Puberty is defined in both the male and female as the ability to accomplish reproduction successfully (acquiring reproductive competence).

I. Definitions of puberty in Female

A. Age at first estrus
   - Visual signs of sexual receptivity
   - May not reflect acquisition of full reproductive capability

B. Age at first ovulation

C. Age at which females can support pregnancy
   - Acquisition of a proper body size, body composition, and metabolic status
   - It is important from management point of view in farm animals

II. Definition of puberty in Male

A. Age at first sexual behavioral activities
   - Mounting and erection
   - Not sperm production

B. Age at first ejaculation
   - Development of muscles, nerves, accessory glands

C. Age at first ejaculation with spermatozoa

D. Age when the ejaculate contains enough sperm cells to accomplish fertilization

III. Age of Puberty

<table>
<thead>
<tr>
<th>Species</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>11 Mo (7-18)</td>
<td>11 Mo (9-24)</td>
</tr>
<tr>
<td>Ovine</td>
<td>7 Mo (6-9)</td>
<td>7 Mo (4-14)</td>
</tr>
<tr>
<td>Porcine</td>
<td>7 Mo (5-8)</td>
<td>6 Mo (5-7)</td>
</tr>
<tr>
<td>Equine</td>
<td>14 Mo (10-24)</td>
<td>14 Mo (12-19)</td>
</tr>
</tbody>
</table>

Adapted from Dr. Senger
IV. The Key to Initiation of Puberty

(Figures 6-3 & 6-4)

A. Release of GnRH in high frequency pulses and high amplitude from hypothalamic neurons

B. High GnRH secretion and thus LH and FSH release for initiation of follicular growth in the female or initiation of spermatogenesis in the male

C. High LH pulses and amplitudes and thus preovulatory LH surges do not occur unless hypothalamic sensitivity to gonadal estradiol decreases

   - Before puberty, females have low ovarian estradiol and high hypothalamic sensitivity to estradiol negative feedback, resulting in low frequency GnRH pulses

V. Factors Impacting the Development of Hypothalamic GnRH neurons

A) Genetic and Breeds (see table 6-2)

B) Body Size and Composition

   1. Degree of fatness and body weight (see figure 6-6)

      - Body growth, shifts in nutrient requirements, and energy balance send metabolic signals

   2. Metabolic signals (see figure 6-5 and 6-7)

      - Insulin, Glucose, and Fatty acids may influence GnRH neurons activity

C. Environmental factors

1. Season (see figure 6-8)

2. Photoperiod

3. Presence of the opposite sex (see figure 6-9 &6-10)