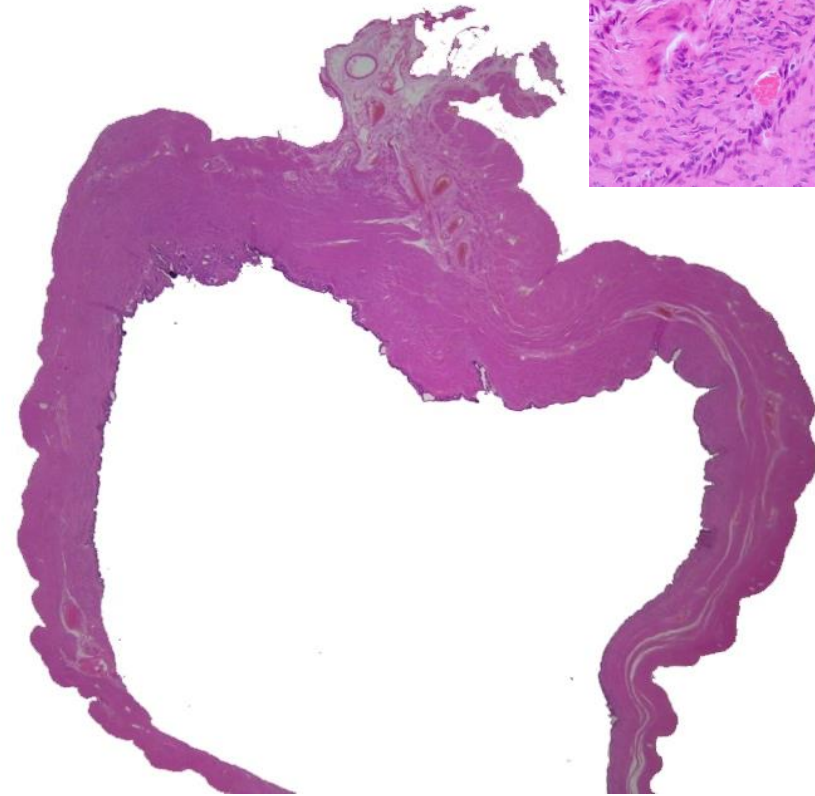
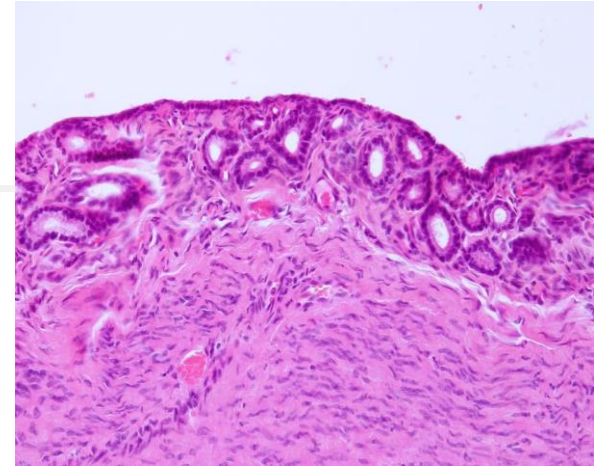
Serosal inclusion cysts - canine



Serosal inclusion cyst - dog



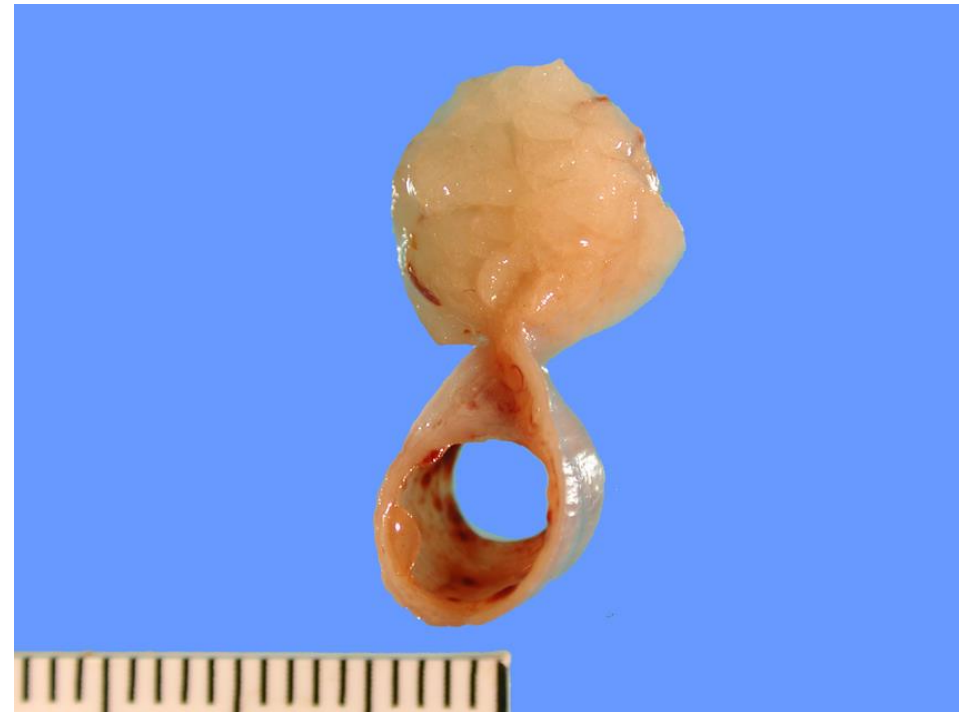
Hydrometra; feline



Hydrometra



Caprine



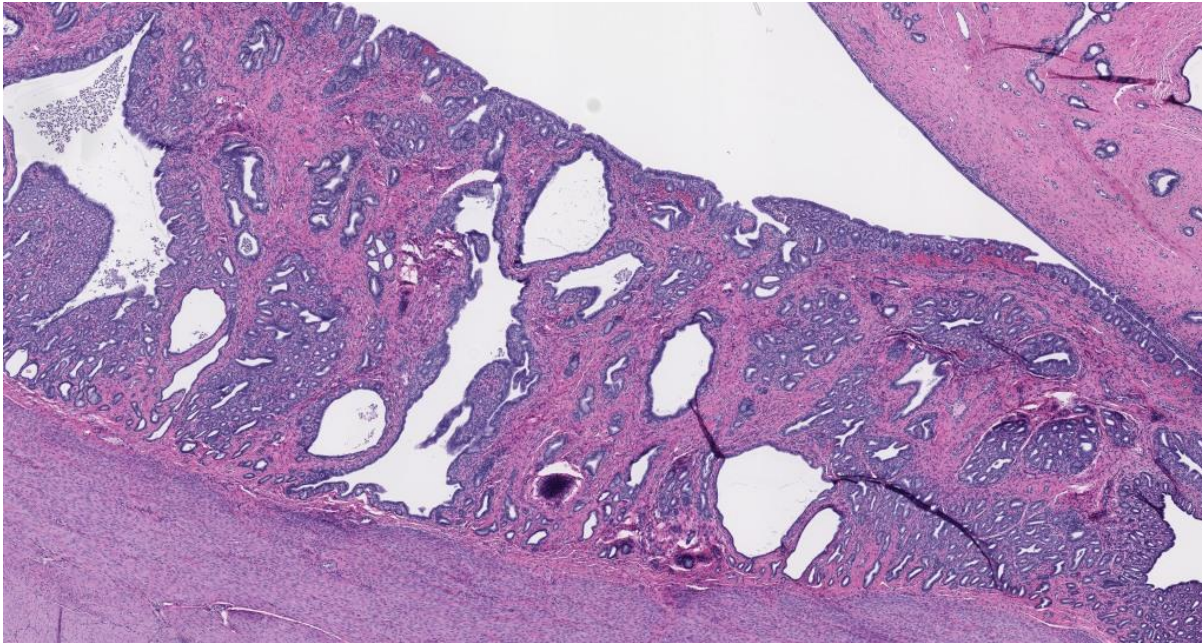
Canine

Photograph compliments of
Dr Philip Ladds

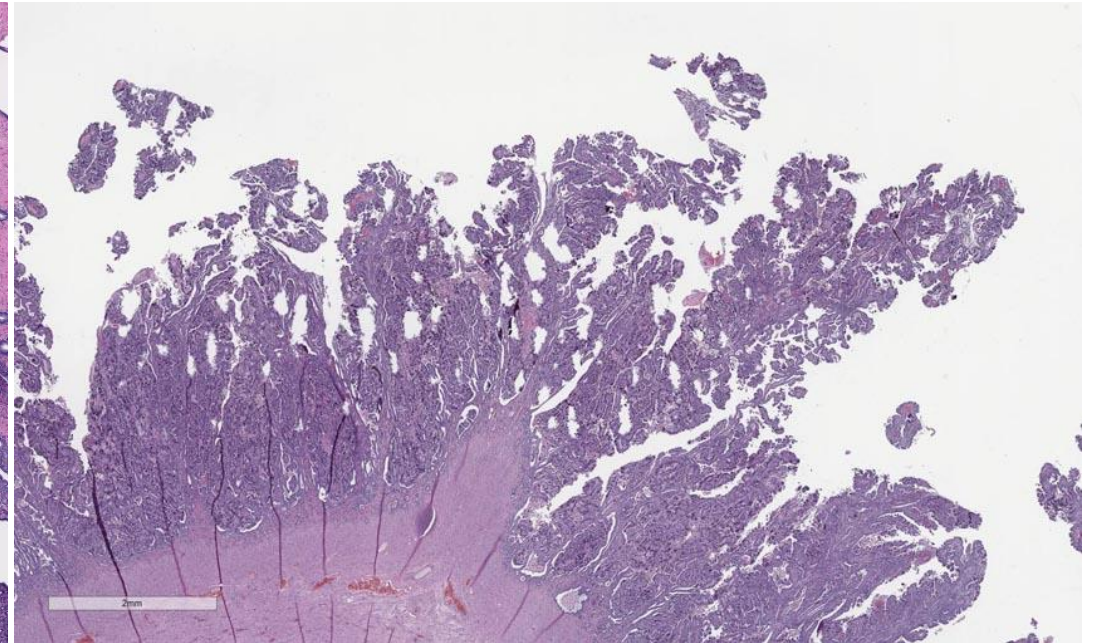
Felid: Endometrial hyperplasia



Felid: Endometrial hyperplasia

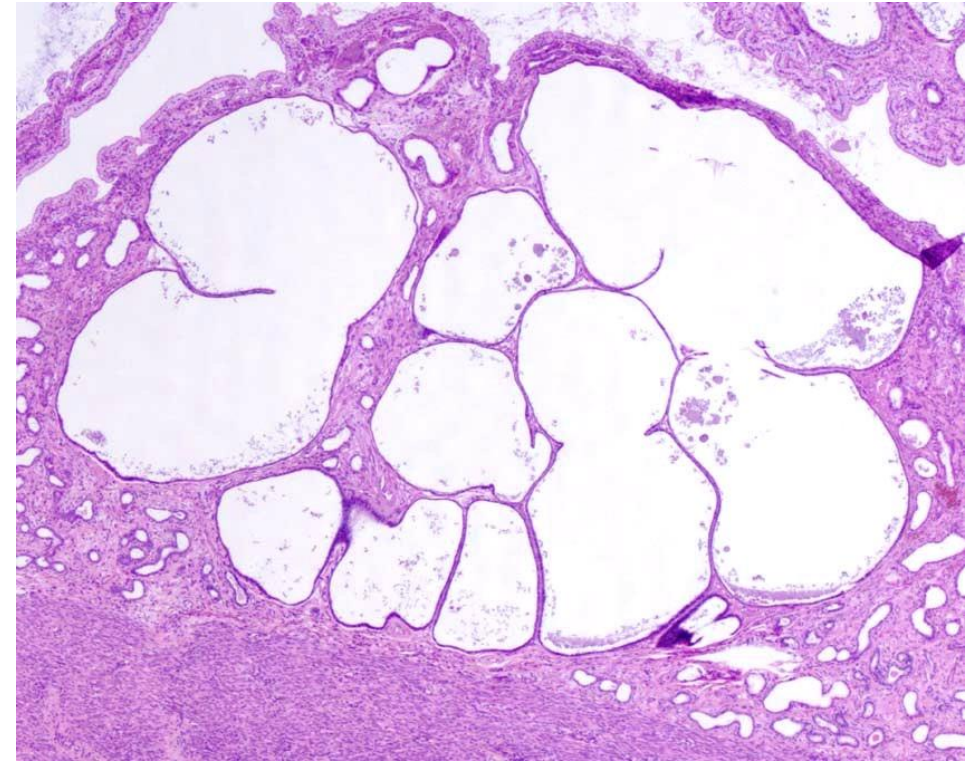
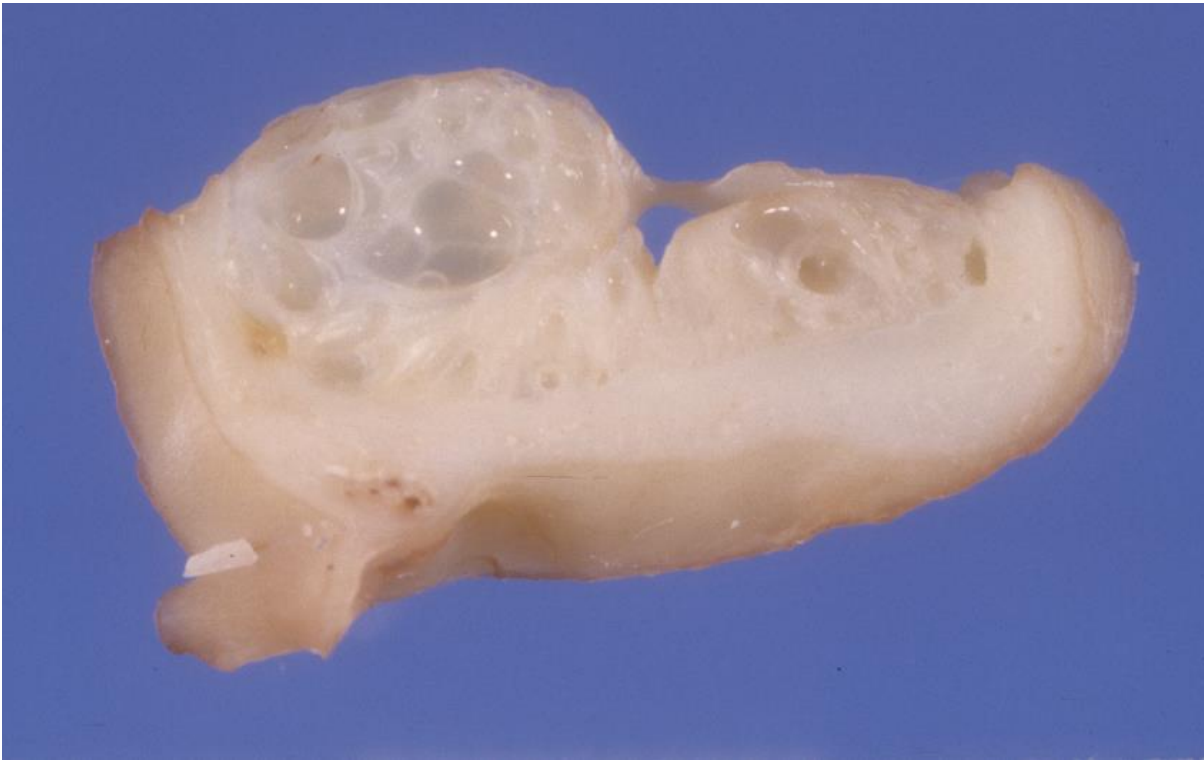


Cystic endometrial hyperplasia



Endometrial hyperplasia of pseudopregnancy

Canid: Cystic endometrial hyperplasia

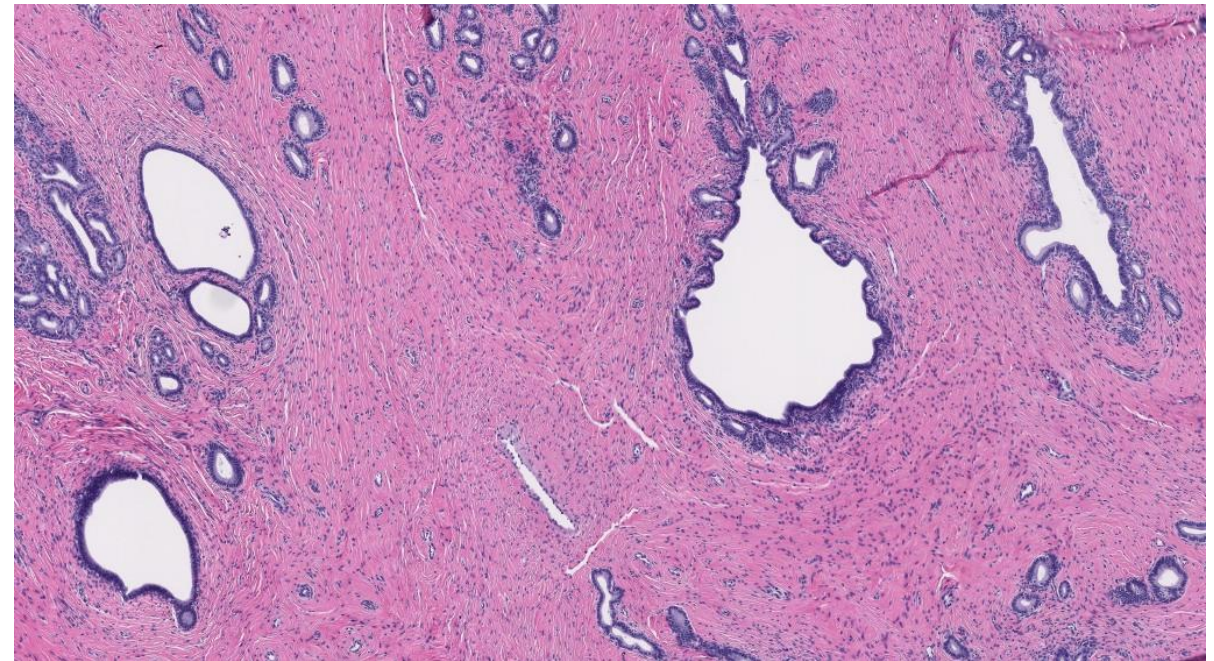
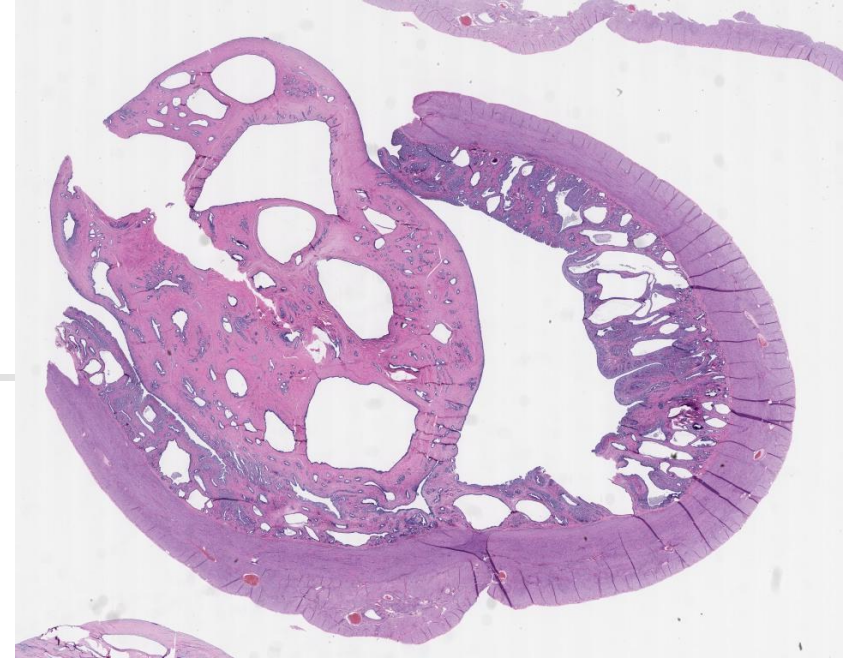




Canid: Cystic endometrial hyperplasia (CEH)

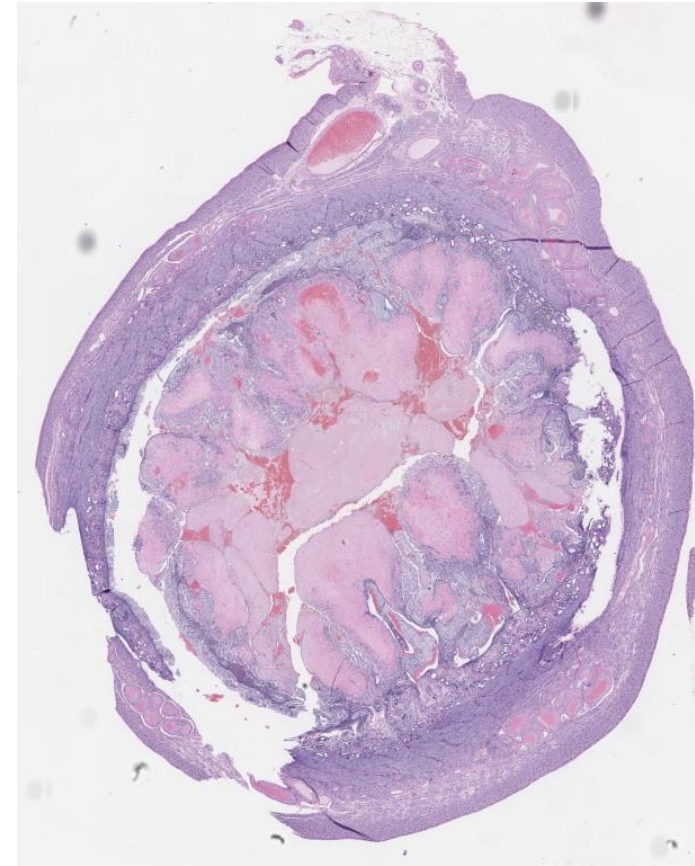
- Chicken or egg
- Dogma
 - long diestrals period
 - hormonal cycles without pregnancy
 - endometrial hyperplasia
 - bacterial infection
 - Pyometra (more later)
- “new” pathogenesis
 - Long diestrals period
 - Bacterial infection
 - Hormonal cycles without pregnancy
 - endometrial hyperplasia
 - Pyometra (more later)

Felid: Endometrial polyp

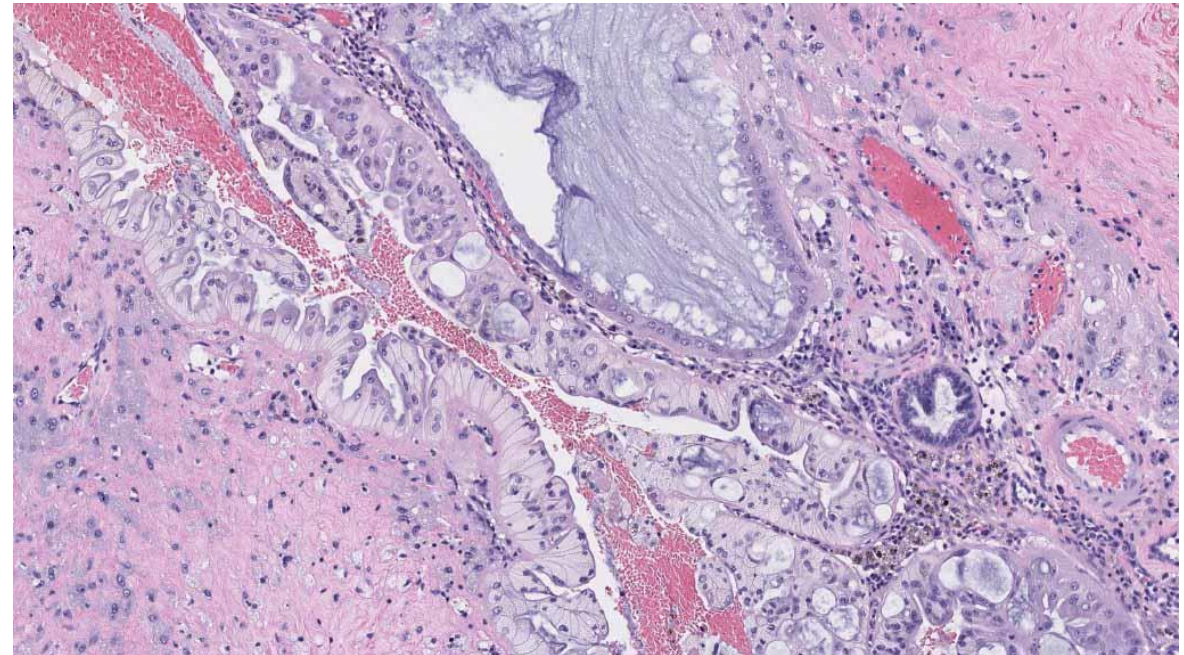
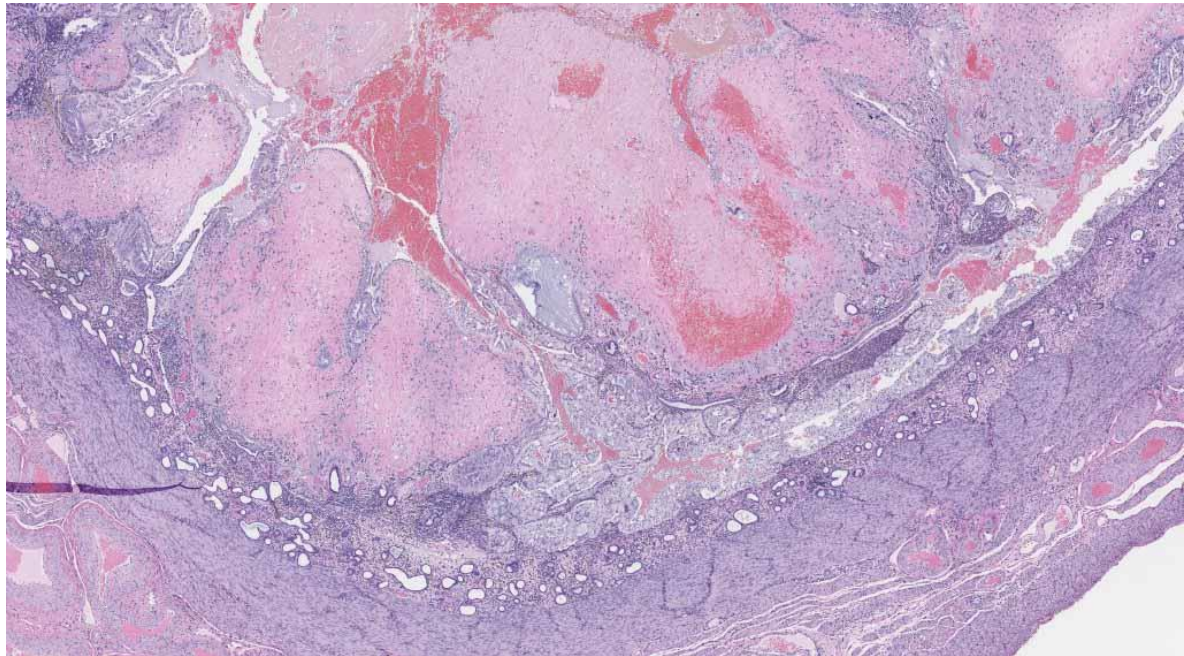


Photograph compliments of
Dr Linden Craig

Canid: post partum endometrium



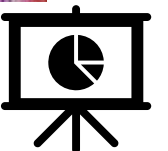
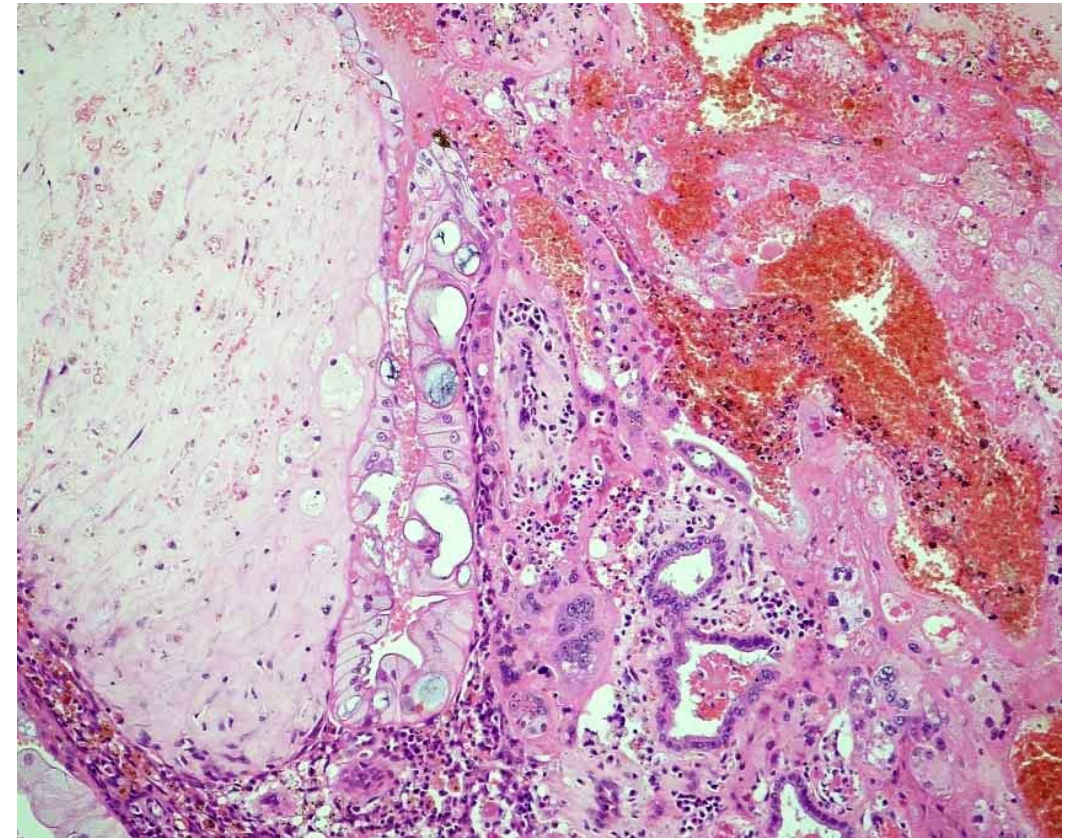
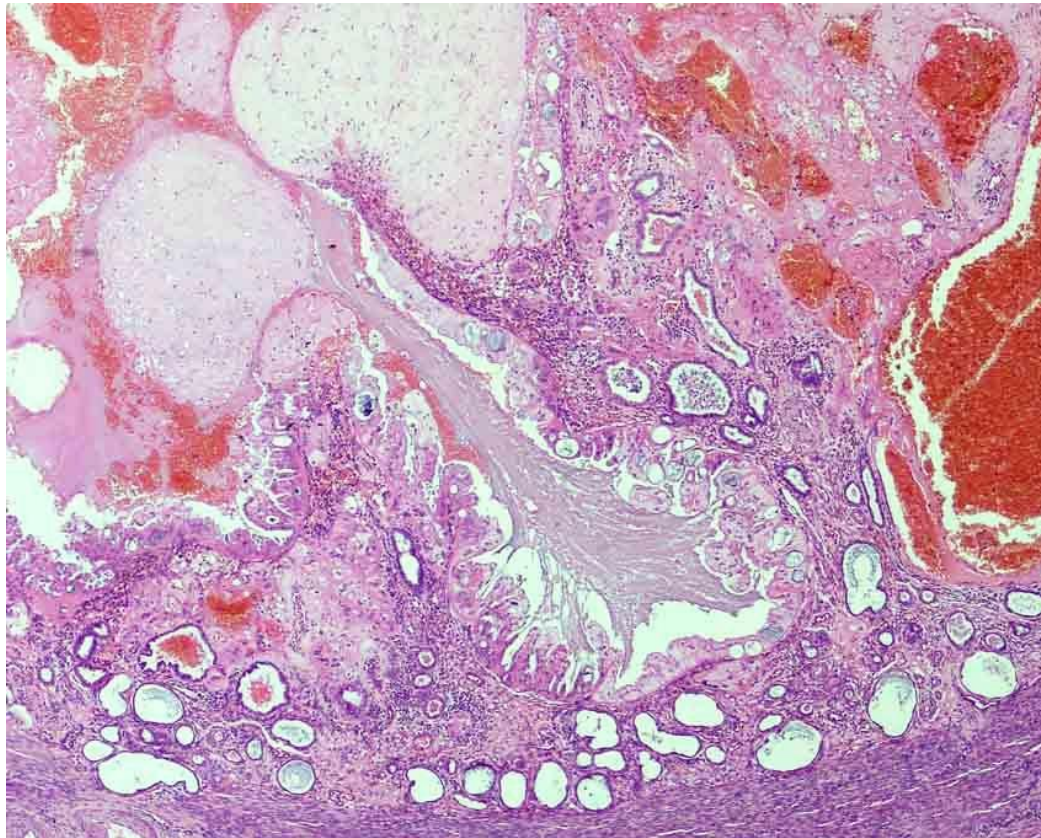
Post partum endometrium



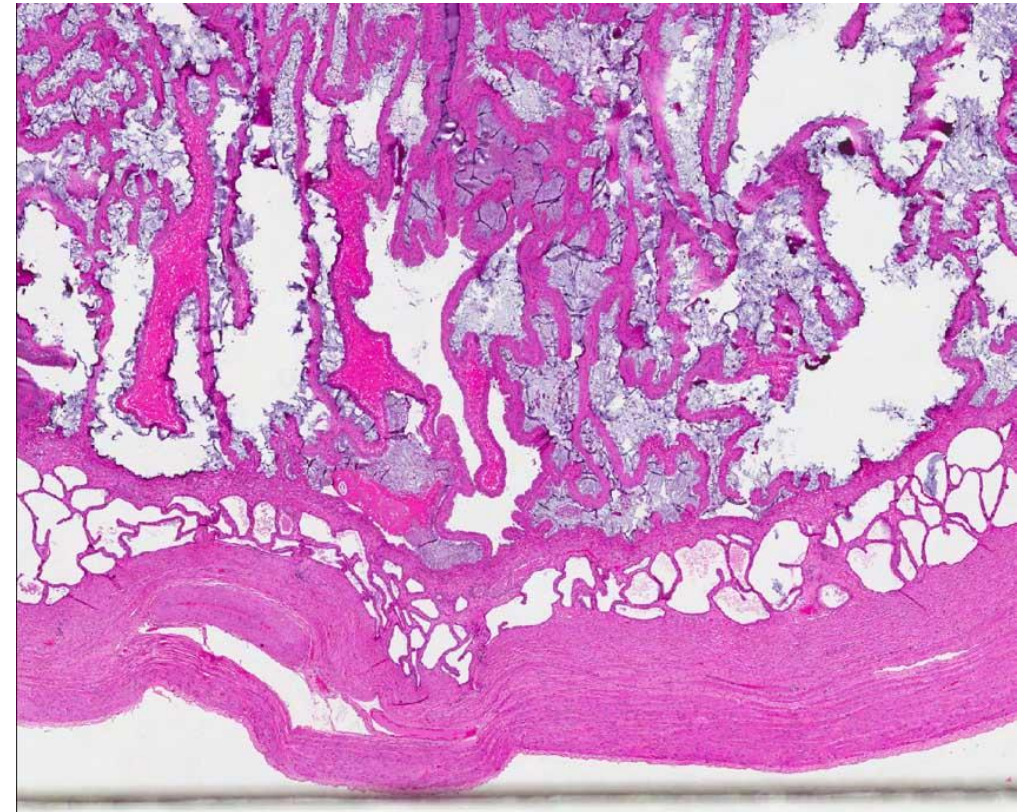
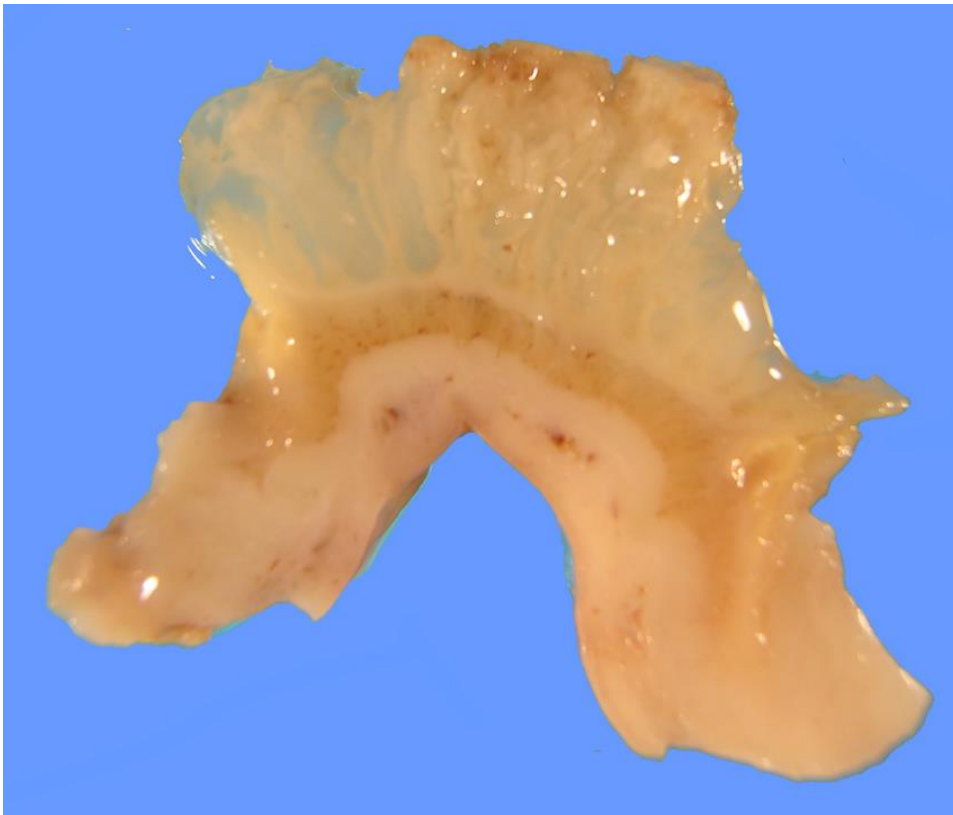
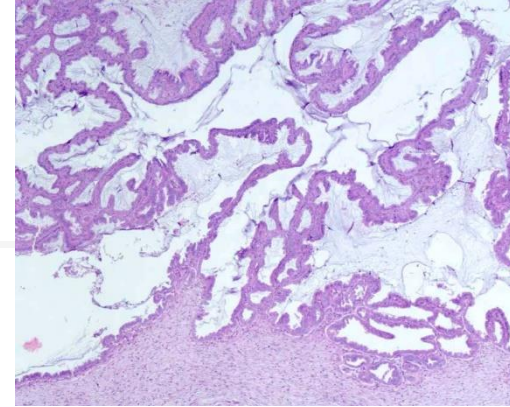
Canid: Subinvolution of placental sites



Canid: Subinvolution of placental sites (SIPS)



Canid: Localised Hyperplasia of Pseudopregnancy / Pseudoplacentation endometrial hyperplasia

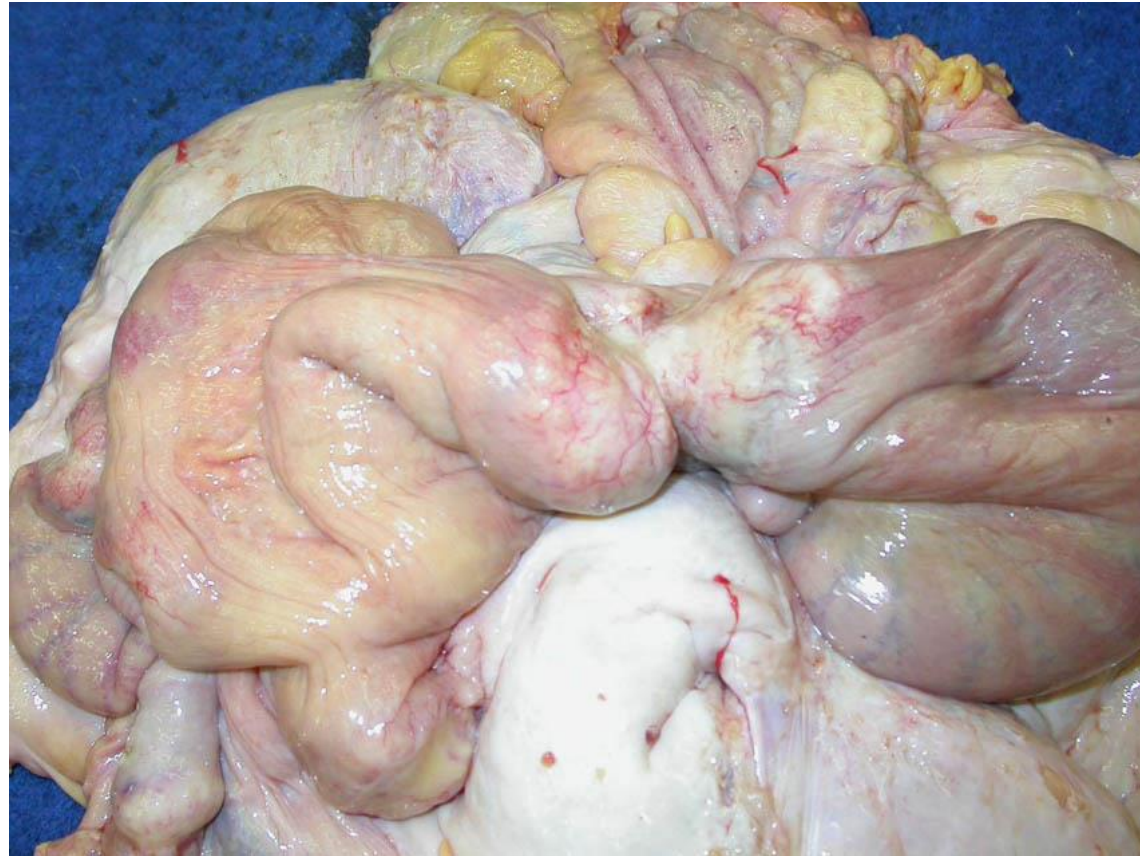




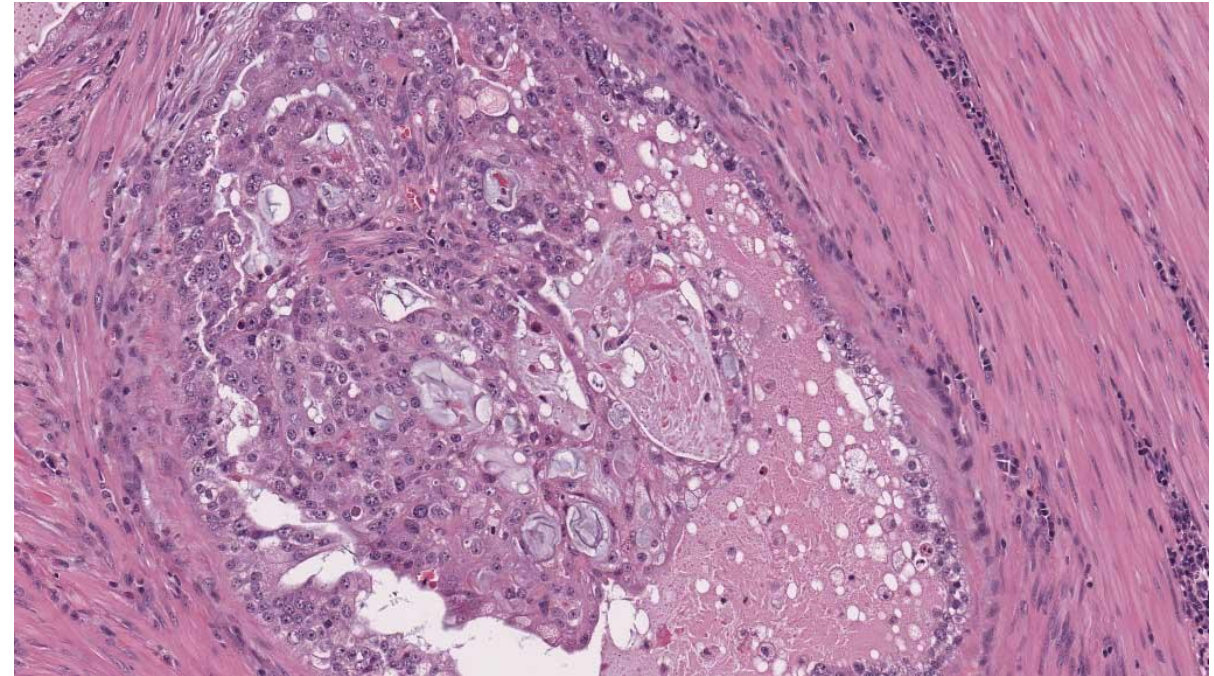
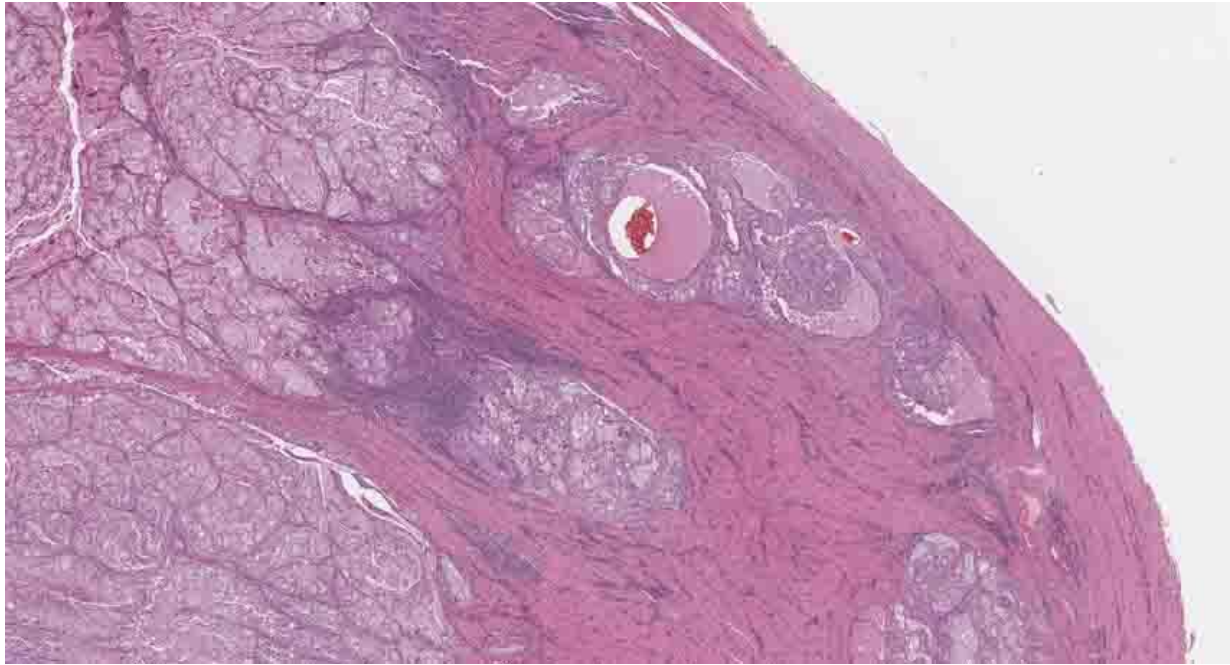
Uterine neoplasia

- Epithelial
 - adenocarcinoma
- Mesenchymal
 - Smooth muscle tumor (leiomyoma)
- Round cell
 - lymphoma
- Other (mixed tumors)
 - adenomyoma

Bovine: Endometrial adenocarcinoma

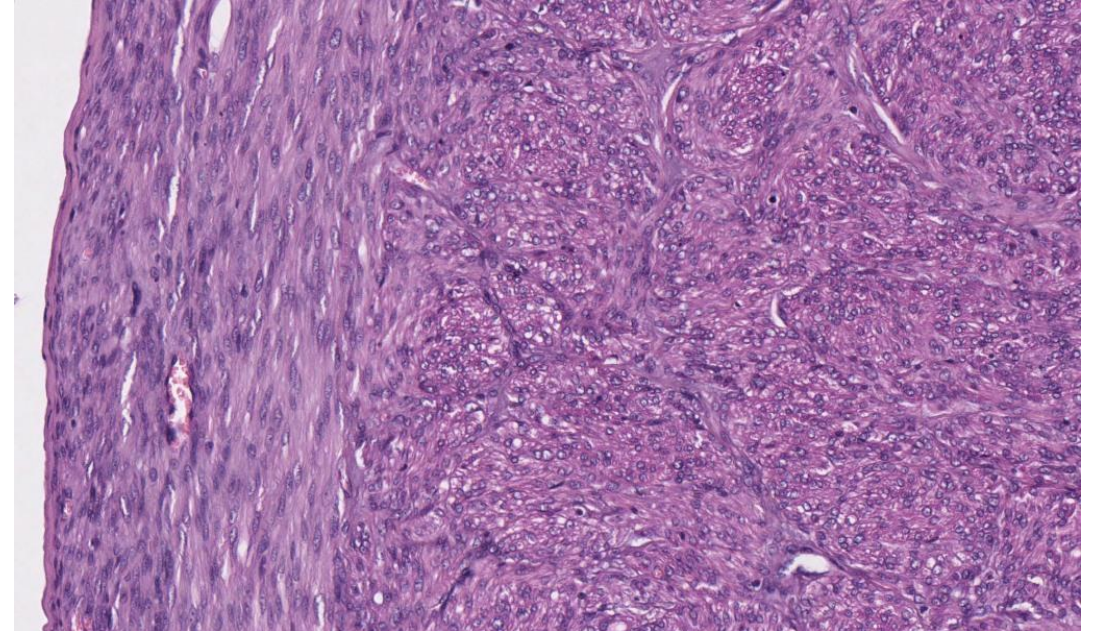


Canid: Endometrial adenocarcinoma



Case from Dr Chris Premanandan

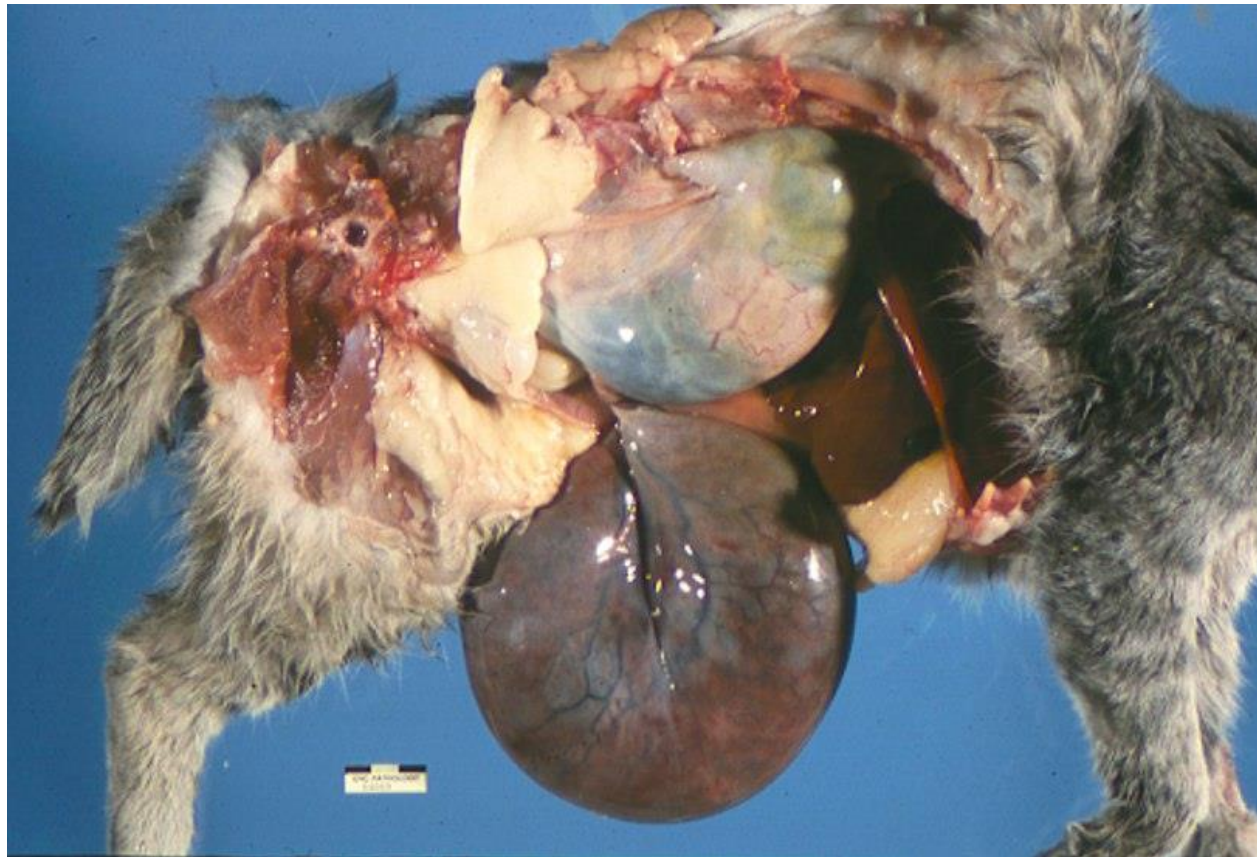
Canid: Uterine smooth muscle tumor



Bovid: lymphoma



Felid: Uterine torsion



Bovid: post partum endometrium



Bovid: Postpartum metritis

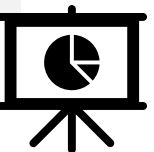
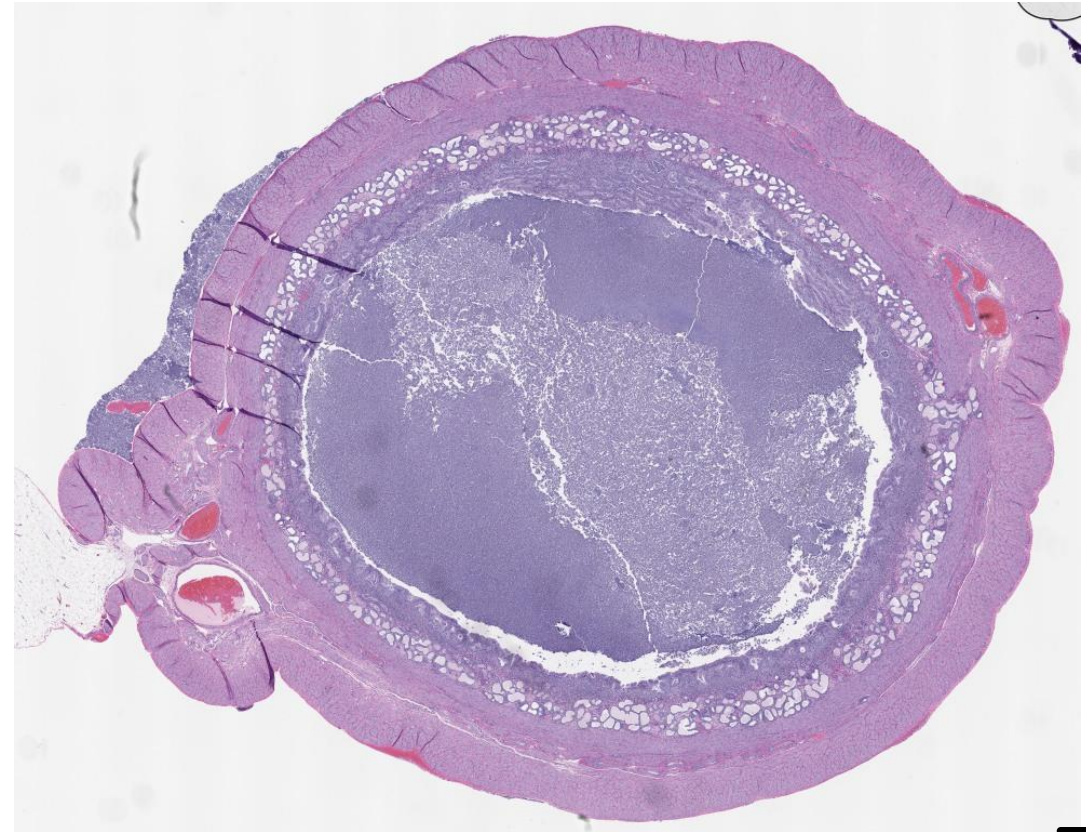
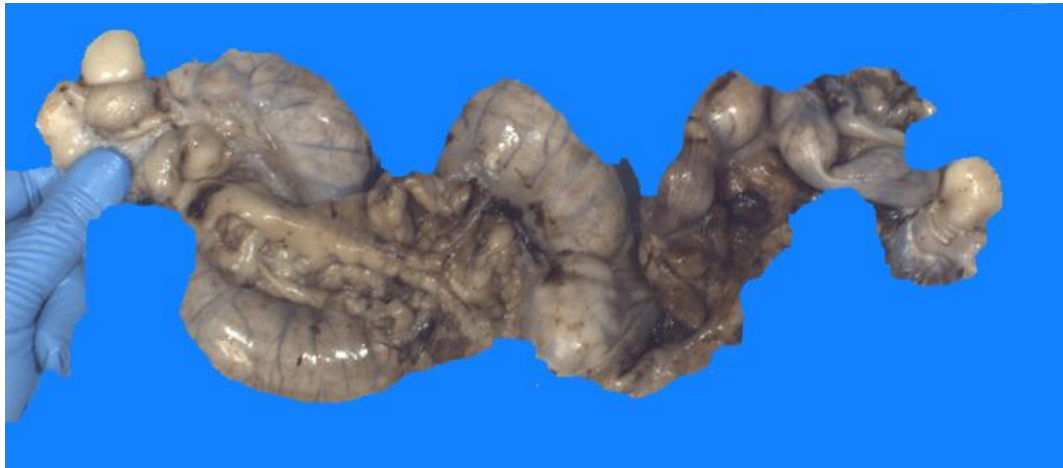




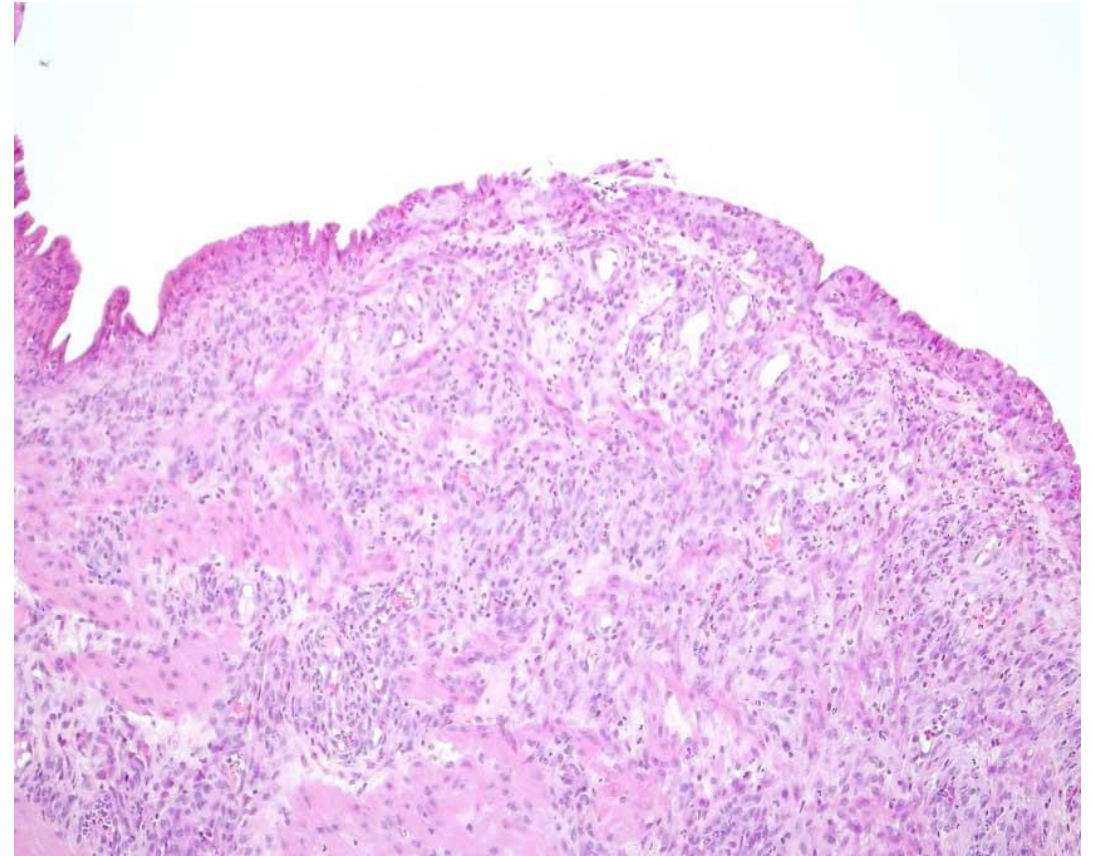
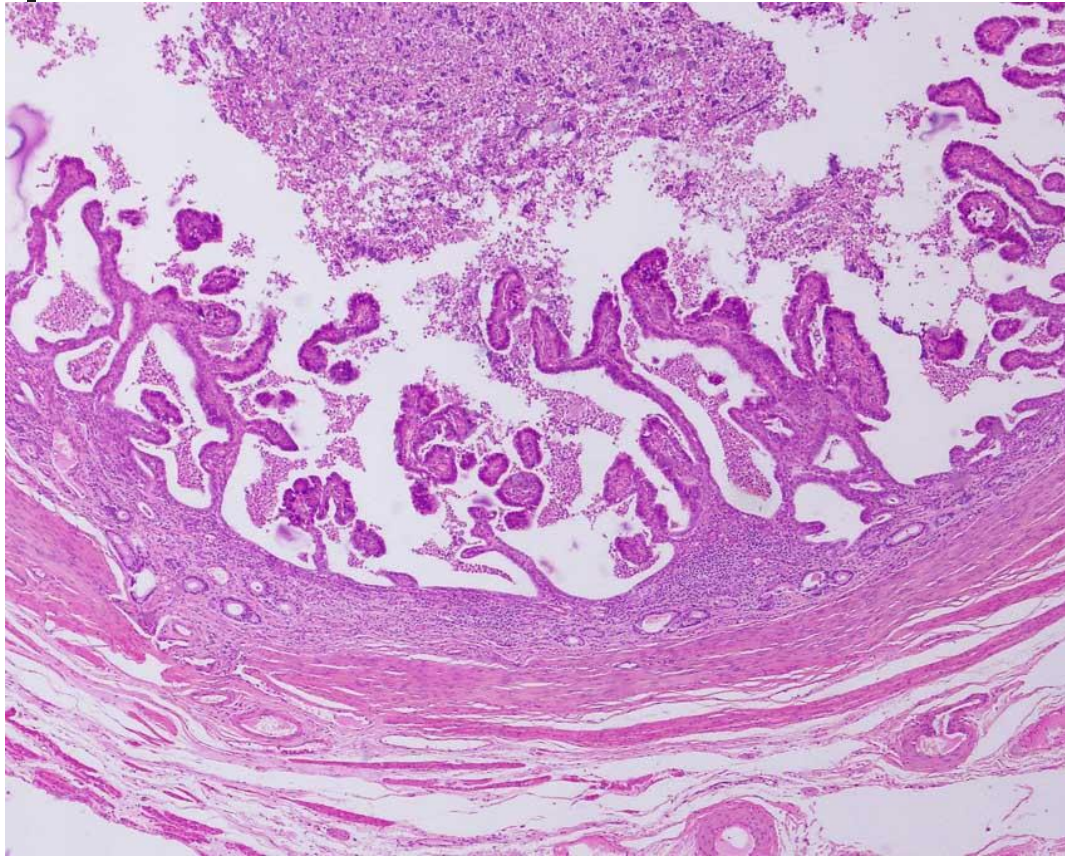
Canid: CEH/Pyometra

- 'New' scheme
- Canine endometrium is primed for pregnancy
- Bacteria, foreign material, embryo induces hyperplastic changes
- CEH and Pyometra are epiphenomena

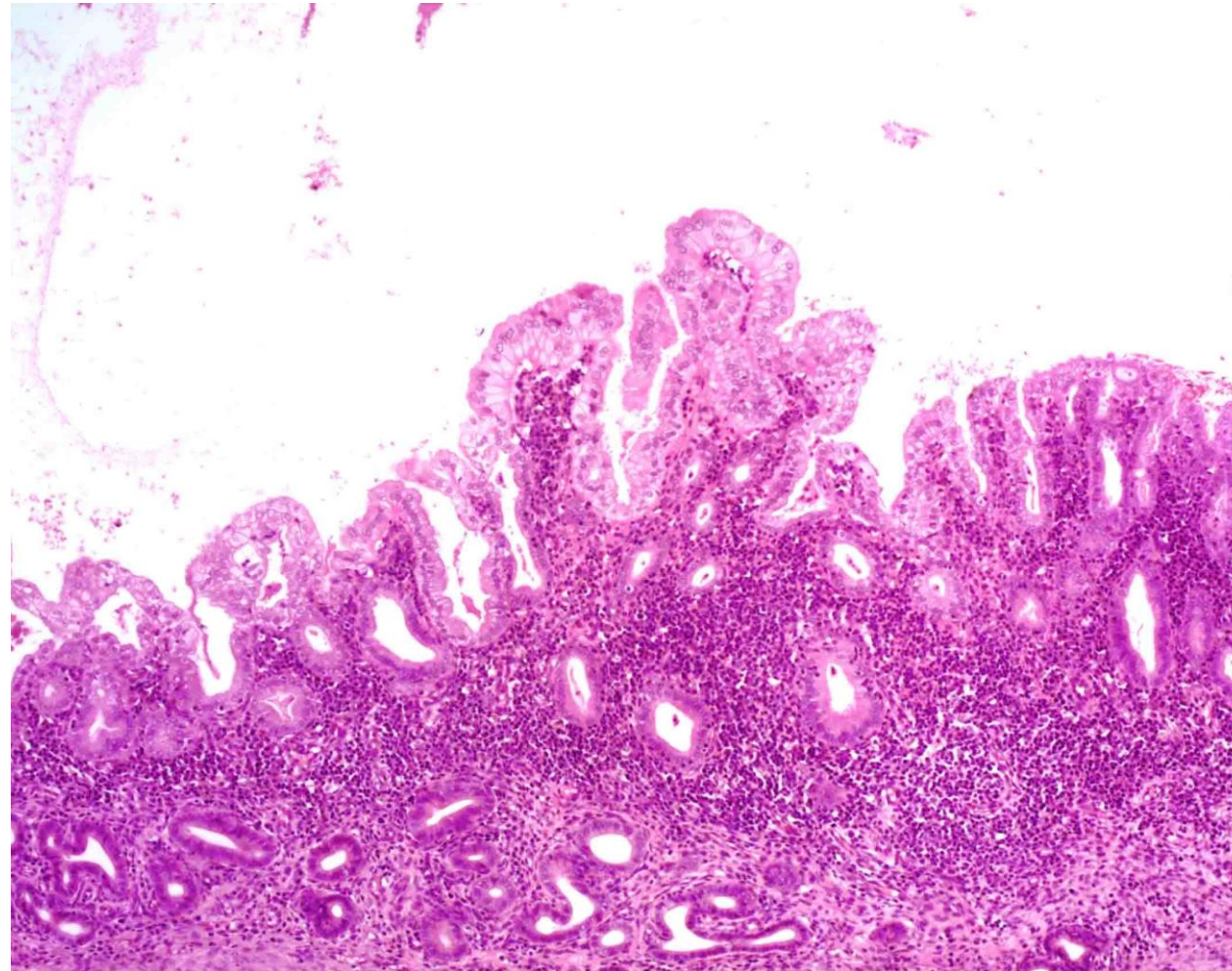
Canid: Pyometra and CEH



Canid: Pyometra – many faces



Canid: Endometritis without pyometra





Post breeding induced endometritis

- Focus on mare
- Occurs in many species – pigs, dogs



Endometrial biopsy

- Cows
- Horse
 - Well established protocols
 - Kenney and Doig
- Camelid
- Dog
 - Initial development by Dr Don Schlafer, Cornell University



Equine endometrial biopsy

- Likelihood of live foaling
 - Grade I – 80+
 - Grade IIA – 50-80%
 - Grade IIB – 10-50%
 - Grade III - <10%
- Pathologists grade often different to Theriogenologists
- Inconsistency in how different pathologists grade
- Description more important
 - Stage of cycle
 - Inflammation
 - Fibrosis
 - Compartments

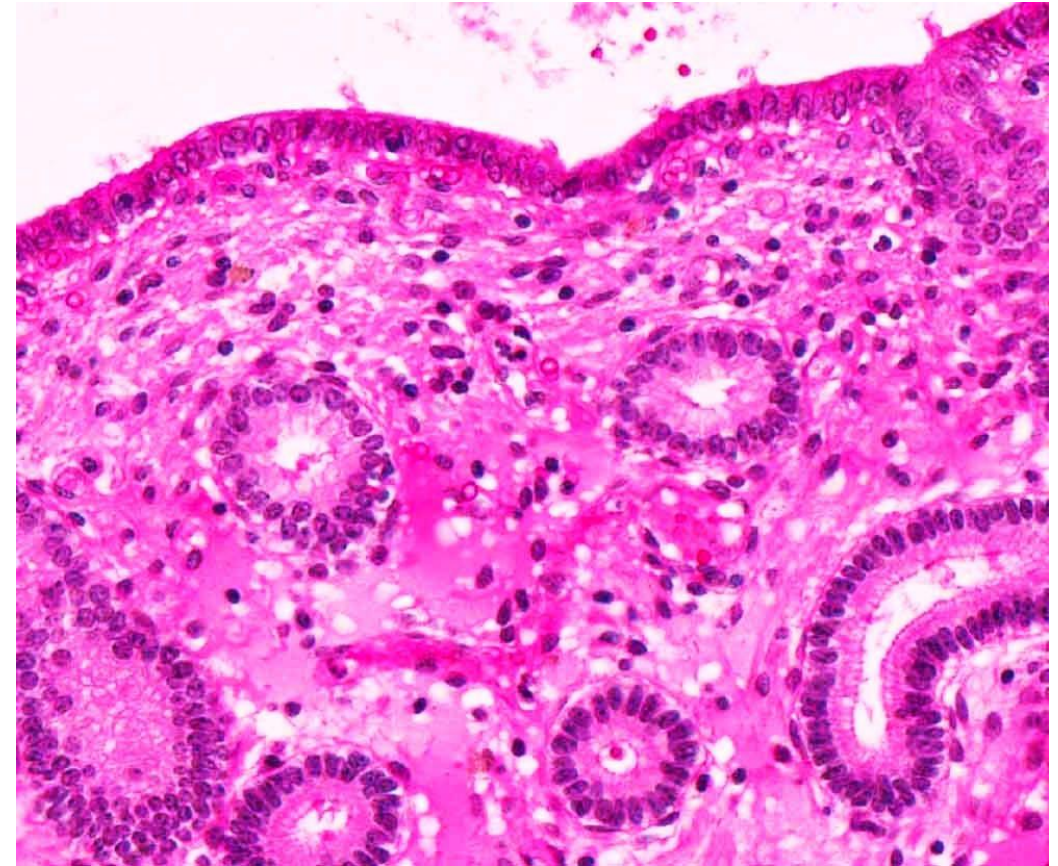


Evaluation of endometrial biopsy

- Use a 'synoptic report' approach
- Suitability of sample
- Stage of cycle
- Cells: neutrophils, lymphocytes, plasma cells, lymphoid follicles
- Fibrosis – nests
- Compartments: luminal, epithelium, Stratum compactum, stratum lucidum, glands, deeper structures, blood vessels

D.H. Schlafer (2007) Equine endometrial biopsy: Enhancement of clinical value by more extensive histopathology and application of new diagnostic techniques? Theriogenology 2007 68: 413–422

Equid: Endometrial biopsy





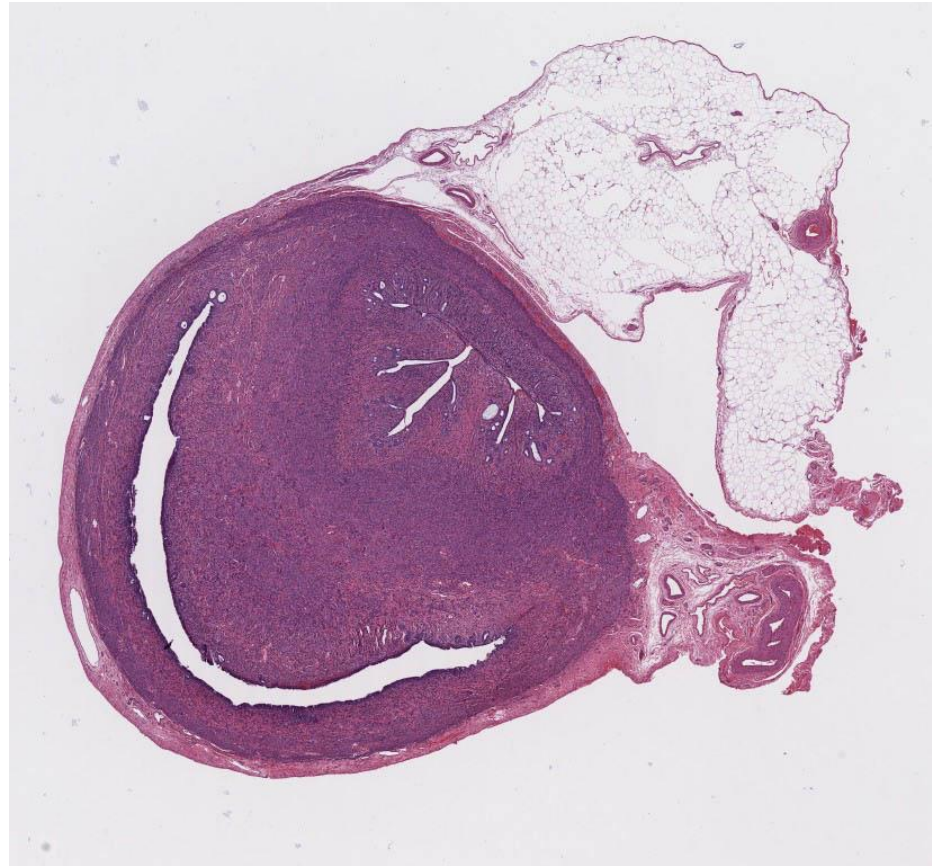
Female Genital Pathology

Ovary
Uterine tube
Uterus
Cervix
Vagina
Vulva

Degeneration cell death
Disturbances of growth
Circulatory disturbances
Minerals and pigments
Inflammation

Canid: Cervical hypertrophy

Typical history is
a mass in the
uterus



Normal



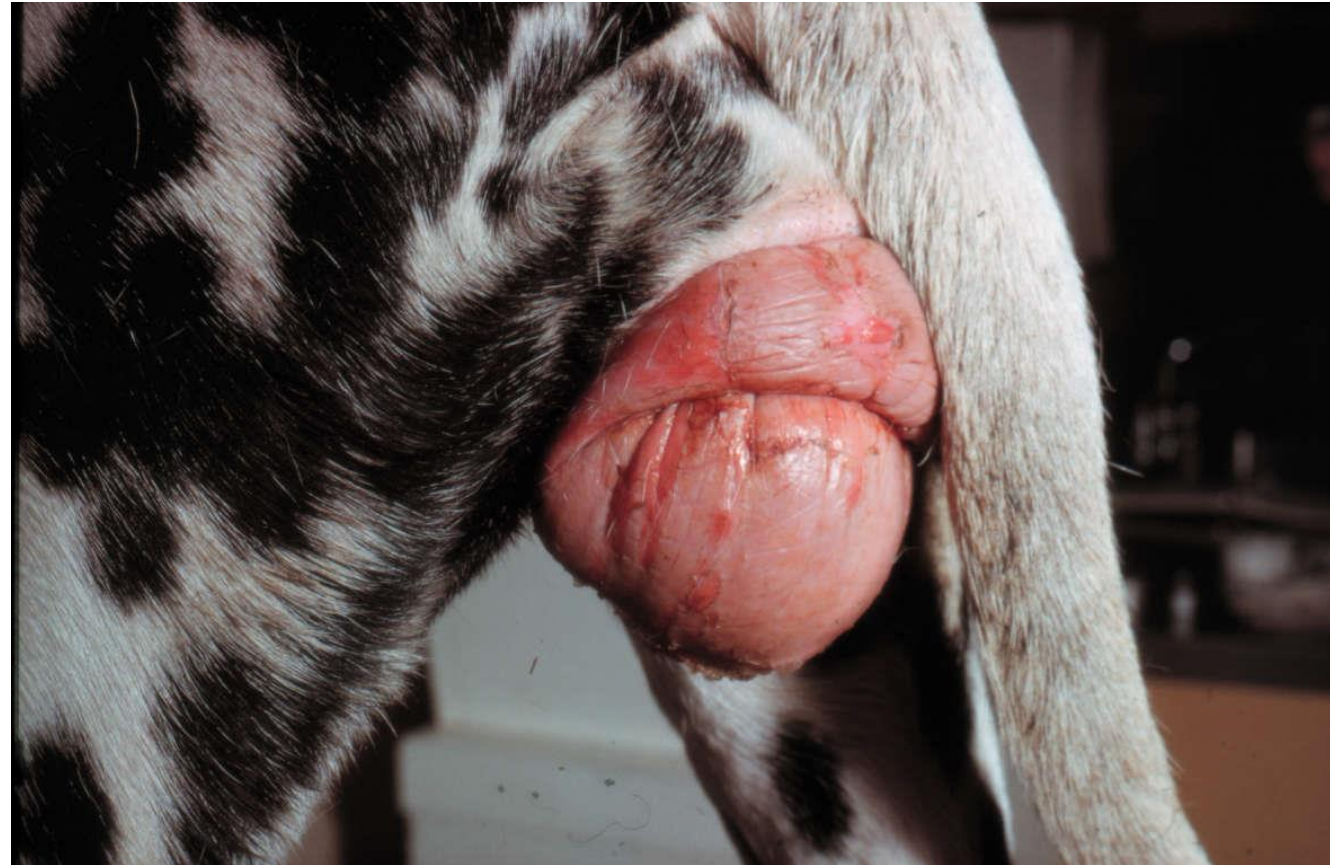


Female Genital Pathology

Ovary
Uterine tube
Uterus
Cervix
Vagina
Vulva

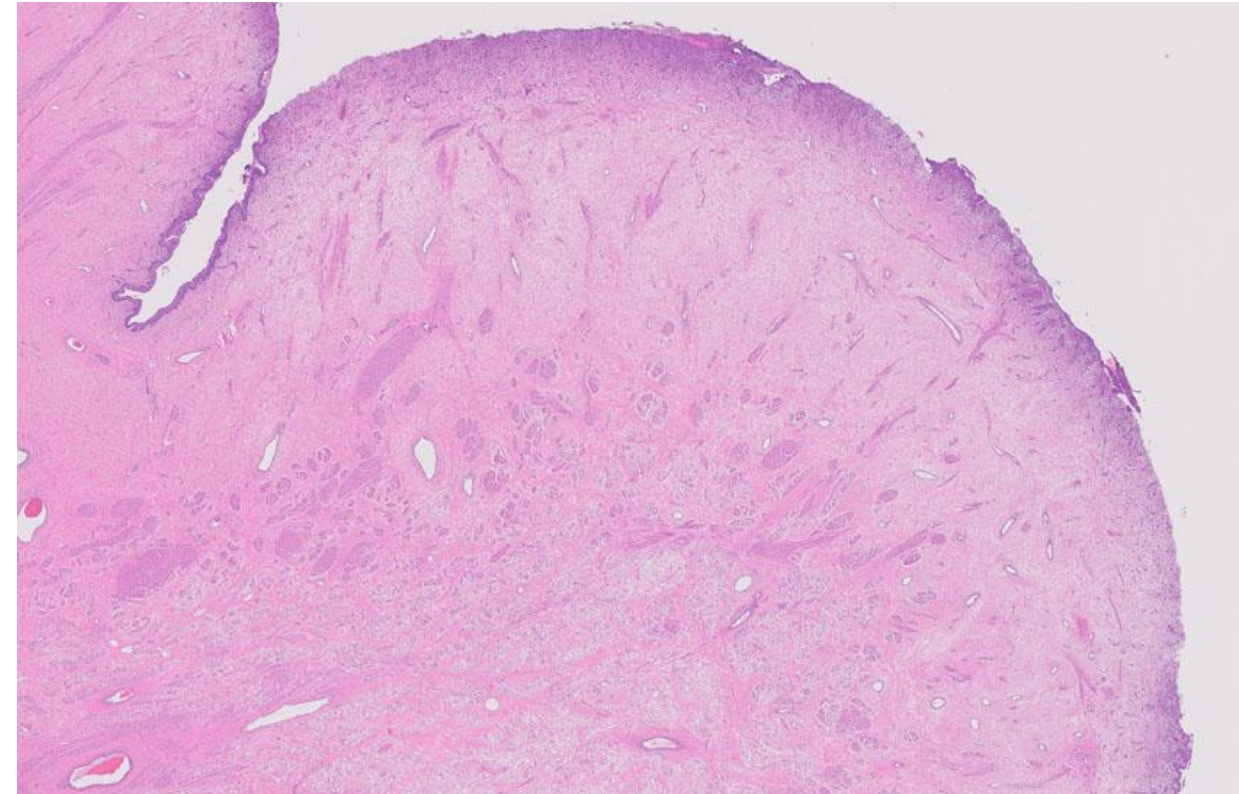
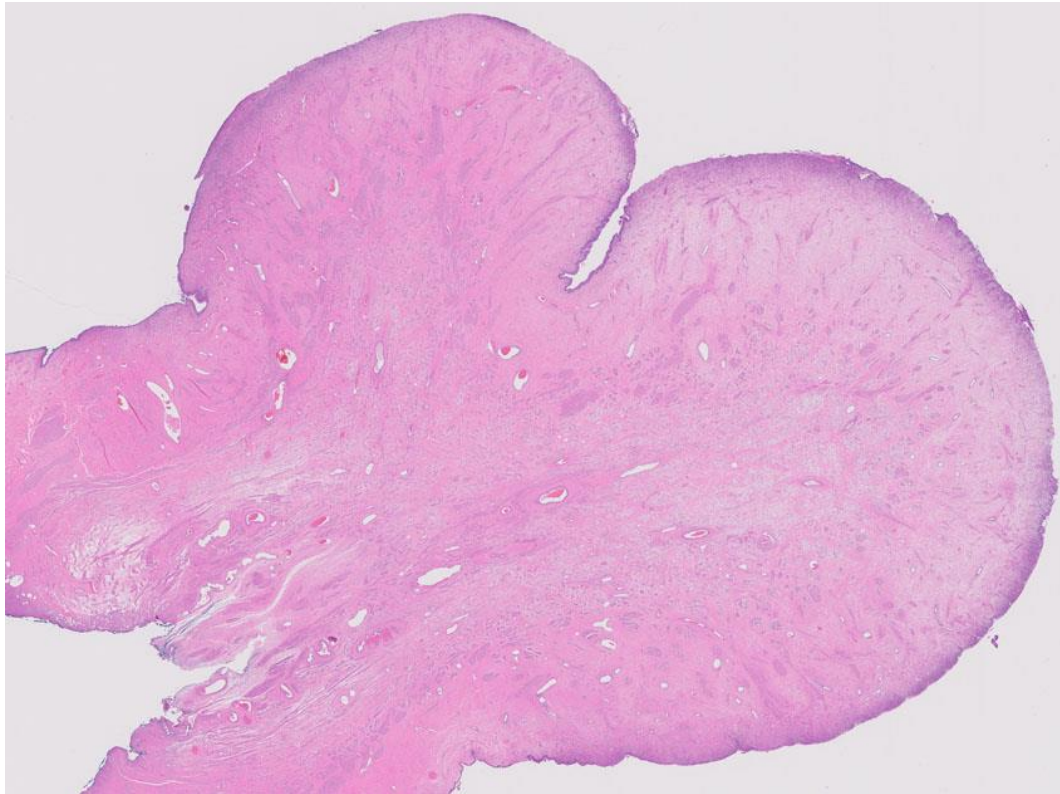
Degeneration cell death
Disturbances of growth
Circulatory disturbances
Minerals and pigments
Inflammation

Canid: vaginal hypertrophy



Photograph compliments of Dr Cathy Gartley

Canid: Vaginal hypertrophy - prolapse

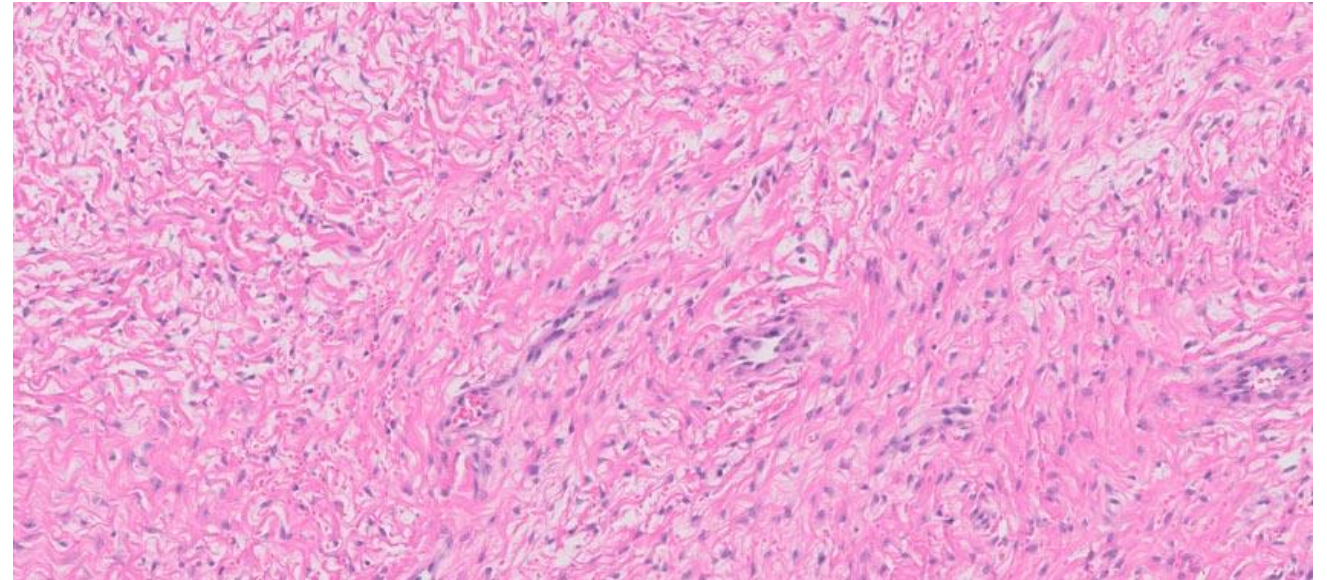
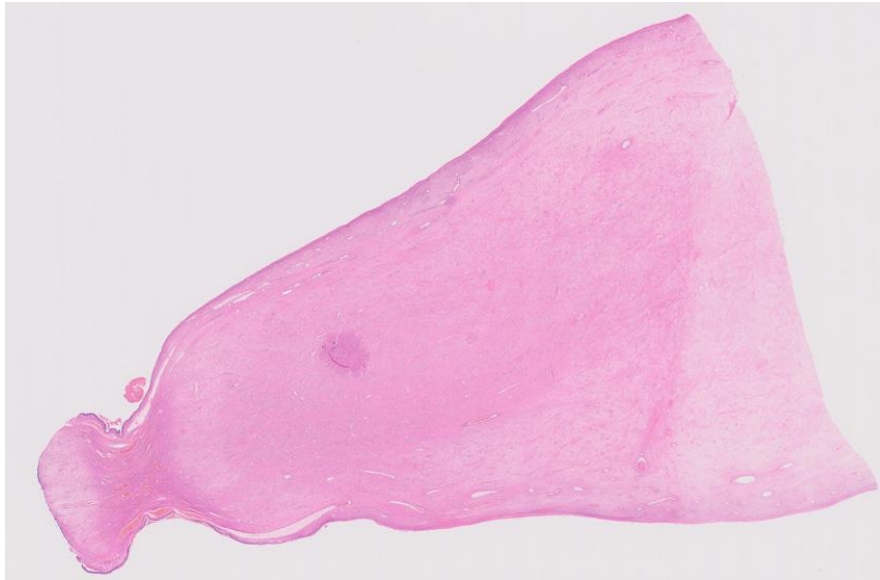


Canid: Vaginal polyps



Photograph compliments of
Dr Fernanda Castillo

Canid: Vaginal polyp



Pathogenesis: recurrent vaginal edema from successive estrus periods - ventral floor of vagina – polyps – with time become fibrotic.



Neoplasia

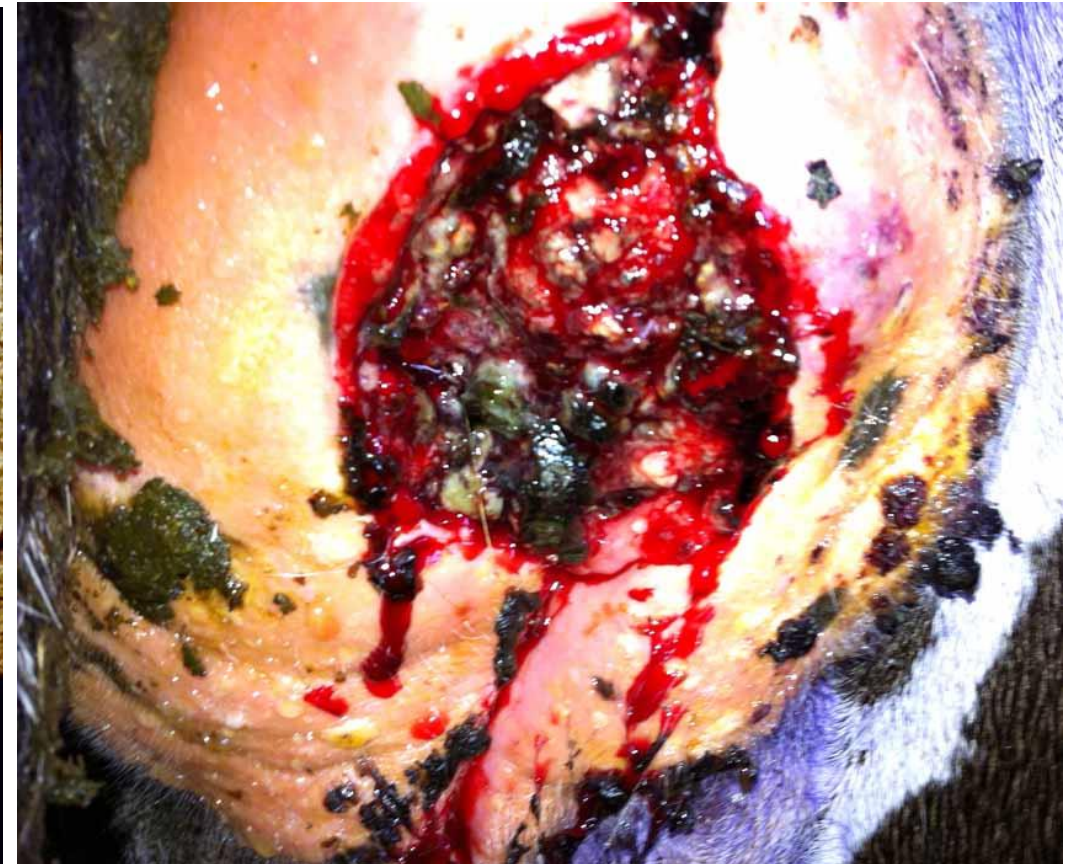
- Epithelial
 - Urothelial carcinoma of vagina
 - Adenocarcinoma of vulva
 - Papilloma
 - Squamous cell carcinoma of vulva
- Mesenchymal
 - Smooth muscle tumour
- Round cell
 - Canine transmissible venereal tumor
- Other

Vulval squamous cell carcinoma

- Pathogenesis
 - Actinic/solar transformation
 - Papillomaviral promotion
 - Unknown



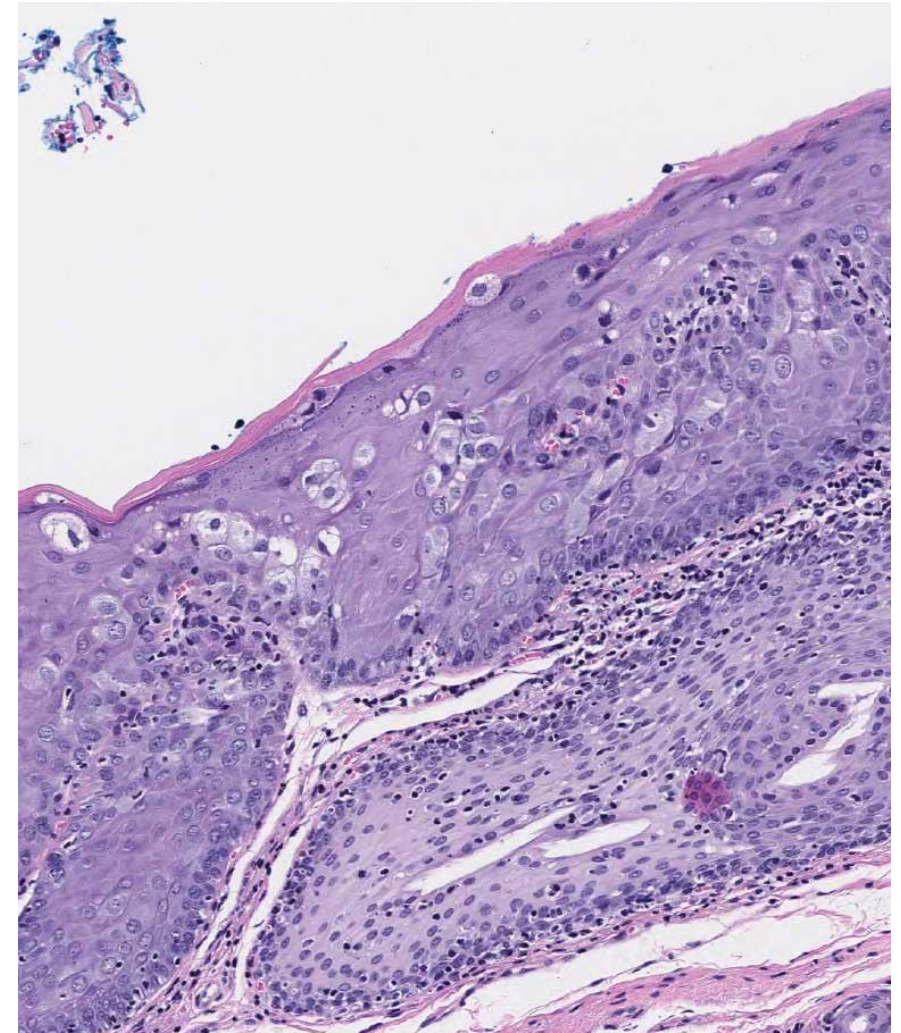
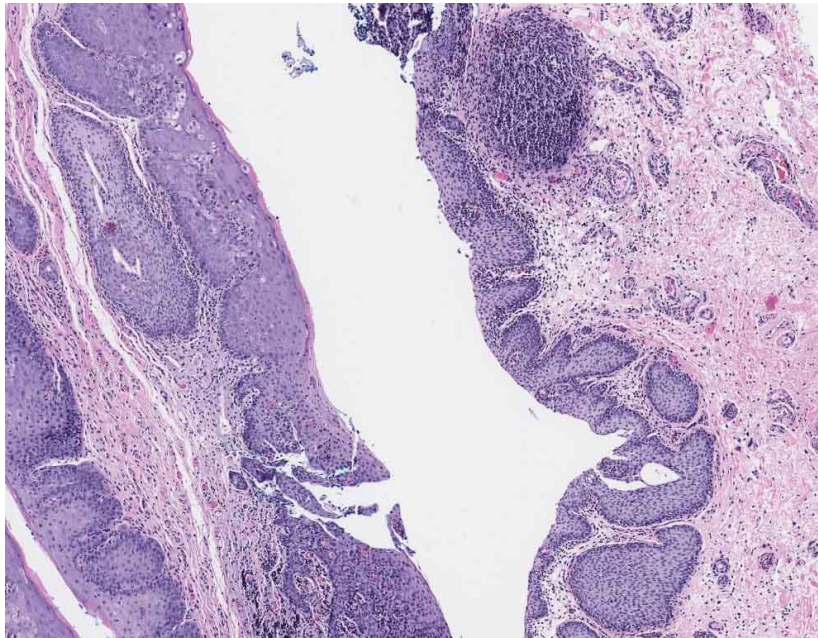
Photograph compliments of
Dr Philip Ladds



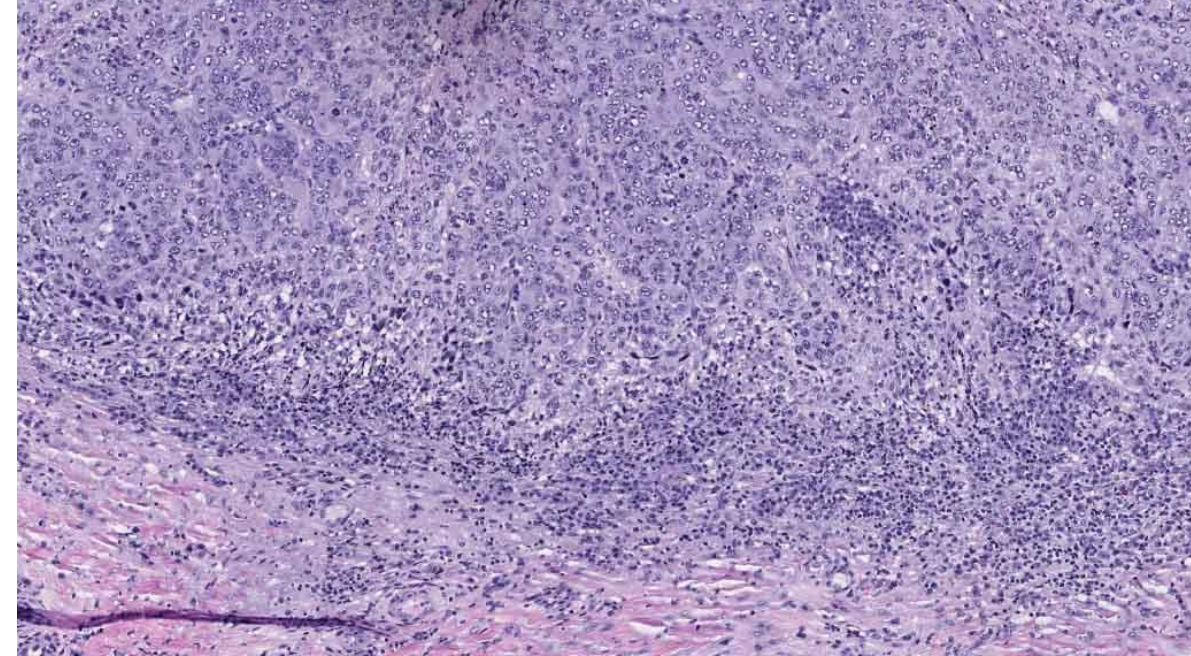
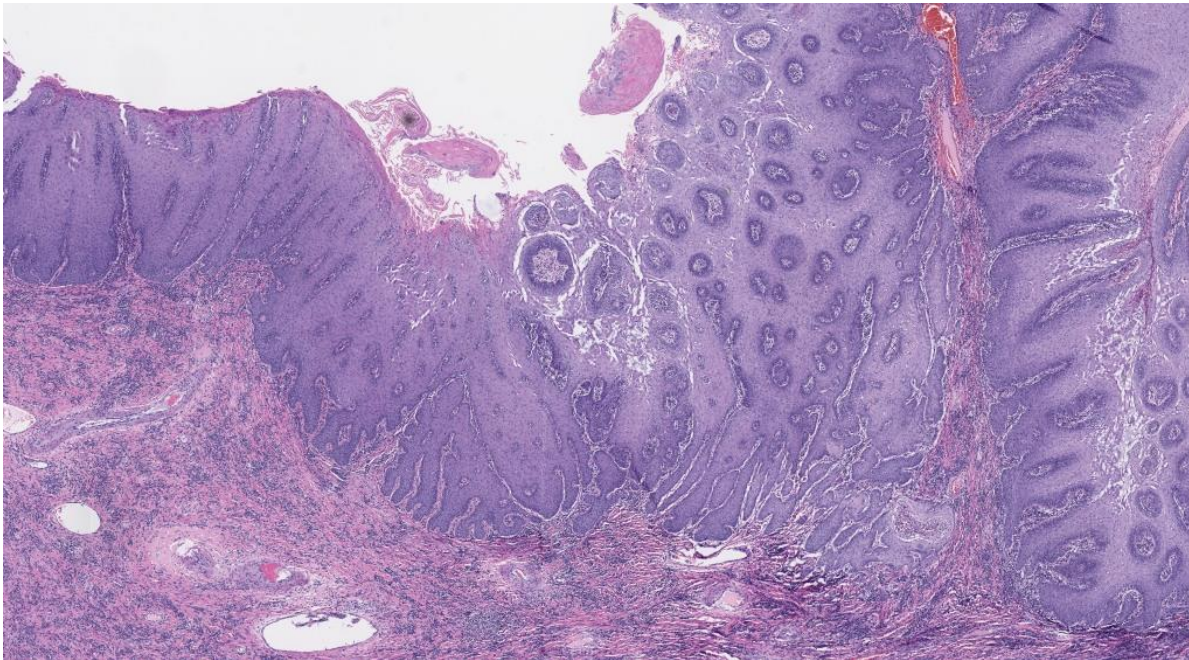
Photograph compliments of
Dr Alexis Berrocal

Equid: Vulval viral plaque – papilloma

- Equus caballus Papillomavirus II

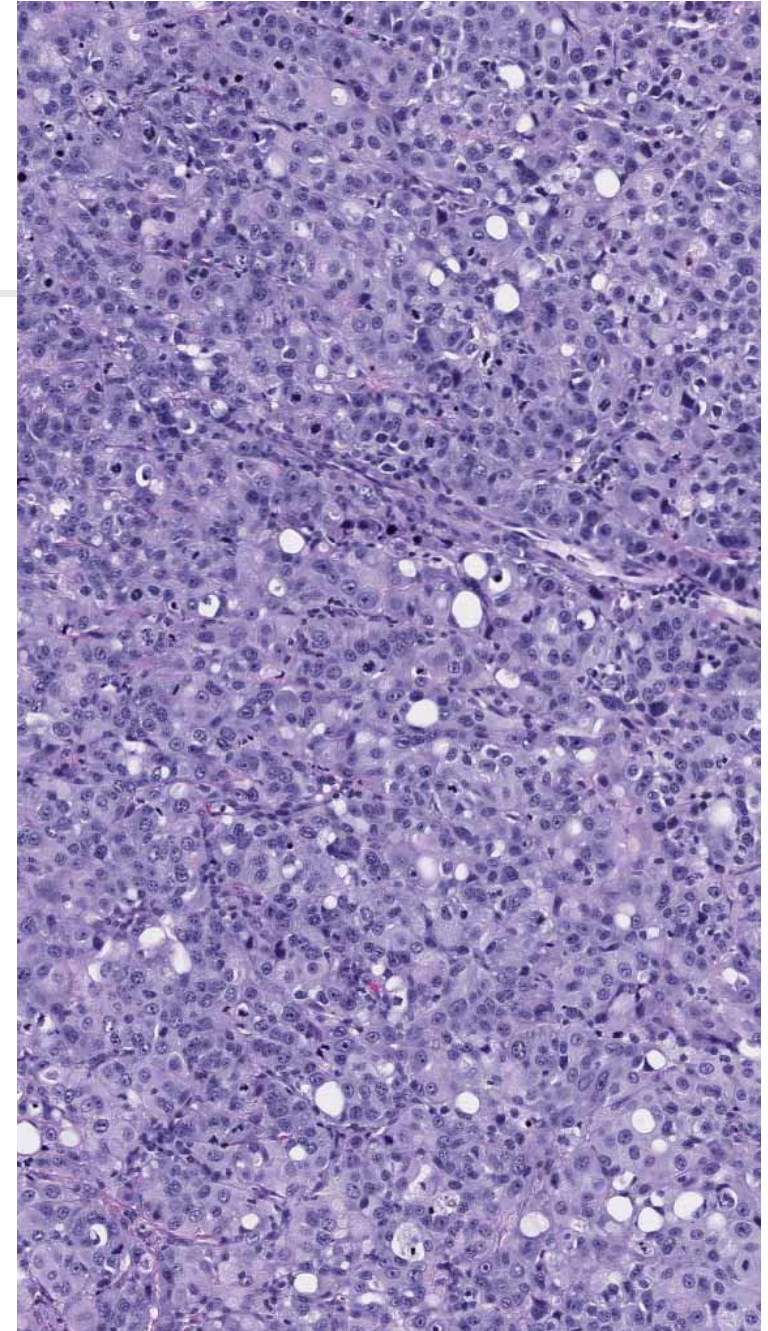
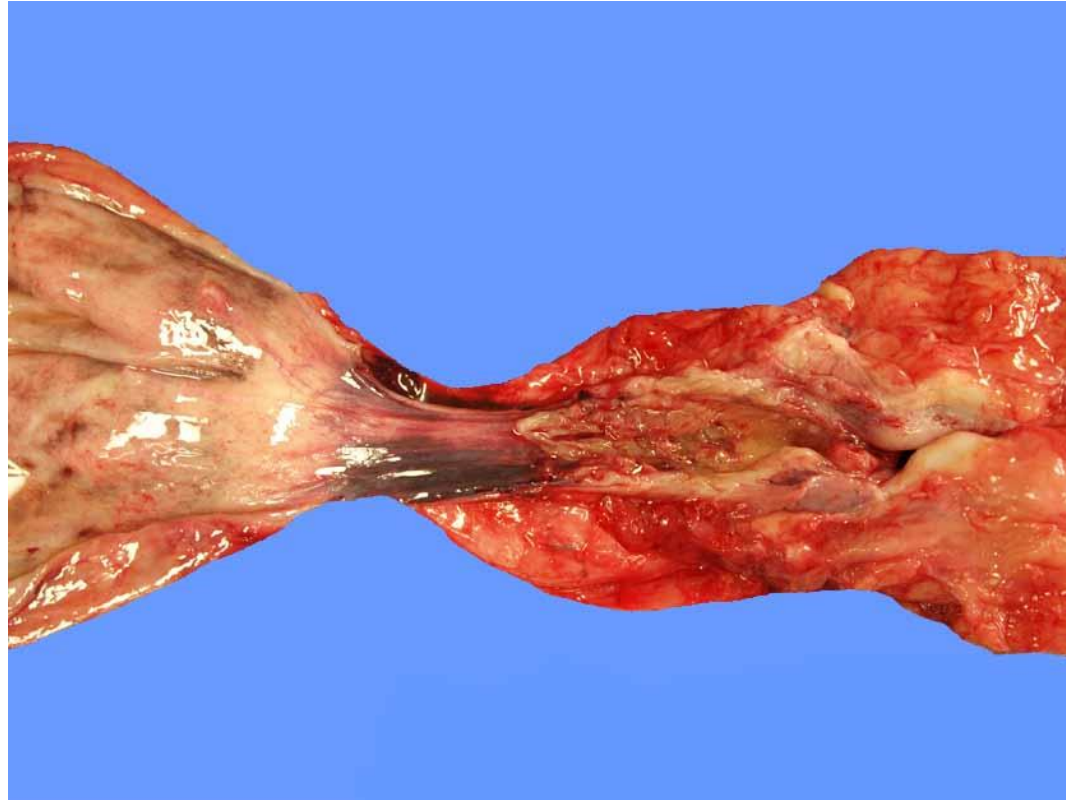


Equid: Vulval squamous cell carcinoma



Canid: Vaginal carcinoma

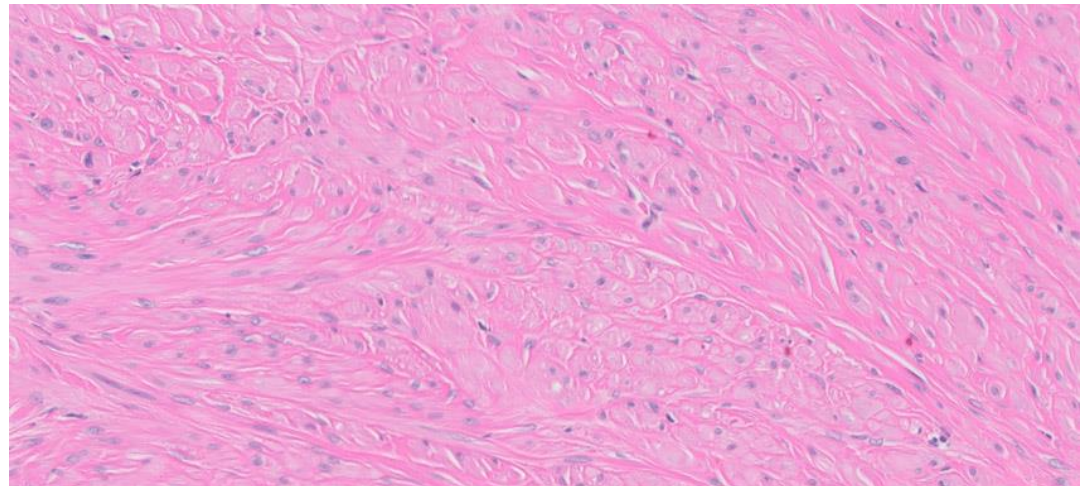
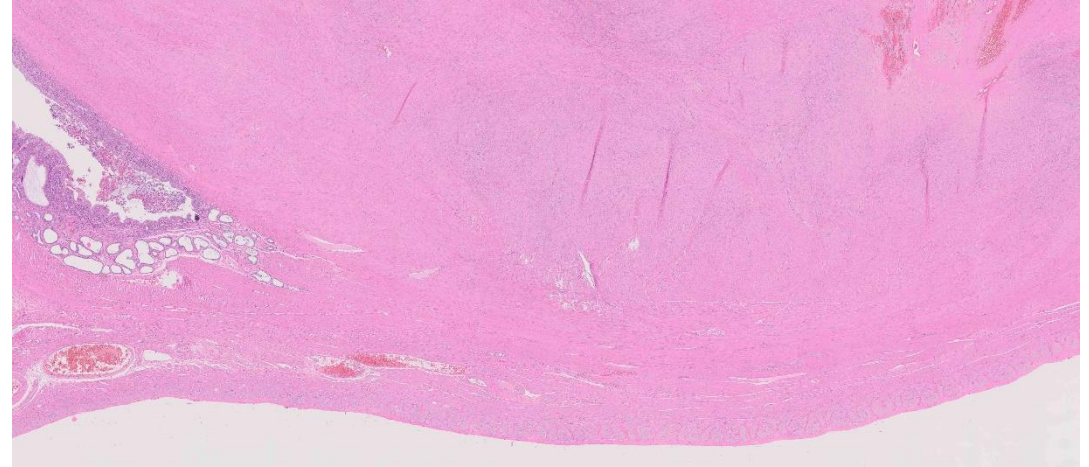
- At opening of urethra
- Looks like urothelial carcinoma



Canid: Smooth muscle tumor - leiomyoma



Photograph compliments of
Dr Linden Craig



Canid: Canine Transmissible Venereal Tumor

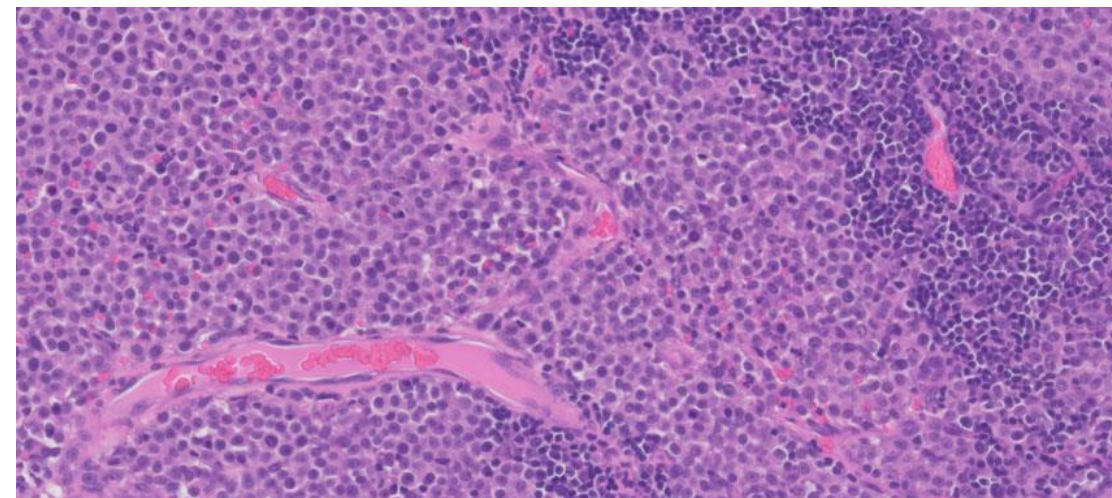
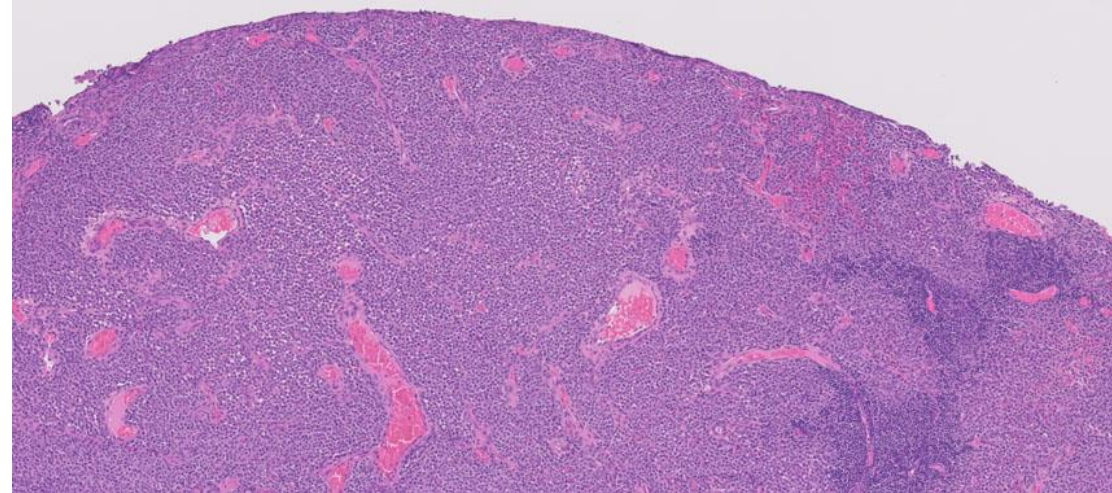
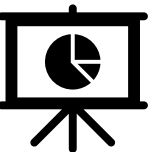


Photo compliments of Dr
Francesca Ivaldi





Vaginitis/vulvitis

- Alphaherpesvirus
- Ureaplasma diversum
- Mycoplasma
- Granular vulvitis - Lymphoid hyperplasia

Herpesviral vulvitis



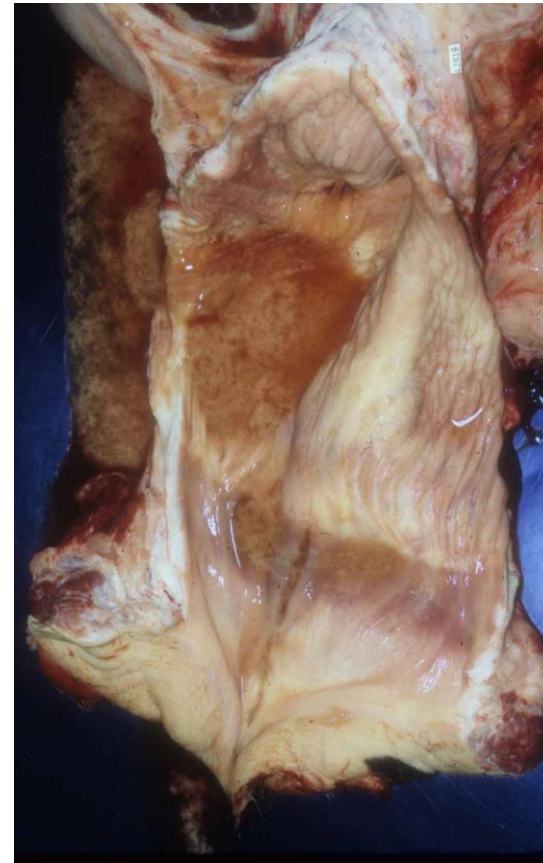
Equid alphaherpesvirus-3
Equine coital exanthema



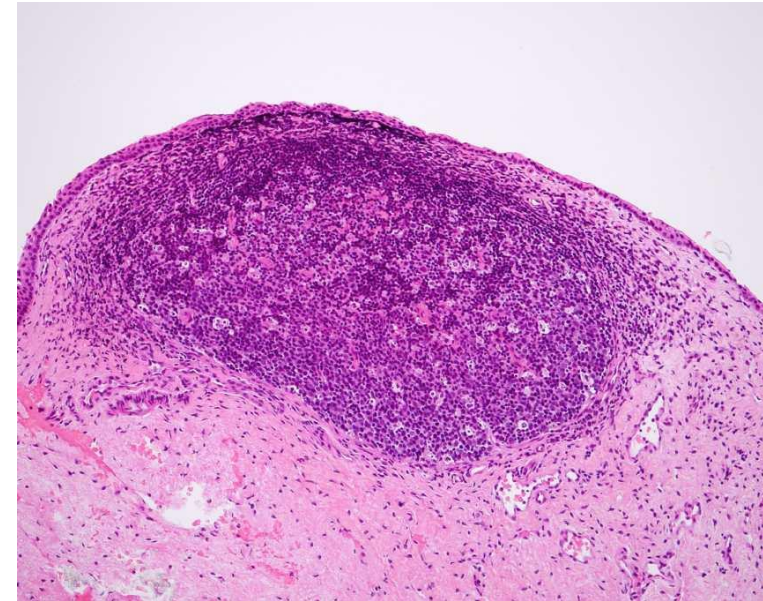
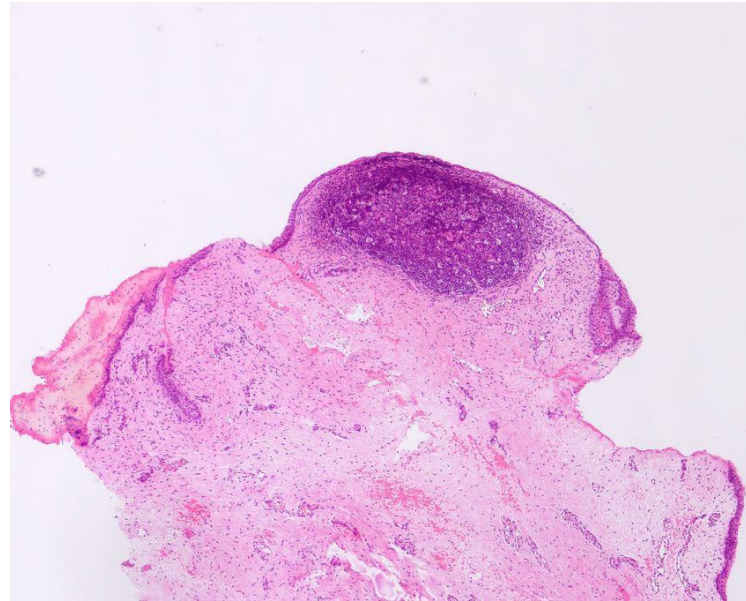
Caprine alphaherpesvirus-1

Bovid: Vulvitis and vaginitis

- *Ureaplasma diversum*
 - 'granular' vulvitis
- *Histophilus somni*
- Bovine alphaherpesvirus 1

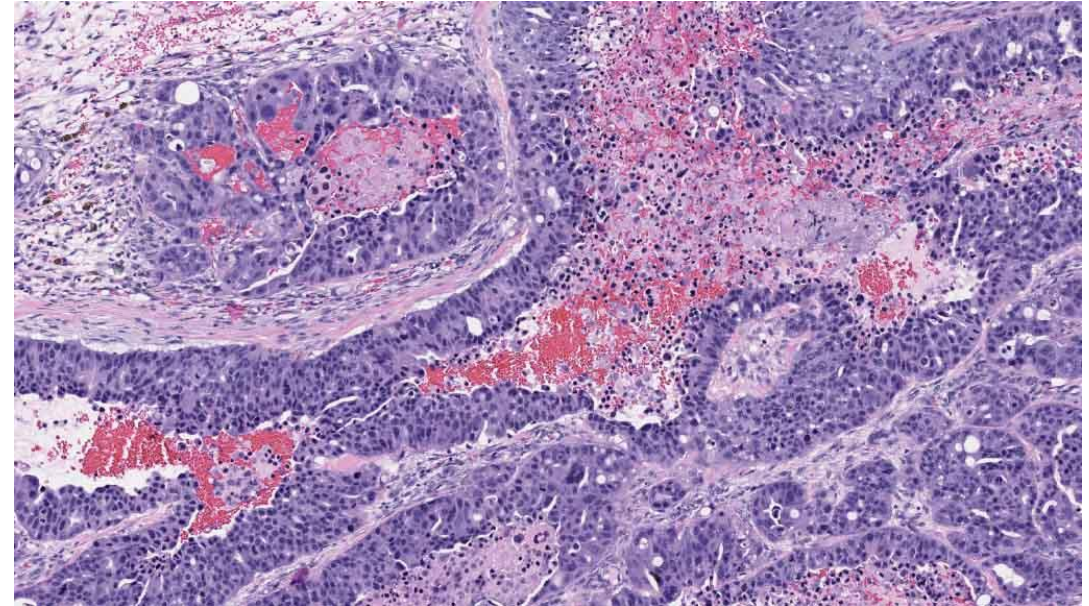
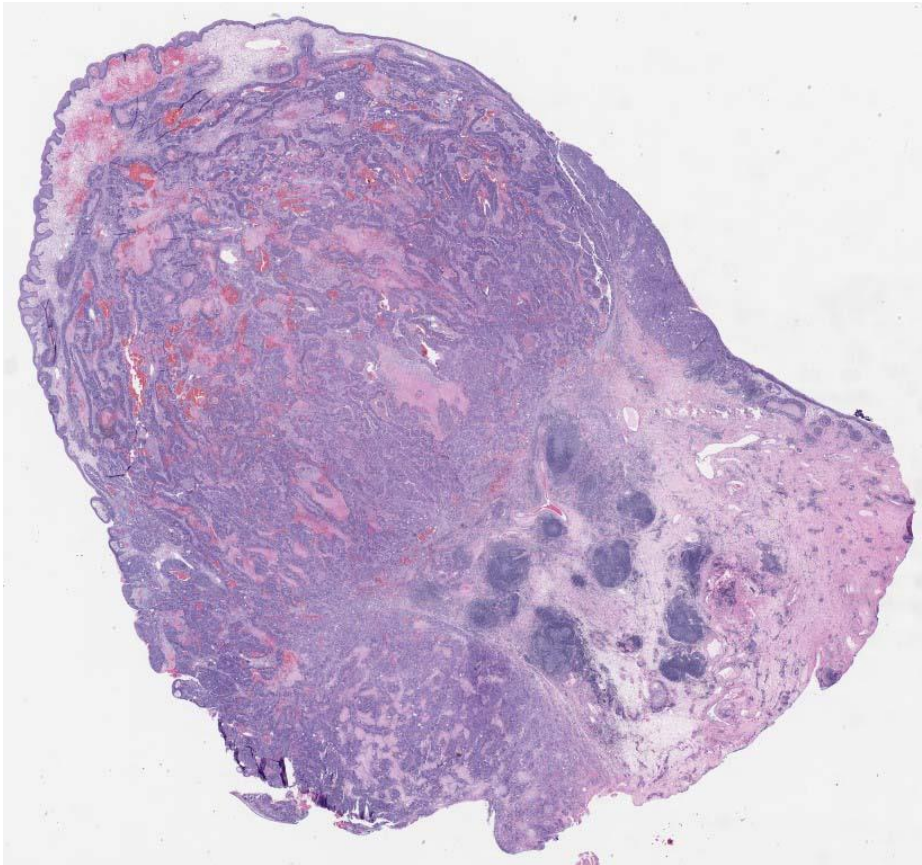


Vulvitis – lymphoid nodular hyperplasia

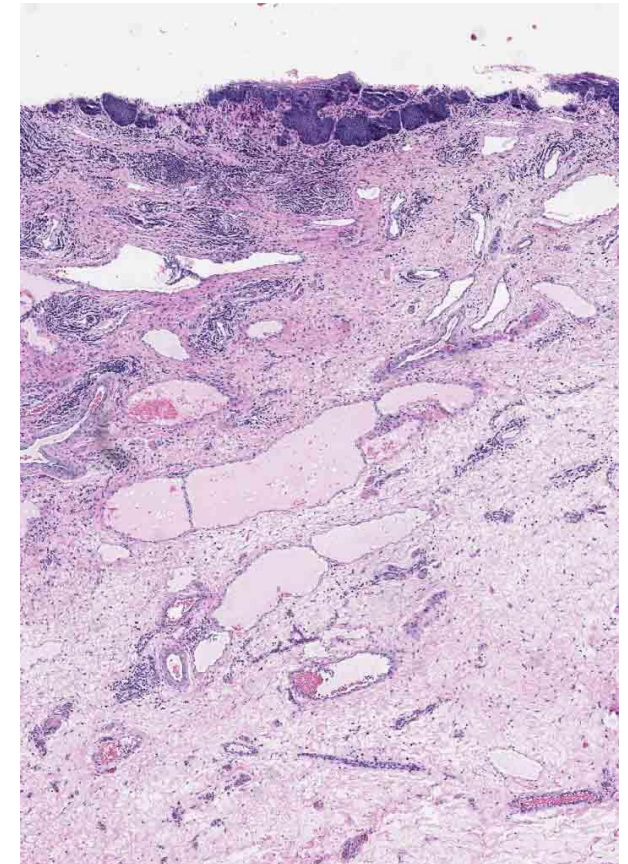
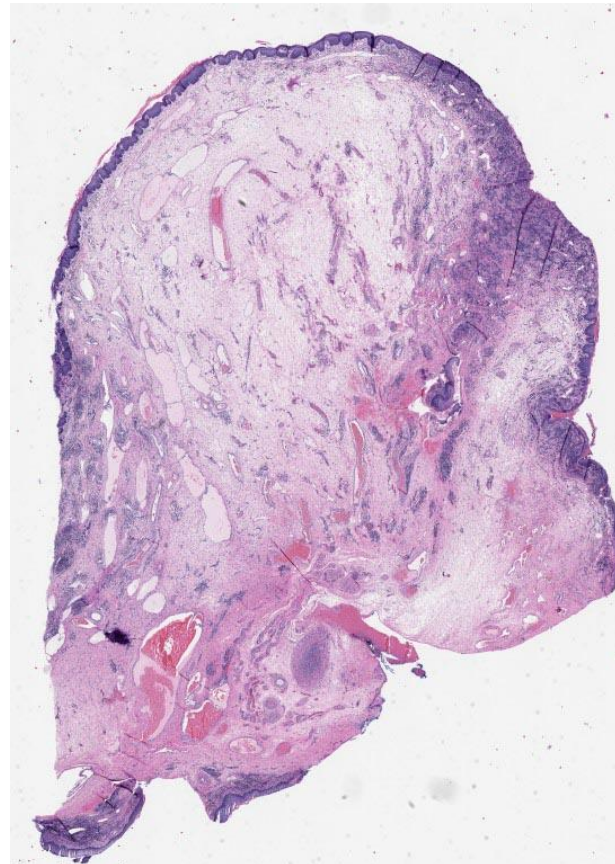
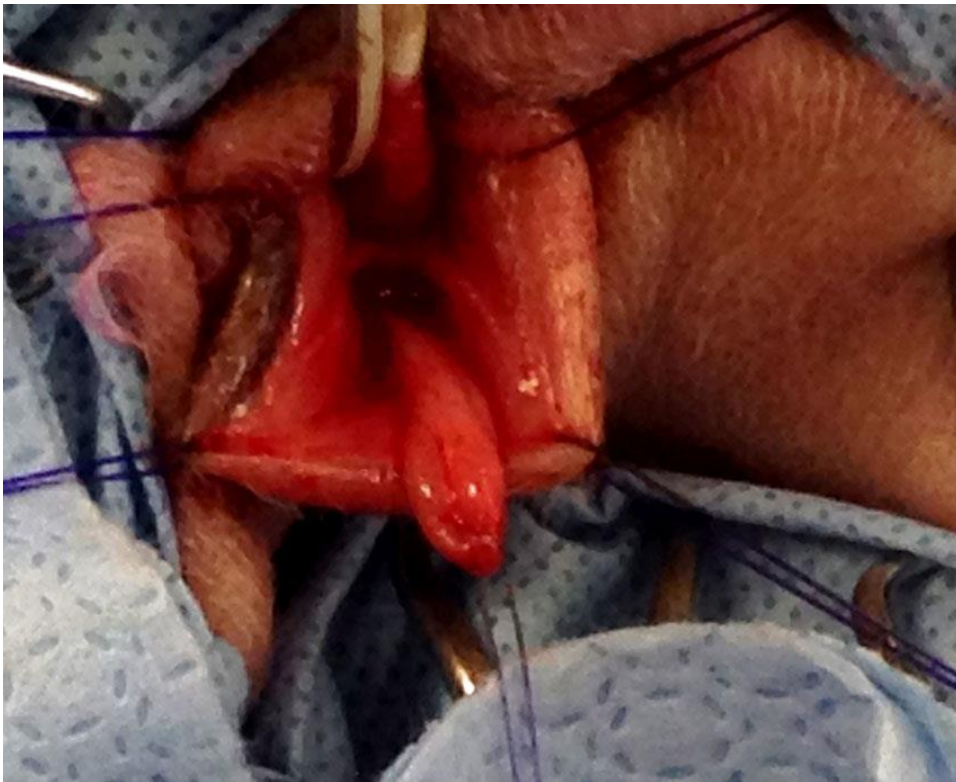


Photograph compliments of Dr Alexis Berracol

Canid: Clitoral adenocarcinoma



Canid: Clitoral hypertrophy



Photograph complements of
Dr Cathy Gartley, OVC



Where to next?

Failure of Pregnancy