Gamete Transport

Sperm Transport in the Male Tract

- No protein synthetic ability
- addition or loss of plasma membrane proteins and lipids
- redistribution of proteins and lipids within sperm
- changes in lipid diffusion coefficients

Acquisition of Fertilizing Ability and Motility

Addition of Decapacitation Factor

- protein, glycolipid and/or lipid
- stabilizes the plasma membrane

Site of Ejaculation

<table>
<thead>
<tr>
<th>Site of Ejaculation</th>
<th>Semen Characteristics</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vagina</td>
<td>slight coagulation of ejaculate</td>
<td>human, rabbit</td>
</tr>
<tr>
<td>vagina</td>
<td>semen with high sperm concentration</td>
<td>cattle, sheep</td>
</tr>
<tr>
<td>uterus</td>
<td>voluminous, distention of cervix</td>
<td>horse</td>
</tr>
<tr>
<td>cervix, uterus</td>
<td>voluminous, retention of penis during copulation</td>
<td>dog, pig</td>
</tr>
<tr>
<td>uterus</td>
<td>vagina plug</td>
<td>rodents</td>
</tr>
</tbody>
</table>

Sperm Loss From Female Tract

- retrograde flow
- phagocytosis by neutrophils
**Evolutionary Strategies for Dealing With Retrograde Flow of Semen**

- coagulation of semen or a plug
- concentrated semen
- semen deposited in uterus

**Sperm Loss From Female Tract**

- retrograde flow
- phagocytosis by neutrophils

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**Experiment on Retrograde Flow in the Cow**

- Insemination at 3 different spots

**Assume 10 million inseminated**

- Uterine Horn at 8 hr = 25% loss or 75% retained = 7.5 million sperm retained
- Cervix at 8 hr = 60% loss or 40% retained = 4 million sperm retained
Neutrophile Infiltration of Uterus

Phases of Sperm Transport

- **rapid**
  - 15-30 min
- **sustained**
  - 6 - 12 hr
- **oviductal**
  - at ovulation

Evidence for Sustained Transport

Effect of Oviduct Transection on Fertilization in Heifers

<table>
<thead>
<tr>
<th>Interval from mating to transection of UTJ</th>
<th>Oocytes Fertilized</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0%</td>
</tr>
<tr>
<td>8</td>
<td>50%</td>
</tr>
<tr>
<td>12</td>
<td>83%</td>
</tr>
</tbody>
</table>

* Mating was done at the start of estrus.

Sperm Transport in the Pig

Ovulation

* Oocyte
  * Cumulus Cells
  * Follicular Fluid
Cue for ovulation may effect isthmus to trigger oviductal transport.

Location of Fertilizing Sperm:
- 6-12 hr
- 18-24 hr
- 1-2 hr

Barriers To Sperm Transport:
- Cervix

Cervix:
- To uterus

VAGINA

CERVIX
Barriers To Sperm Transport

Factors Regulating Oocyte Transport in the Oviduct

Remains closed until day 3 - 5 post ovulation

Factors Regulating Oocyte Transport in the Oviduct

Remains closed until day 3 - 5 post ovulation
Now view the video podcast entitled

View Video on Ovulation and Oocyte Transport

Found at:
http://www.anisci.wisc.edu/jjp1/anisci_repro/sec/lec_16_gamete_tran/ovulation_oocyte_trans.html