



# Pregnancy Failure

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Equine



# General Approach to Failure of Pregnancy

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- Preliminary discussions
  - Is there a public health issue?
  - Is there really a problem?
  - Cost benefit analysis
  - Discuss Isolation
- Clinical Investigation of FOP
  - Clinical history and interview
  - Take precautions to prevent zoonotic disease
  - **Determine common diseases**
  - **Examine Mother, Fetus and Placenta**
  - **Diagnostic testing**
  - Final diagnosis
  - Treatment or recommendations.



# The Mare

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- many 'nonlesion' lesions
- no placental reserve
- 'loose' cervix



# Functional Anatomy of Uterus and Placenta

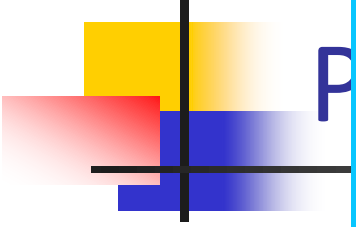
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# Normal uterus



# Postpartum uterus





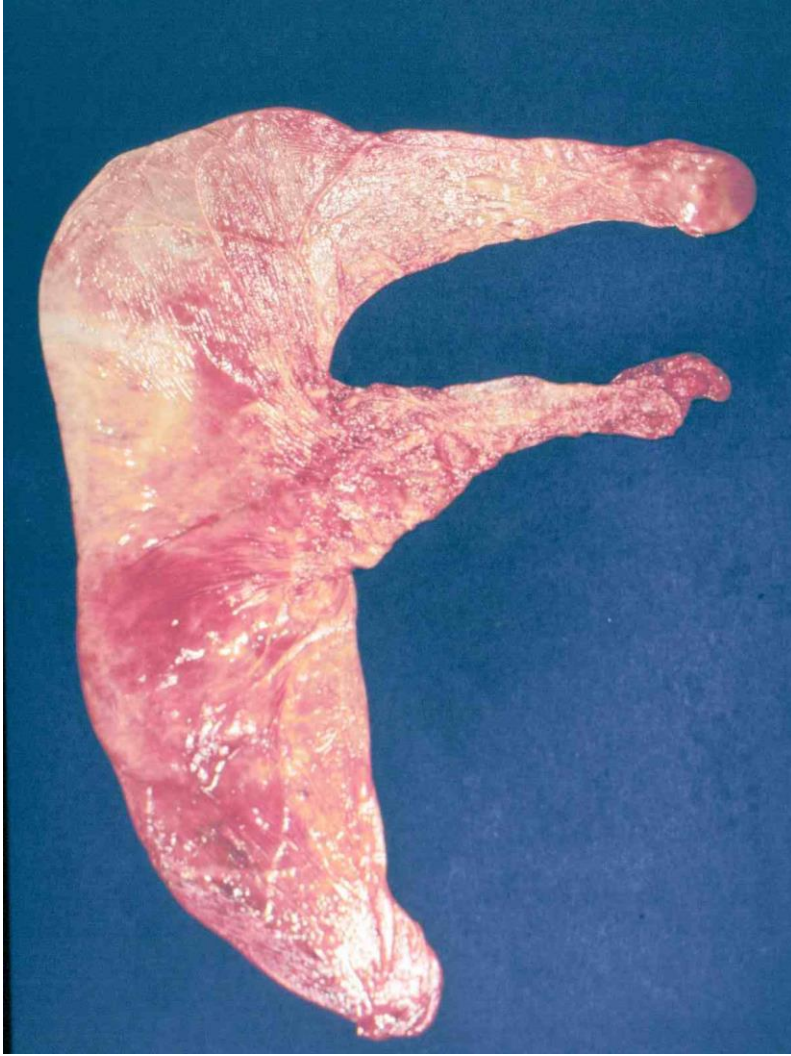
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Embryo attachment/fixation is at the bifurcation



# Equine placenta

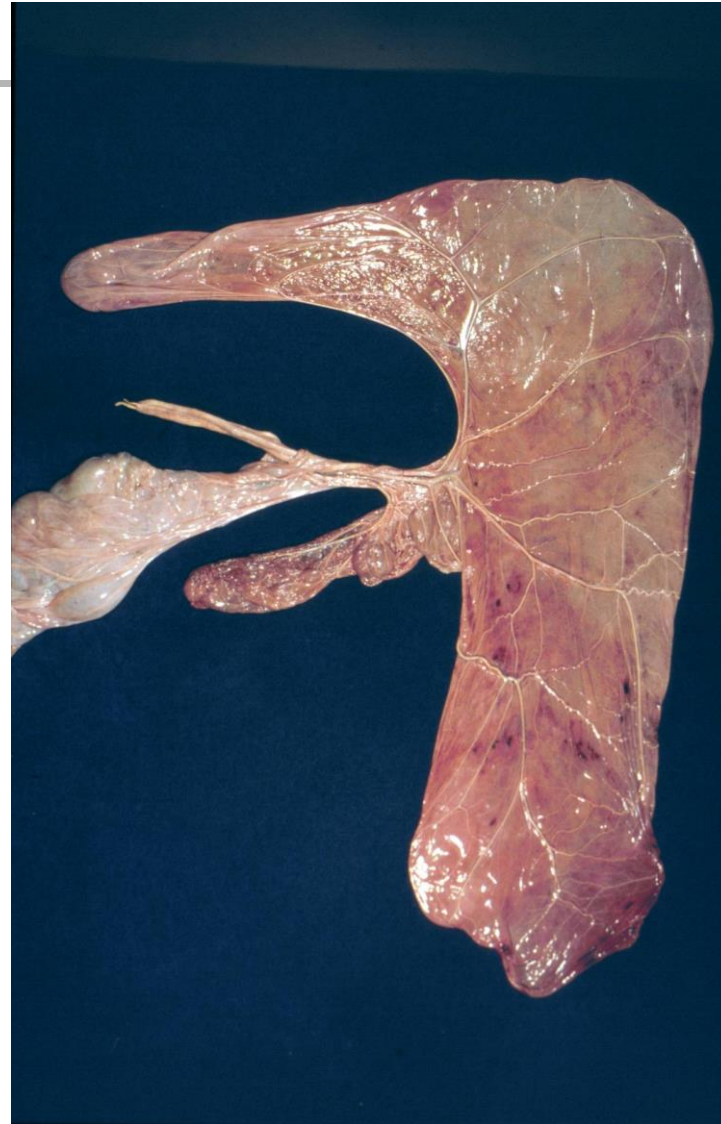






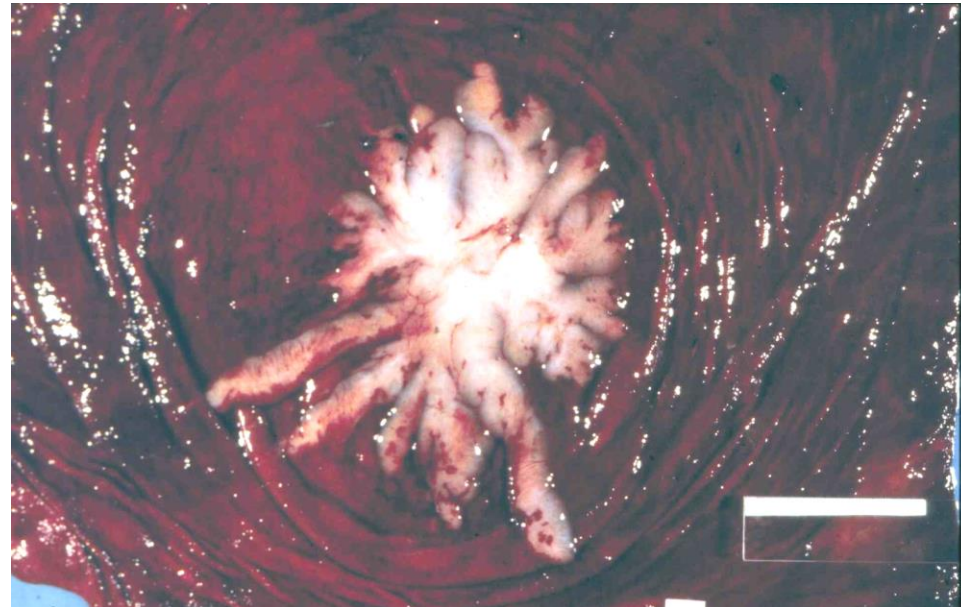
# Allantoic surface

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# Nonlesion lesions

- Avillous regions
  - **cervical star**
  - chorioallantoic pouch
  - insertion of cord
- Allantoic pouches
- Yolk sac remnant
- Hippomane

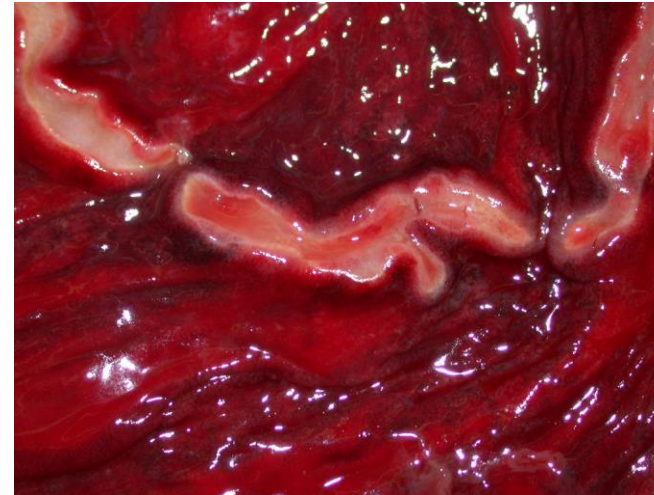


# Postpartum cervical star

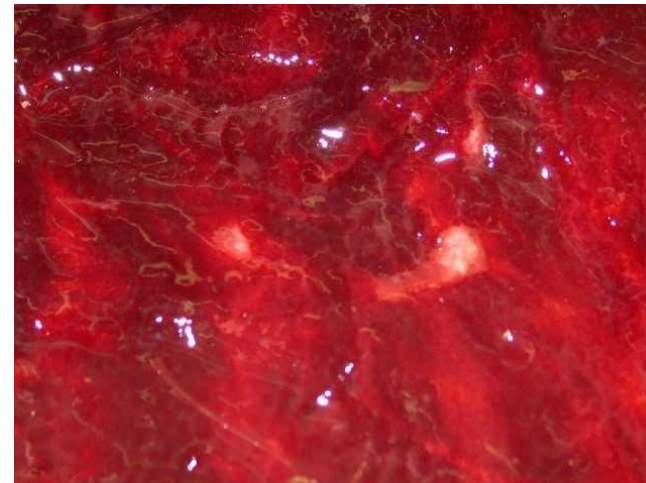


# Nonlesion lesions

- Avillous regions
  - cervical star
  - **chorioallantoic pouch**
  - Insertion of cord
- Allantoic pouches
- Yolk sac remnant
- Hippomane

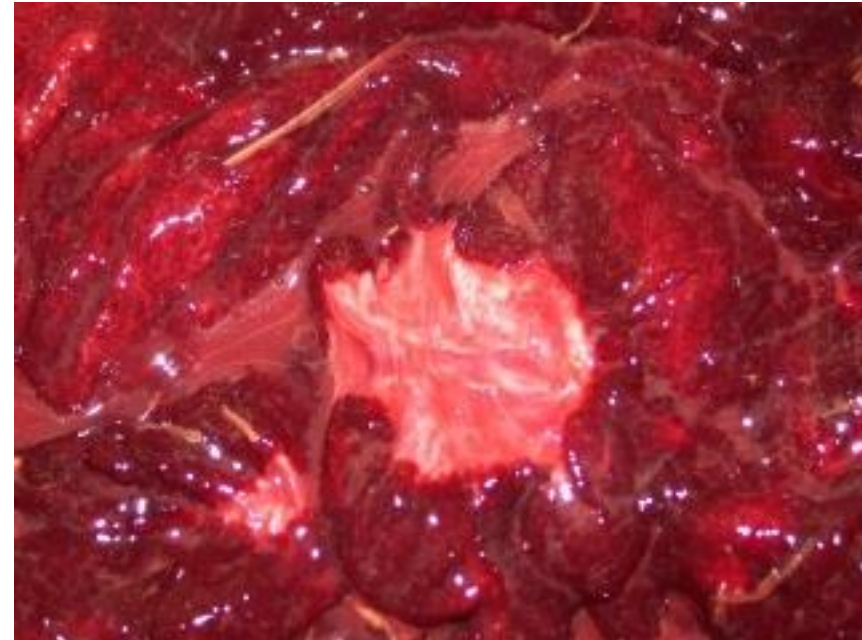


Endometrial cups



# Nonlesion lesions

- Avillus regions
  - cervical star
  - chorioallantoic pouch
  - **insertion of cord**
- Allantoic pouches
- Yolk sac remnant
- Hippomane



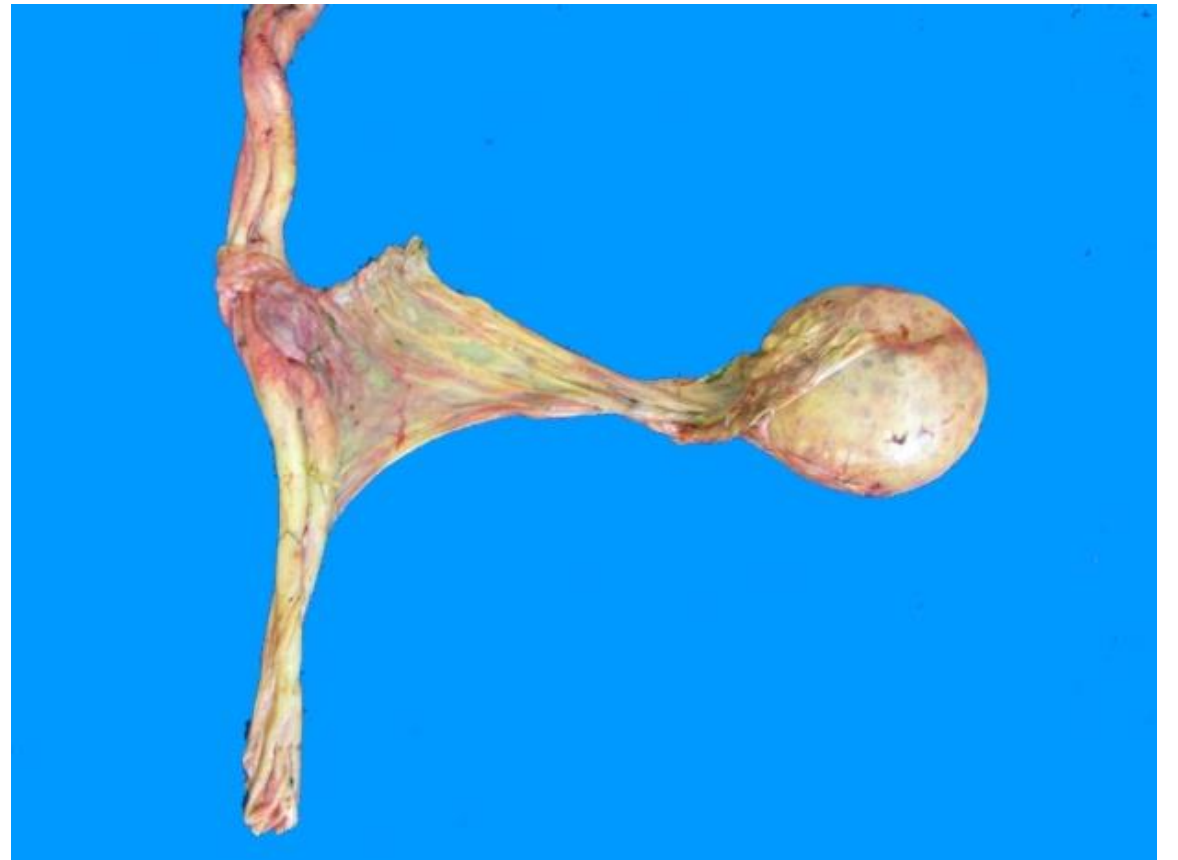
# Nonlesion lesions

- Avillus regions
  - cervical star
  - chorioallantoic pouch
  - insertion of cord
- Allantoic pouches/polyp/vesicle
- Yolk sac remnant
- Hippomane



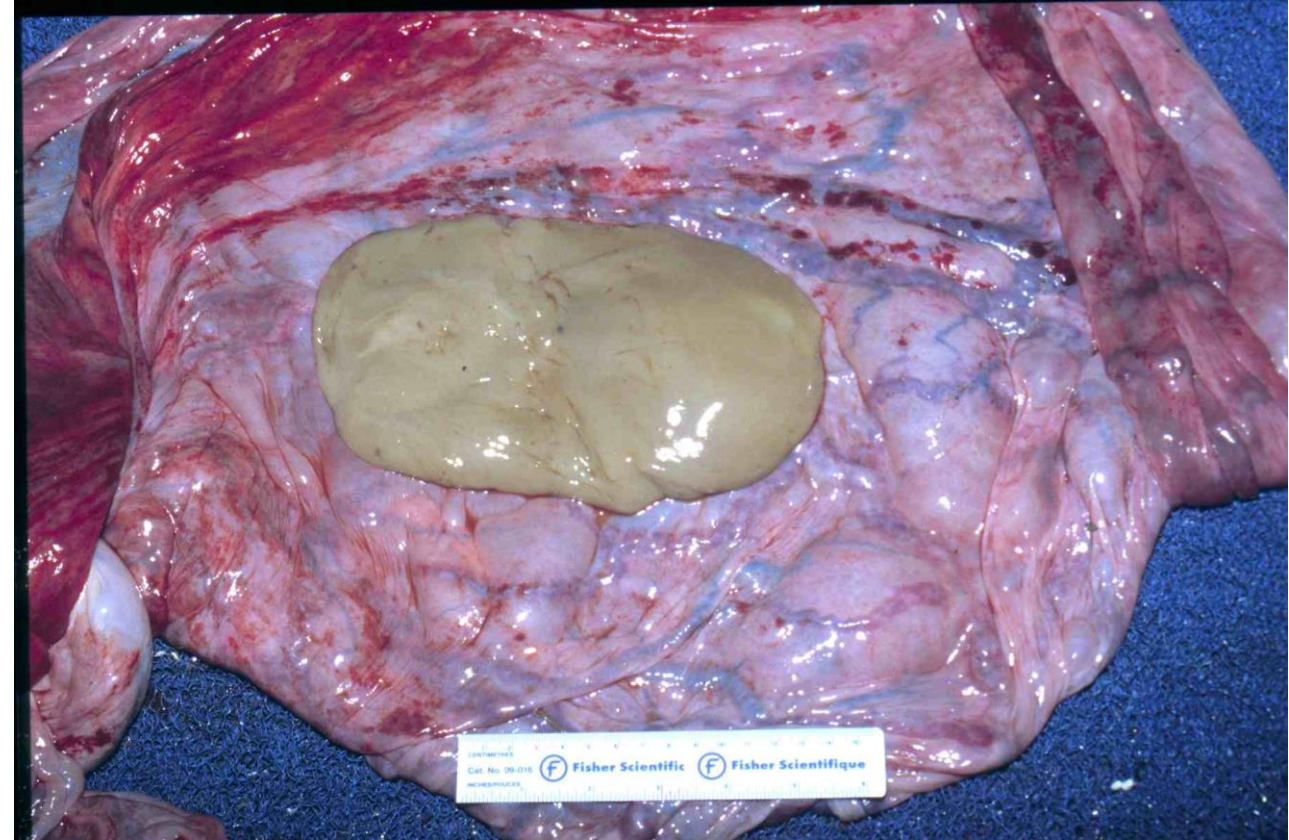
# Nonlesion lesions

- Avillus regions
  - cervical star
  - chorioallantoic pouch
  - chorionic fold
- Allantoic pouches
- **Yolk sac remnant**
- Hippomane



# Nonlesion lesions

- Avillus regions
  - cervical star
  - chorioallantoic pouch
  - chorionic fold
- Allantoic pouches
- Yolk sac remnant
- **Hippomane**







# Diseases of the Equine Fetus

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# Common Diseases – Kentucky, Guelph, California

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■ No diagnosis	16, 71	■ Infectious	37, 19
■ Noninfectious	47, 11	■ Bacteria	18, 12
■ Dystocia/trauma	19	■ Placentitis	10
■ congenital defects	10, 2	■ EHV	4, 5
■ placental edema	7	■ Leptospirosis	2
■ twins	6, 0.4	■ Fungal	2, 1
■ cord abnormality	3,	■ Nocardia	1
■ body pregnancy	2		

■ Giles *et al* 1993, Causes of abortion, stillbirth and perinatal death in horses. 3,527 cases. JAVMA 203: 1170-1175

■ Cantón GJ, Navarro MA, Asin J, Chu P, Henderson EE, Mete A, Uzal FA. Equine abortion and stillbirth in California: a review of 1,774 cases received at a diagnostic laboratory, 1990-2022. J Vet Diagn Invest. 2023; 35: 153-162.



# Abnormalities

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- Fetus

- **Dystocia**

- Congenital anomalies

- Thyroid hyperplasia and musculoskeletal disease

- Lesions of *Varicellovirus equidalpha1* (EHV)

- fibrin cast in trachea

- interstitial pneumonia

- focal necrosis on liver



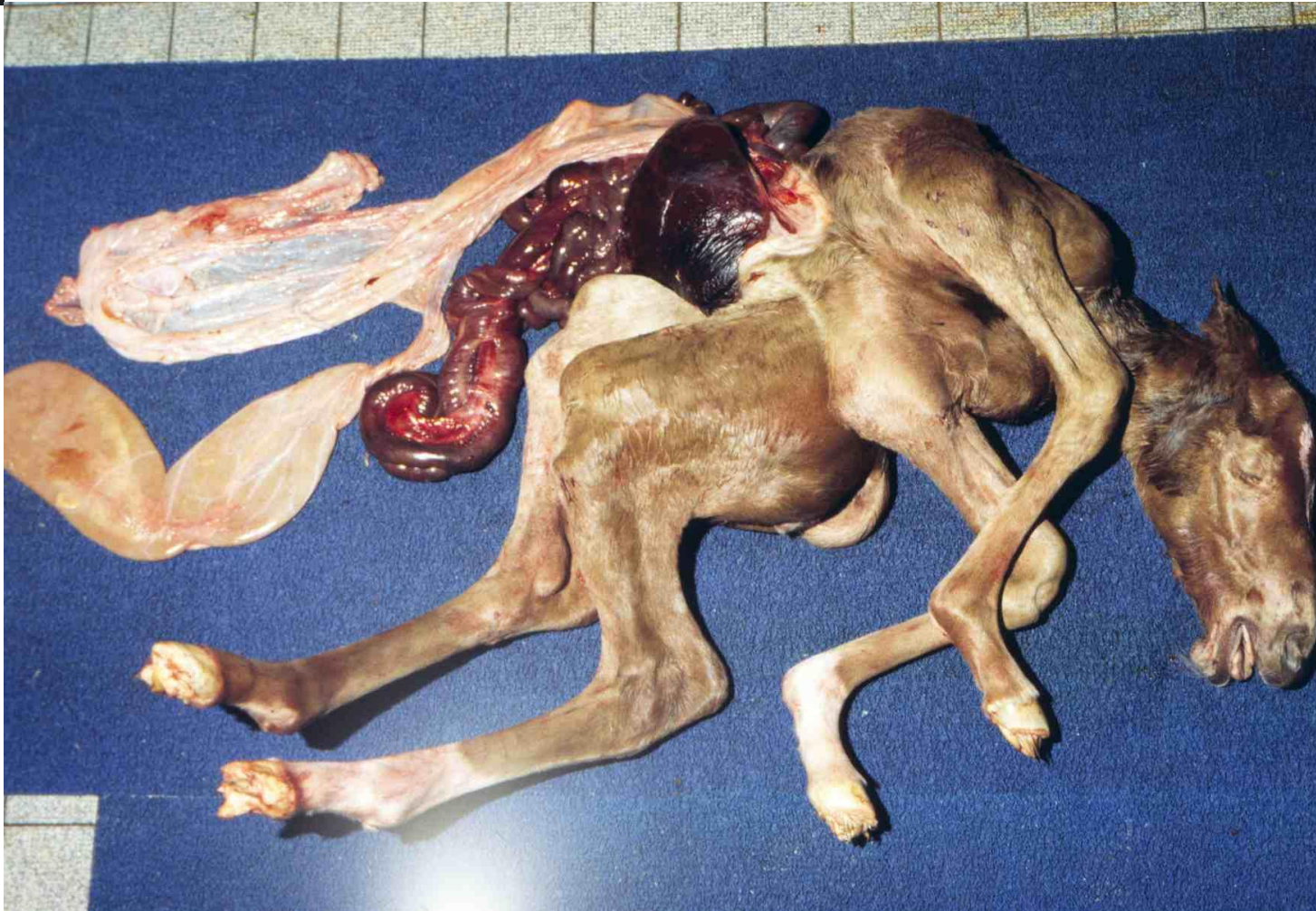
# Fetal Abnormalities

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- Fetus

- Dystocia
- **Congenital anomalies**
- Musculoskeletal disease and Thyroid hyperplasia
- Lesions of *Varicellovirus equidalpha1* (EHV-1)
  - fibrin cast in trachea
  - interstitial pneumonia
  - focal necrosis on liver

# Congenital abnormalities



Schistosomus reflexus

Schism – division  
Soma – body



# Abnormalities

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- Fetus
  - Dystocia
  - Congenital anomalies
  - **Musculoskeletal Disease and Thyroid Hyperplasia**
  - Lesions of *Varicellovirus equidalpha1* (EHV-1)
    - fibrin cast in trachea
    - interstitial pneumonia
    - focal necrosis on liver

# Musculoskeletal disease and thyroid hyperplasia

- Variety of skeletal abnormalities
  - Limb deformities
  - Arthrogryposis
  - Osteopetrosis
- Microscopic hyperplasia
- Poor feeds nitrite/nitrate



Arthros – joint, gryposis – abnormal curvature, Osteo – bone, petros - rock



# Abnormalities

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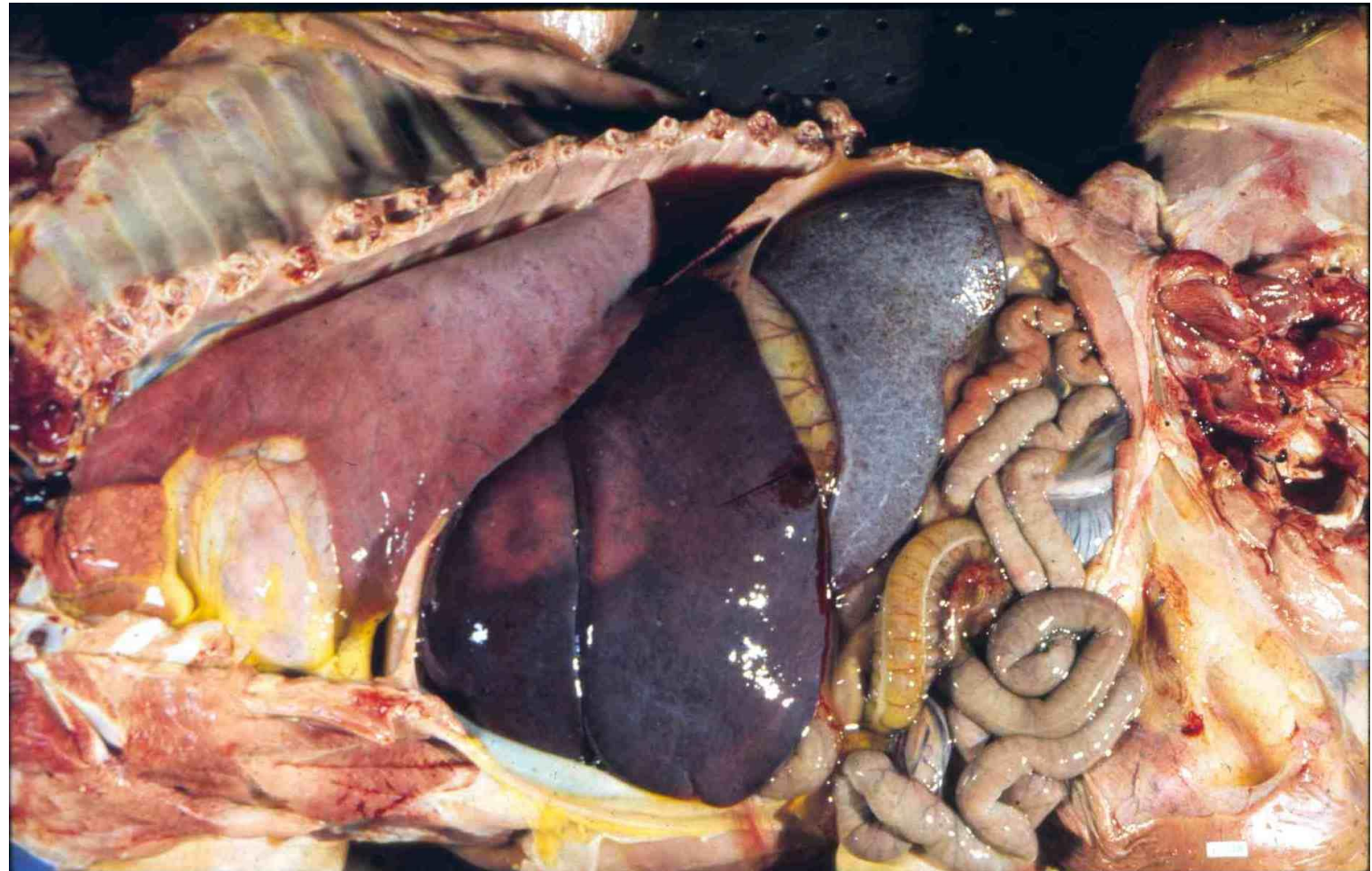
- Fetus
  - Dystocia
  - Congenital anomalies
  - Musculoskeletal disease and thyroid hyperplasia
  - ***Varicellovirus equidalpha1* (EHV)**
    - fibrin cast in trachea
    - interstitial pneumonia
    - focal necrosis on liver



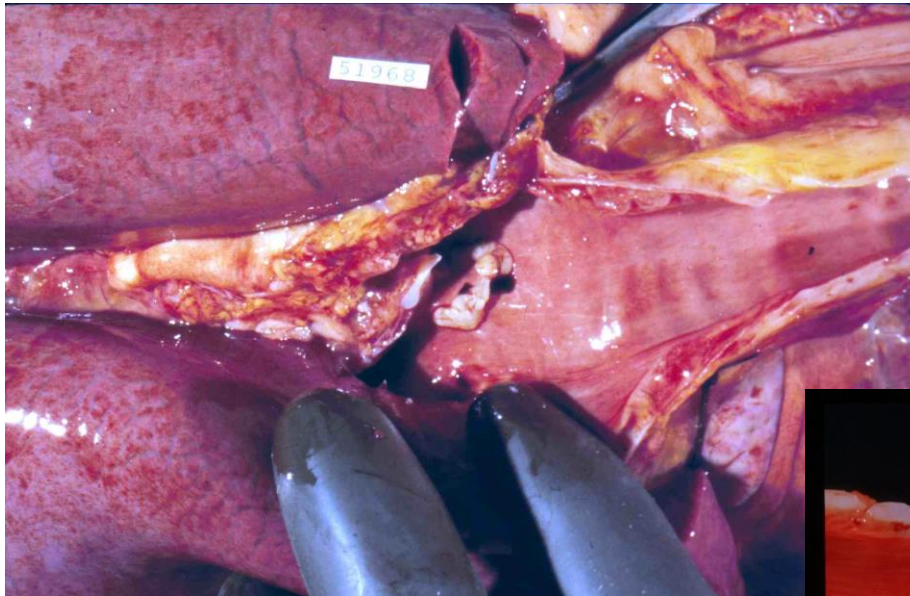
# *Varicellovirus equidalpha1 (EHV)*

Interstitial pneumonia

Focal hepatic necrosis



# *Varicellovirus equidalpha1*

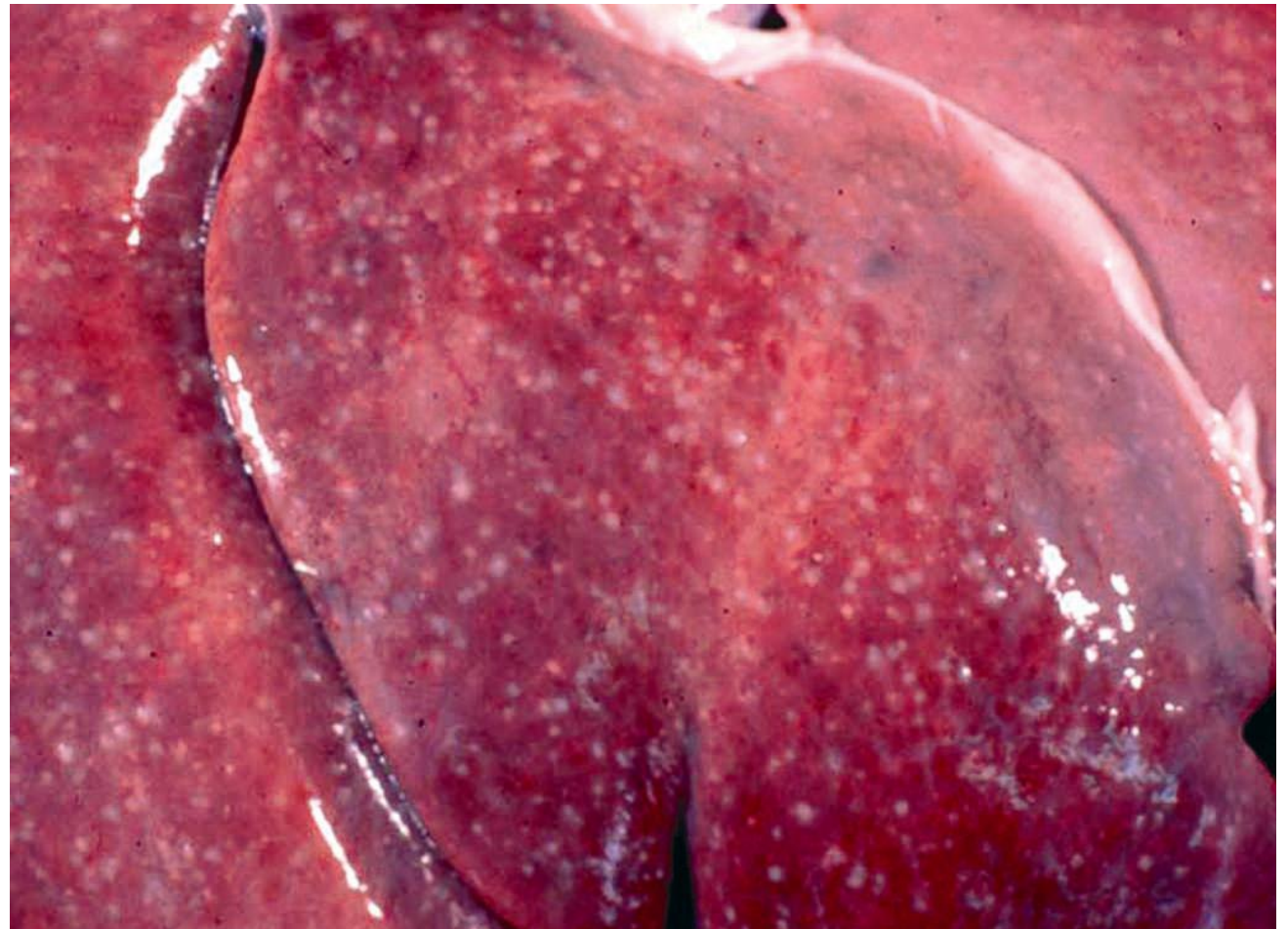


Fibrin cast in trachea



# *Varicellovirus equidalpha1 (EHV-1)*

Focal hepatic necrosis





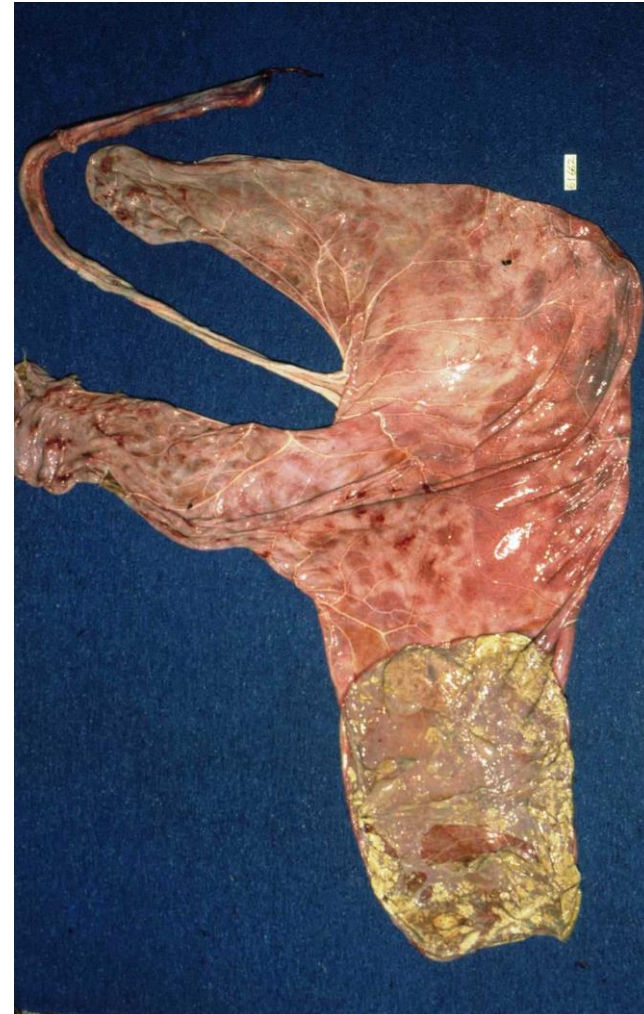
# Equine Placental Abnormalities

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# Cord Abnormalities

- too short <36 cm
- too long >83 cm
  - placental infarct
  - torsion (>3 turns)
  - strangulation



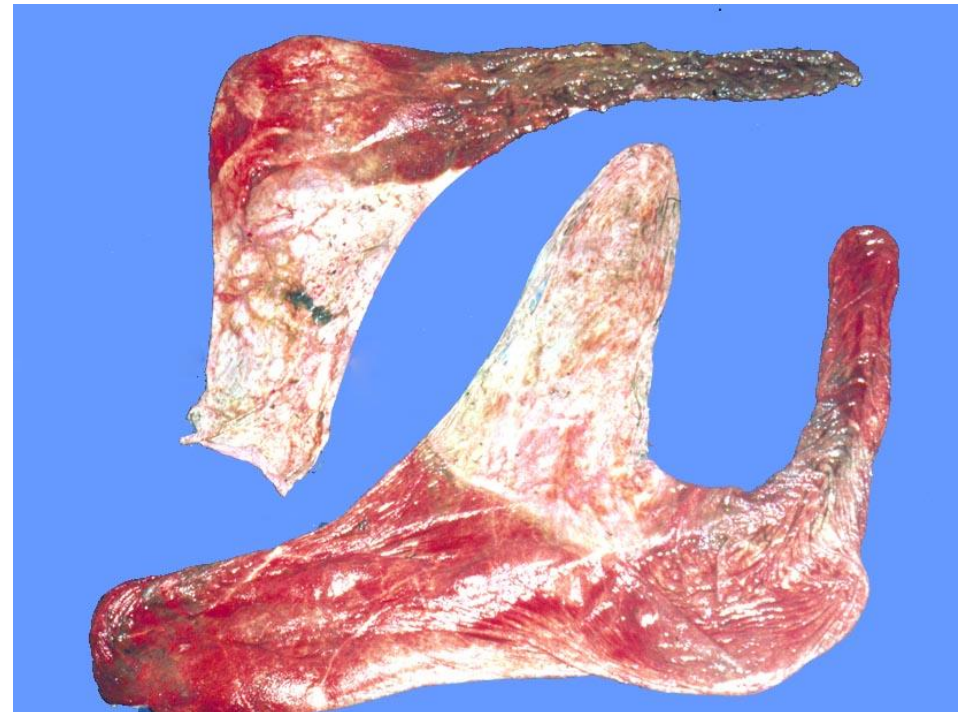
# Cord abnormalities - torsion



# Reduced placental reserve – Avillus regions

- Avillus regions
  - **twinning**
  - **premature separation**
  - body pregnancy
- Placentitis
  - Ascending infection

## Twinning



# Reduced placental reserve – avillus regions

- Avillus regions
  - twins
  - premature separation
  - **body pregnancy**
- Placentitis
  - Ascending infection





# Reduced placental reserve - Placentitis

- Avillus regions
  - twins
  - premature separation
  - body pregnancy
- **Placentitis**
  - **Ascending infection**
  - ***Streptococcus equi zooepidemicus***



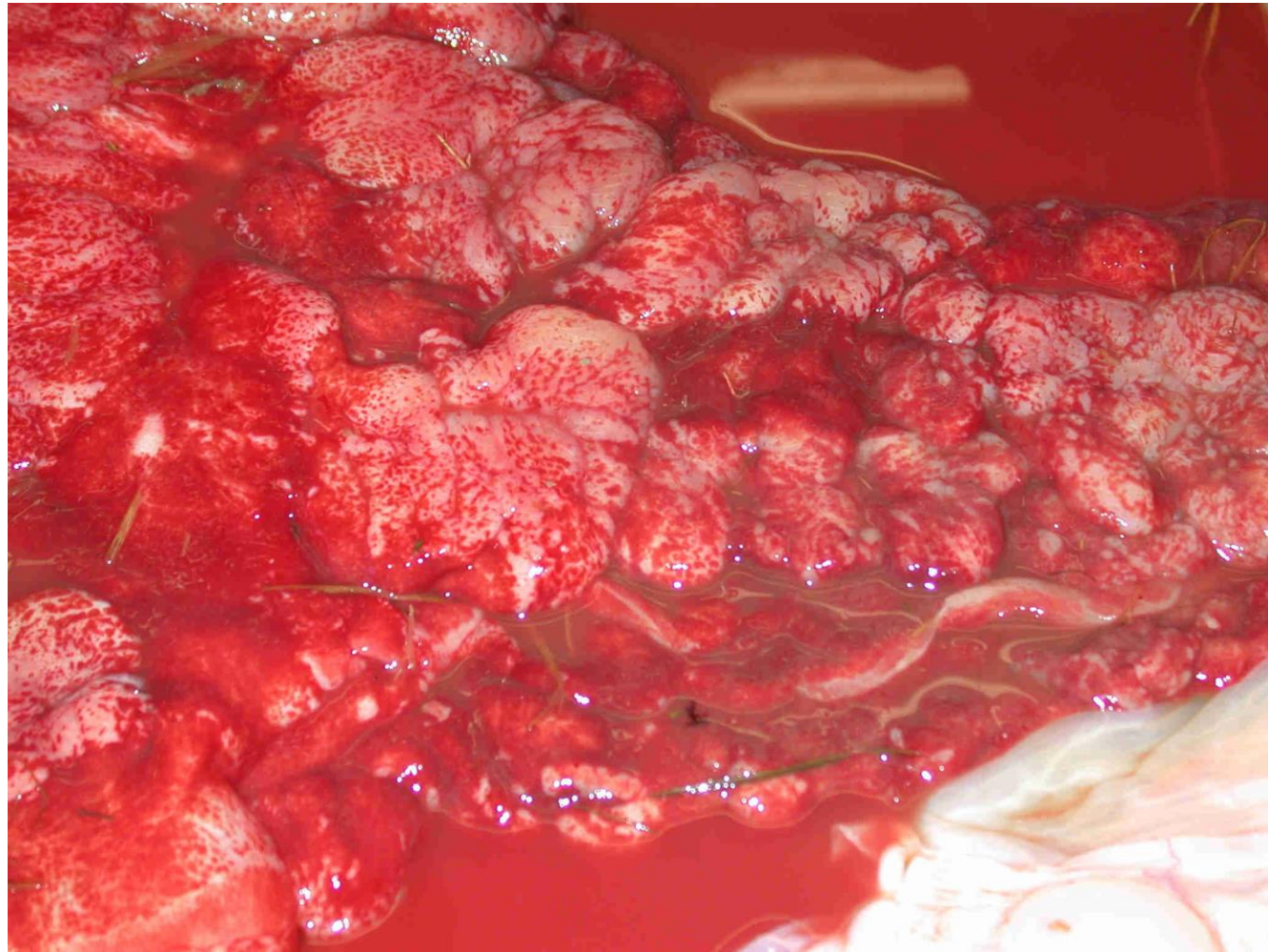


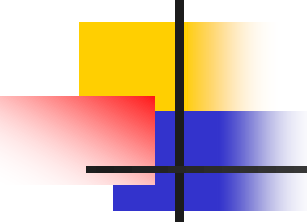
# Regionally important

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- Fescue endophyte mycotoxicosis
  - *Neotyphodium coenophialum*
  - Kentucky and southern Ontario!
  - Ergot alkaloids (vasoactive and prolactin)
  - Hyperthermia
  - Placental edema and thickening
  - Dysmaturity
  - Prolonged gestation

# Endophyte toxicosis





# 'Mare Reproductive Loss Syndrome' and 'Equine Amnionitis and fetal loss'

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- 2001 and 2002 foaling season
- Early fetal loss (>day 40) – about day 80
- Peak about May 7th
- ◆ Link to Processionary Caterpillars
  - Eastern Tent Caterpillar (exoskeleton)
- Increased evidence of fetal sepsis and 'amnionitis'.
  
- Hairs (setae) penetrate intestine, uterus and placenta – endotoxemia/bacteremia

# Kentucky

■ No diagnosis	16	■ Infectious	37
■ Noninfectious	47	■ Bacteria	18
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