**INTRODUCTION**

Reproductive efficiency is considered to be one of the main management factors to improve dairy profitability. Pregnancy rate and its distribution over the time are two variables that affect the production and economy of dairy farms. To be more competitive, appropriate synchronization protocols have to be used to get a high pregnancy rate after only one artificial insemination. In this way, the recent literature describes different synchronization protocols that are able to control the estrous cycle using different strategies.

**FOLLICULAR DYNAMIC**

Process of growth and regression follicles modulated by the neuroendocrine system

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Origin</th>
<th>Target Site</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonadotrophin-Releasing Hormone (GnRH)</td>
<td>Hypothalamus</td>
<td>Anterior hypophysis</td>
<td>Stimulate FSH/ LH production and secretion</td>
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<tr>
<td>Follicle Stimulating Hormone (FSH)</td>
<td>Hypophysis</td>
<td>Ovaries</td>
<td>Steroidogenesis and follicular growth and maturation</td>
</tr>
<tr>
<td>Luteinizing Hormone (LH)</td>
<td>Hypophysis</td>
<td>Ovaries</td>
<td>Ovulation + Corpus luteum formation/maintenance</td>
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<tr>
<td>Estrogen/Estriol (E2)</td>
<td>Ovaries</td>
<td>Hypothalamus</td>
<td>Stimulate sexual behaviour and positive feedback</td>
</tr>
<tr>
<td>Progestrone (P4)</td>
<td>Ovaries/Uterus</td>
<td>Ovaries/Hypothalamus</td>
<td>Uterus preparation for deployment to maintain gestation + Negative feedback</td>
</tr>
<tr>
<td>Prostaglandin F2a (PGF2a)</td>
<td>Uterus</td>
<td>Ovaries/Hypothalamus</td>
<td>Destruction CL + Abolition of negative feedback by progestrone</td>
</tr>
</tbody>
</table>

**1. PROGESTAGEN PROGRAMS**

**MELENGESTROL ACETATE PROGRAM**

- **STOP MGA + Injection PGF2a**
  - GnRH: 4 days
  - IA: 48 hours
  - Daily administration MGA (Progestogen)

**SUBCUTANEOUS IMPLANTS OF SYNTHETIC PROGESTIN PROGRAM**

- SC implants removed + Injection PGF2a/eCG
- ACYCLIC FEMALES = Ecg CYCLIC FEMALES = PGF2a
  - IA: 50 hours
  - SC implants + administration PGF2a + synthetic progestin

**INTRAVAGINAL DEVICE PROGRAM**

- CIRD-8 (1.9g P4, PRID (1.55g P4), DIB (1g P4))
  - ACYCLIC FEMALES = eCG
  - Injection PGF2a + device removed
  - Injection GnRH + IA
  - 9 day
  - X day
  - Y day
  - Program device according days + Hours until second injection of GnRH + IA

**2. GnRH – PGF2α- GnRH PROGRAMS**

**CLASSIC OVSYNCH PROGRAM**

- GnRH
- PGF2α
- GnRH
- IA
  - 7 days
  - 48 hours
  - 24 hours
  - Oxidation + CL formation + New follicular wave
  - CL regression
  - Oxidation

**OVSYNCH56 PROGRAM**

- GnRH
- PGF2α
- GnRH
- IA
  - 7 days
  - 56 hours
  - 56 hours
  - Oxidation

**COVSYNCH72 PROGRAM**

- GnRH
- PGF2α
- GnRH
- IA
  - 7 days
  - 72 hours
  - Oxidation

**5dCOVSYNCH72 PROGRAM**

- HEIFERS ANESTROUS OR POLYCYSTIC OVARIENS
  - GnRH
  - PGF2α
  - GnRH
  - GnRH + IA
  - 5 days
  - 24 hours
  - 48 hours

**CONCLUSIONS**

- It is necessary to understand the reproduction physiology to develop new estrus synchronization programs.
- Synchronization efficiency and fertility rate depend on the synchronization program used.
- The synchronization program may require the use of one or more hormones.
- Management, nutrition, environmental or pathologic factors that prevent cows from cycling or cause low conception rate must be corrected before starting a synchronization program.