Use of Placental Tissue for diagnosis of Bovine Viral Diarrhea Virus Persistently Infected Alpaca Crias

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Diagnosing BVDV PI Neonates

Cattle:
- Ear Notch (Skin) Sample
  - Immunohistochemistry
  - Antigen Capture ELISA
  - PCR

Alpacas:
- Blood
  - PCR
Camelid Owner Concerns

- Blood sampling frequently requires a veterinarian’s assistance
- Cost to owner for testing
- Ear notch (skin) sampling
  - Aesthetics for Alpacas?
  - Validity
How else can we test for BVDV in Neonatal Alpaca’s?

- Placental tissue
  - Easy to get
  - Owner
  - Tests at birth
- Fetal tissue has been studied in cattle, why not in alpaca’s?
Objective

- Determine if PCR testing of placenta tissue could be used to identify BVDV infection in newborn alpaca crias.
20 Alpaca Crias
- Blood Sample
- Placenta Tissue Sample

BVDV rtPCR performed on samples
- CSU Veterinary Diagnostic Laboratory

Compared the results of the placental PCR with that of the blood PCR
BVDV rtPCR Procedure

- **CSU Diagnostic Laboratory**
  - **Primers**
    - **Forward**
      - 5’-GTA GTC GTC AGT GGT TCG-3’
      - 5’-CGA CAC TCC ATT AGT TGA GG-3’
    - **Reverse**
      - 5’-GCC ATG TAC AGC AGA GAT-3’
      - 5’-GTC CAT AAC GCC ACG AAT AG-3’
  - **Reverse Transcriptase**
### Results

<table>
<thead>
<tr>
<th>Blood PCR</th>
<th>Placenta PCR</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
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<td>2</td>
</tr>
<tr>
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</tr>
<tr>
<td>Negative</td>
<td>Negative</td>
<td>17</td>
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</tbody>
</table>
Test Validity

- **Sensitivity**
  - 100%
  - Small sample size (n=2)

- **Specificity**
  - 94.4% (17/18)
  - 95% CI = 72.7-100%
  - One False Positive Test?

Why the False Positive?
Transient Congenital Infections

- Fetus and Placenta Infected *in utero*
- Fetal immunity clears fetal infection
- Placenta Immune Privileged
  - Maternal Tissue Rejection
  - Fetal Tissue Rejection
  - BVDV persists in placental tissue
Placenta Immunohistochemistry

- Collaboration with Dr. Clayton Kelling

**Images:**
- BVDV IHC Positive Placenta
- BVDV IHC Negative Placenta
Conclusions

- BVDV PCR of Placental Tissue is a good PI screening test for alpaca neonates.
- The placenta sample can be easily collected by the owner.
- A confirmatory Blood PCR is recommended for positive animals to confirm PI status.
- Congenital BVDV infection may provide a model to study placental immune recognition.
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Integrated Livestock Management

Alpaca Breeders of the Rockies

Animal Population Health Institute