PART 1

1. **Label** the endocrine glands in the following diagram.
2. Using contrasting colors, **color** the endocrine organs in the figure below.
3. **Locate** the endocrine structure in each of the torso models.

4. Examine the interior of a skull and locate the sella turcica that protects the pituitary gland. This bony structure’s can be translated to mean ______________
PART 2
Set 71 - Endocrine System
Study the microscopic anatomy of different endocrine glands utilizing Viewmaster Set 71

The Endocrine System. Drawings optional.

1. Pancreas (xs)
   - P – exocrine tissue which produces digestive enzymes
   - Arrow → points to islets which contain alpha and beta cells that produce endocrine products
     o Name these two endocrine products
     Note how the endocrine and exocrine tissue differ though they are adjacent to each other

2. Pancreatic islets (of Langerhans) (xs)
   - Note how the islets differ from surrounding exocrine tissue

3. SKIP

4. SKIP

5. Adrenal Gland (xs)
   - Note the different presentation of the adrenal medulla and cortex
     Neural tissue can be found in the __________________
     Glandular tissue can be found in the _____________
     The cortex is stimulated by ____________________
     The medulla is stimulated by ___________________

6. SKIP

7. Pituitary gland (ls)
   - Note the similarity in presentation of the medulla and cortex to that of the adrenal gland in slide 5
     Neural tissue can be found in the ______________
     Glandular tissue can be found in the ______________
     The anterior pituitary is stimulated by ______________
     The posterior pituitary is stimulated by ______________

8. SKIP

PART 3
Hormone Abbreviations

1. ACTH _____________________________
2. ADH _____________________________
3. FSH _____________________________
4. hGH _____________________________
5. LH _____________________________
6. NE _____________________________
7. PRL _____________________________
8. PTH _____________________________
9. TSH _____________________________
PART 4
Main Endocrine Organs and their Hormones
Write the name of the endocrine gland that secretes the following hormones

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Endocrine Gland</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACTH</td>
<td></td>
</tr>
<tr>
<td>2. ADH</td>
<td></td>
</tr>
<tr>
<td>3. androgens</td>
<td></td>
</tr>
<tr>
<td>4. calcitonin</td>
<td></td>
</tr>
<tr>
<td>5. cortisol</td>
<td></td>
</tr>
<tr>
<td>6. epinephrine/NE</td>
<td></td>
</tr>
<tr>
<td>7. estrogen/progesterone</td>
<td></td>
</tr>
<tr>
<td>8. FSH</td>
<td></td>
</tr>
<tr>
<td>9. glucagon</td>
<td></td>
</tr>
<tr>
<td>10. hGH</td>
<td></td>
</tr>
<tr>
<td>11. insulin</td>
<td></td>
</tr>
<tr>
<td>12. LH</td>
<td></td>
</tr>
<tr>
<td>13. melatonin</td>
<td></td>
</tr>
<tr>
<td>14. oxytocin</td>
<td></td>
</tr>
<tr>
<td>15. prolactin</td>
<td></td>
</tr>
<tr>
<td>16. PTH</td>
<td></td>
</tr>
<tr>
<td>17. TSH</td>
<td></td>
</tr>
<tr>
<td>18. melanocyte stimulating hormone</td>
<td></td>
</tr>
</tbody>
</table>

PART 5
Hormone Function

1. decreases blood glucose levels by transporting glucose into body cells
2. stimulates oocyte production and estrogen secretion
3. decreases blood calcium levels by inhibiting osteoclasts
4. darkens skin pigmentation
5. increases resistance to stress, increases blood glucose levels and decreases inflammation
6. stimulates production of milk
7. promotes the fight-or-flight response
8. triggers ovulation and stimulates secretion of estrogen/progesterone
9. increases metabolism and basal metabolic rate
10. increases sex drive in females
11. decreases water loss by increasing reabsorption of water into blood and decreasing urine production
12. stimulates secretion of hormones by the adrenal cortex
13. stimulates uterine contractions and milk release during suckling
14. increases blood glucose levels by stimulating the liver to break down glycogen into glucose
15. stimulates the secretion of testosterone
16. stimulates sperm production
17. Be sure you are familiar with the antagonistic relationships between the hormones on the next page.
Parathyroid Hormone (PTH) – Calcitonin (CT) Antagonism

1. High level of Ca\textsuperscript{2+} in blood stimulates thyroid gland parafollicular cells to release more CT.

2. Low level of Ca\textsuperscript{2+} in blood stimulates parathyroid gland chief cells to release more PTH.

3. CALCITRIOL stimulates increased absorption of Ca\textsuperscript{2+} from foods, which increases blood Ca\textsuperscript{2+} level.

4. PARATHYROID HORMONE (PTH) promotes release of Ca\textsuperscript{2+} from bone matrix into blood and slows loss of Ca\textsuperscript{2+} in urine, thus increasing blood Ca\textsuperscript{2+} level.

5. PTH also stimulates the kidneys to release CALCITRIOL.

6. PTH also stimulates the kidneys to release CALCITRIOL.

Insulin – Glucagon Antagonism

1. Low blood glucose (hypoglycemia) stimulates alpha cells to secrete GLUCAGON.

2. Glucagon acts on liver cells to:
   - break down glycogen into glucose
   - form glucose from lactic acid and certain amino acids

3. Glucose released by liver cells raises blood glucose level to normal

4. If blood glucose continues to rise, hyperglycemia inhibits release of glucagon

5. High blood glucose (hyperglycemia) stimulates beta cells to secrete INSULIN.

6. Insulin acts on various body cells to:
   - promote facilitated diffusion of glucose into cells
   - speed synthesis of glycogen from glucose
   - increase uptake of amino acids and increase protein synthesis

7. Blood glucose level falls

8. If blood glucose continues to fall, hypoglycemia inhibits release of insulin
PHILADELPHIA -- Scientists at the University of Pennsylvania and the Monell Chemical Senses Center in Philadelphia have found that exposure to male perspiration has marked psychological and physiological effects on women: It can brighten women's moods, reducing tension and increasing relaxation, and also has a direct effect on the release of luteinizing hormone, which affects the length and timing of the menstrual cycle.

The results will be published in June in the journal Biology of Reproduction and currently appear on the journal's Web site.

"It has long been recognized that female pheromones can affect the menstrual cycles of other women," said George Preti, a member of the Monell Center and adjunct professor of dermatology in Penn's School of Medicine. "These findings are the first to document mood and neuroendocrine effects of male pheromones on females."

In a study led by Preti and colleague Charles J. Wysocki, extracts from the underarms of male volunteers were applied to the upper lip of 18 women ages 25 to 45. During the six hours of exposure to the compound, the women were asked to rate their mood using a fixed scale.

"Much to our surprise, the women reported feeling less tense and more relaxed during exposure to the male extract," said Wysocki, a member of the Monell Center and adjunct professor of animal biology in Penn's School of Veterinary Medicine. "This suggests that there may be much more going on in social settings like singles bars than meets the eye."

After the women's exposure to the underarm extract, further testing revealed a shift in blood levels of luteinizing hormone. Levels of this reproductive hormone, produced in pulses by the pituitary gland, typically surge right before ovulation but also experience hundreds of smaller peaks throughout the menstrual cycle. Preti and Wysocki found that application of male underarm secretions hastened onset of these smaller pulses. Duration to the next pulse of luteinizing hormone was shortened by an average 20 percent, from 59 to 47 minutes.

Preti and Wysocki are now looking at the several dozen individual compounds that make up male perspiration to determine which may be responsible for the effects they observed. They also plan to study whether female pheromones can affect men's moods or physiological functions.

"This may open the door to pharmacological approaches to manage onset of ovulation or the effects of premenstrual syndrome or even natural products to aid relaxation," Wysocki said. "By determining how pheromones impact mood and endocrine response, we might be able to build a better male odor: molecules that more effectively manipulate the effects we observed."

The underarm extracts used in the study came from men who bathed with fragrance-free soap and refrained from deodorant use for four weeks. The extracts were blended to avoid reactions to individual men's odors. None of the women involved in the study discerned that male sweat had been applied right under their noses; some believed they were involved in a study of alcohol, perfume or even lemon floor wax.

Half the women received three applications of the male secretions during a six-hour period, followed three controlled exposures to ethanol, used as a control substance, over a six-hour period. For the other half, the regimen was reversed. The women did not report feeling any more or less energetic, sensuous, tired, calm, sexy, anxious, fatigued or active after exposure to male perspiration.

Preti and Wysocki are joined in the Biology of Reproduction paper by co-authors Kurt T. Barnhart and Steven J. Sondheimer of Penn's Department of Obstetrics and Gynecology and James J. Leyden of Penn's Department of Dermatology. Their work is sponsored by the National Institutes of Health.

**Question One:** According to this study, male pheromones affected which gland to alter the onset and duration of LH pulses?

**Question Two:** Pheromones are a part of the secretion from which exocrine glands?
If you put a hamster on steroids, he'll attack other hamsters more quickly and more often, and bite a lot. Cut him off and you might think he'd mellow out.

Not so. Hamsters on steroids remain aggressive into adulthood, according to a new study that offers yet another caution to teens who might try to bulk up artificially.

The hamsters started out tame. Then they were put on anabolic steroids and, as studies have shown with teens, the rodents exhibited "very high levels" of aggression, said study leader Richard Melloni, Jr. of Northeastern University.

Long after the more than 100 hamsters were taken off the steroids, the aggressive tendencies, or "roid rage" as scientists put it, remained in 85 percent of them.

"The behavior lasted for weeks into the adult period in hamsters," Melloni told LiveScience. "Typically weeks translates into years from rodent to primate."

Autopsies revealed the hamsters' brains had changed. The anterior hypothalamus, known to regulate aggression, pumped out more of a hormone called vasopressin (also known as antidiuretic hormone or ADH).

"Steroids step on the gas for aggression by enhancing the activity of brain areas that induce aggression," Melloni said, adding that this brain area is similar in rodents and humans. "Some of the effects may wear off after withdrawal, but aggressive behavior won't stop immediately, leaving them to be a danger to themselves and others."

The results are detailed in the latest issue of the journal Behavioral Neuroscience.

According to the National Institute on Drug Abuse, about half a million teens abuse anabolic-androgenic steroids. Other research has shown teen use can lead to psychiatric problems and heavier steroid use later in life.

Melloni said other research that his team has not yet published indicates that drug use by teenagers causes irreversible changes in serotonin (a central nervous system neurotransmitter) levels, which play a part in depression.

**Question One:** In this study, which part of the hamster's brains exhibited irreversible changes following prolonged use of anabolic steroids?

**Question Two:** This study points to the use of anabolic steroids as the possible cause of mood swings; aggression due to the increased secretion of hormone ______________ and depression due to the reduced secretion of neurotransmitter ______________.