LESSON ASSIGNMENT

LESSON 8
Reproductive Hormones and Oral Contraceptives.

LESSON ASSIGNMENT
Paragraphs 8-1 through 8-22.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

8-1. Given the name of one of the three main categories of reproductive hormones and a group of statements, select the statement that best describes that hormone.

8-2. Given the name of one of the three main categories of reproductive hormones and a group of statements, select the statement that describes the use of that hormone or the side effects associated with that hormone.

8-3. Given the trade or generic name of a specific estrogen, progestin, or androgen agent and a list of uses, patient warning statements, and side effects, select the use(s), patient warning statement(s), and side effect(s) associated with the given agent.

8-4. Given the trade or generic name of a specific estrogen, progestin, androgen agent, or oral contraceptive and a group of trade and/or generic names, select the trade or generic name that corresponds to the given name.

8-5. Given the name of one of the methods of contraception and a group of statements, select the statement that best describes that method of contraception.

8-6. Given a group of statements, select the statement that describes a mechanism of action of oral contraceptives.
8-7. Given a group of statements, select the statement that best describes one of the three types of oral contraceptives.

8-8. Given a group of effects, select the side effect associated with the use of oral contraceptives.

8-9. Given a group of statements, select the statement that describes what a patient who is beginning to take oral contraceptives should be told.

8-10. Given the name of an oral contraceptive, classify that agent into one of three given categories of oral contraceptives (for example, estrogen product alone).

8-11. Given the trade or generic name of an ovulation-inducing agent and a group of statements, select the statement that describes the property, use, dispensing information, or side effects associated with that agent.

8-12. Given the trade or generic name of an ovulation-inducing agent and a group of trade and/or generic names of drugs, select the trade or generic name corresponding to the given name.

**SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.
LESSON 8

REPRODUCTIVE HORMONES AND ORAL CONTRACEPTIVES

Section I. INTRODUCTION

8-1. GENERAL COMMENTS

For many years people have attempted to better understand the reproductive process. The reasons why people have desired to learn more about reproduction are many. Some wish to identify and alleviate problems that prevent them from having children. Others want to identify and use ways to prevent pregnancy. You will dispense drugs that affect the reproductive process. Hence, you should be familiar with these agents and how they affect the reproductive system as well as the entire body.

8-2. REPRODUCTIVE HORMONES

There are three main categories of reproductive hormones, estrogens, progestins, and androgens.

a. Estrogens. In females, estrogens are secreted by the developing ovarian follicle and by the corpus luteum (see Lesson 6, para 6-11b). During pregnancy, the placenta secretes estrogens. Estrogens are responsible for the development of the uterus, vagina, fallopian tubes, and breasts. Estrogen also produces such physiological effects as accelerating growth at puberty (causes epiphyses of long bones to close), increasing clotting factors in circulation, and decreasing bone reabsorption. Estrogen produces female secondary sex characteristics (like distribution of fat, development of pubic hair, high-pitch voice, and increased skin pigmentation). In males, there is limited estrogen secretion by the adrenal glands.

b. Progesterone. Progesterone is the hormone that prepares the female’s body for pregnancy and helps maintain pregnancy. That is, this hormone decreases the motility of the uterus, allowing the fertilized egg to implant and remain implanted in the uterus. Progesterone also develops the milk-secreting cells of the breasts. Decreased levels of progesterone cause irregularity of the menstrual cycle.

c. Androgens. In males, the androgens are produced in the testes. Testosterone is the principal and most powerful androgen. Physiologically, the androgens affect the following:

(1) Development of the testes, vas deferens, the prostate, seminal vesicles, penis, and scrotum.

(2) Growth at puberty and the length of long bones (closes epiphyses of long bones).
(3) Anabolism increases the synthesis and decreases the breakdown of protein. Androgens also act to produce secondary sex characteristics associated with the male (like development of pubic hair and facial hair, development of a deeper pitched voice, and development of increased sebaceous secretions). In females, there is limited androgen production by the adrenal glands.

Section II. USES OF REPRODUCTIVE HORMONES

8-3. INTRODUCTION

In the previous section, the reproductive hormones were discussed in terms of their site of production and the effects produced on the body. As you have probably realized by now, these substances affect the body in many ways. Therapeutically, physicians take advantage of the different ways these substances affect the body in order to use them to treat certain disease conditions. This section will focus on the uses associated with the reproductive hormones discussed in Section I.

8-4. USES OF ESTROGEN

Estrogen has a variety of uses in medical practice. Following are some of those uses:

a. **Hormonal Replacement.** In cases where there is insufficient estrogen present, the woman can suffer various conditions (like dryness of the vagina). The lack of sufficient estrogen in the woman’s body could be attributed to surgery (removal of the ovaries), to menopause, or to other conditions. In such cases, the physician might elect to prescribe estrogen therapy to provide the needed estrogen.

b. **Palliative Treatment of Breast Cancer and Prostatic Cancer.** Palliative refers to lessening the severity of symptoms or pain, such treatment does not necessarily mean cure. Estrogen is sometimes administered to relieve “bone pain,” a condition experienced by some men who have cancer of the prostate that has metastasized to bone causing severe pain. In females, some breast tumors are sensitive to estrogens if there is an “estrogen receptor” present. The presence of such an estrogen receptor can be determined by laboratory tests. If such a receptor is present, estrogen therapy can lead to a decrease in the size of the tumor. At the present time, it is not known if an estrogen receptor is present in cases involving cancer of the prostate. It is recommended that other treatment (for example, chemotherapy) be used in conjunction with estrogen therapy.

c. **Oral Contraceptive.** Estrogen alone, or in conjunction with progesterone, can be used to prevent pregnancy.
d. **Treatment of Postpartum Breast Engorgement and Bleeding.** Within 24 to 48 hours after delivery, the mother’s breasts will become swollen and tender. If the mother intends to breast feed the infant, the nursing staff will provide care to help alleviate the pain. After a while, the pain will subside. If the mother does not wish to breast feed the infant, estrogen can be administered. A large dose of estrogen will feed back to the pituitary gland through the hypothalamus. Prolactin release will be inhibited and the breast engorgement will not occur. You should know that the use of estrogen to treat postpartum breast engorgement is not recommended because of the risk of clot formation. Such administration of estrogen is soon after delivery. Estrogen can also be given to decrease uterine bleeding, since estrogen stimulates the repair of the uterus and vagina (increases the lining of these structures).

e. **Treatment of Acne.** At one time physicians frequently prescribed estrogens in the treatment of severe acne. The estrogens caused the sebaceous secretions to be more fluid. Hence, the pores did not tend to clog so easily. You should know that this treatment is not as popular as it once was. Today other products are sometimes given in conjunction with antibiotics (for example, tetracyclines) in the treatment of acne.

### 8-5. SIDE EFFECTS ASSOCIATED WITH ESTROGEN THERAPY

As you might expect, there are some side effects associated with the use of estrogens. Some of these side effects are listed and discussed below:

a. **Bleeding.** Women on estrogen therapy sometimes experience vaginal bleeding. Such bleeding can be prolonged. When bleeding occurs with estrogen therapy, the patient should contact the physician.

b. **Headaches.** Headaches associated with estrogen therapy may be sudden in onset and/or severe in nature.

c. **Edema and Breast Tenderness.** The breast may enlarge because of fluid buildup, which cause the breasts to be very tender.

d. **Nausea and Vomiting.**

e. **Thrombo Embolic Disease.** Administration of estrogen can cause an increase in the likelihood of clot formation.

f. **Increased Incidence of Cancer.** There appears to be a higher incidence (five to 15 times) of endometrial cancer in postmenopausal patients that use estrogens, especially, patients who have taken estrogens for a long period of time (five years or longer).
g. **“In Utero” Effects on the Fetus.** In the 1950s and 1960s, females who were habitual aborters were given an estrogen product called diethylstilbestrol (DES). This drug was given in order for the habitual aborters to have children. The children they gave birth to have been found to have been affected by this drug. Some female offspring have been found to have an increased incidence of vaginal cancer. Some male offspring have decreased semen volume, sperm density, and mobility and hypertrophic testes.

h. **Increased Dietary Requirements for Vitamin B6 and Folic Acid.** Estrogens interfere with the absorption of these substances from the gastrointestinal tract. Hence, the patient may have to increase intake of these substances in order to absorb body requirements.

8-6. **USES OF PROGESTINS**

Progestins are used as listed and discussed below:

a. **Oral Contraceptive.** Progestins are used either alone or in combination with estrogens as oral contraceptives.

b. **Cancer Treatment.** Some progestins (for example, megestrol acetate) can be used in the treatment of certain types of cancer. Specifically, these agents are used in the treatment of breast cancer and cancer of the endometrium. The mechanism by which these products produce this anticancer effect is unknown. In the treatment of these cancers, the progestins are used in conjunction with other agents.

c. **Progestinic Supplement.** Progestins are prescribed in instances in which insufficient amounts of progestins are produced by the body.

8-7. **SIDE EFFECTS ASSOCIATED WITH PROGESTIN THERAPY**

Progestins may be estrogenic or androgenic in terms of the effects they produce. The various actions of progestins seem to be responsible for the side effects observed with their use. Immediately below are some of the side effects associated with progestins.

a. Changes in vaginal bleeding patterns (breakthrough bleeding or complete lack of bleeding can occur with these agents).

b. Severe or sudden headaches may occur with these agents.

c. Sudden loss of coordination.

d. Changes in appetite.

e. Changes in weight (can be caused by edema).
8-8. **PRECAUTIONS ASSOCIATED WITH THE USE OF PROGESTINS**

Progestins should not be taken during the first four months of pregnancy because of the potential harm they can cause the fetus. Progestins, because of the effects they produce, may delay the spontaneous abortion of a defective fertilized egg.

8-9. **USES OF ANDROGEN THERAPY**

a. **Androgen Replacement Therapy.** In some instances, there is a lack or insufficient amount of androgen produced by the testes. For example, the testes may have been surgically removed or damaged in some way. In these cases, androgens may be given to the man.

NOTE: Testicular cancer is most common in the young male from age 18 to 30. This type of cancer can be fatal if not diagnosed and treated early. Therefore, any lump on the testes should be cause for an immediate medical check. The loss of the testes will cause sterility. However, loss of the testes will not affect the ability to have an erection, ejaculation, or orgasm.

b. **Treatment of Osteoporosis.** Androgens are administered in osteoporosis in order to cause a rebuilding of bone.

c. **Treatment of Endometriosis.** Endometriosis is the uncontrolled growth of uterine endometrium. Androgens are given to treat endometriosis.

d. **Reduction of Protein Loss.** Androgens can be especially useful in the debilitated or geriatric patient to reduce the amount of protein lost from muscle tissue. In the use of androgens for this purpose, additional protein should be added to the diet in order for the body to synthesize the required proteins.

8-10. **SIDE EFFECTS ASSOCIATED WITH ANDROGEN THERAPY**

Because of the actions of androgens, they produce characteristic side effects. Some of the most widely observed side effects are:

a. **Edema.** To a slight extent androgens increase sodium and water retention in the kidney.

b. **Masculinizing Effects.** The androgens are responsible for producing the secondary male characteristics. Some of these characteristics include deepening the voice and increased hair on the body.
Section III. SPECIFIC REPRODUCTIVE HORMONES

8-11. INTRODUCTION

In the previous sections, general concepts related to reproductive hormones were presented. You were told of the effects, uses, and side effects associated with these agents. In this section, specific reproductive hormones will be discussed.

8-12. SPECIFIC ESTROGEN AGENTS

a. Conjugated Estrogens (Premarin®). Premarin® is used in estrogen replacement therapy. Side effects associated with Premarin® are listed in paragraph 8-5. Provide the patient with a patient package insert (PPI) when dispensing this product. Premarin® is available in tablet, topical cream, vaginal cream, and injectable forms.

b. Chlorotrianisene (Tace®). This estrogen is used to prevent postpartum breast engorgement. The usual dosage of this product is 12 milligrams four times daily for seven days or 50 milligrams every six hours for six doses. Because of the short duration of therapy associated with this product, nausea and vomiting are often associated with its use. Tace® also produces side effects such as those listed in paragraph 5-8 in some patients. When you dispense this product you should inform the patient that the medication should be taken until it is gone. Furthermore, a PPI should be provided to the patient when this product is dispensed. Tace® is supplied in capsule form.

c. Ethinyl Estradiol (Estinyl®). This estrogen product is used for estrogen replacement therapy, in the palliative treatment of cancer, and as a contraceptive. For the side effects associated with this agent, read paragraph 8-5. Provide the patient with a patient package insert when this product is dispensed. Estinyl® is available in tablet form.

d. Dienestrol. This estrogen product is used in estrogen replacement therapy and in the treatment of atrophic vaginitis. (Atrophic vaginitis is a condition sometimes observed in postmenopausal women. Dryness and itchiness of the vagina characterize it.) This preparation is supplied in the form of a cream. The usual dose of this product is one applicator full applied vaginally. Since this product is absorbed locally, the side effects associated with this agent are the same as for the other estrogens. Provide the patient with a PPI when you dispense this product.
e. Diethylstilbestrol (Stilphostrol®). This estrogen is used in estrogen replacement therapy, in the palliative treatment of breast and prostate cancer, and as a contraceptive (given as a single high dose following rape). Diethylstilbestrol (DES) is not routinely used as an oral contraceptive. The dosage of the product varies with the use. For the side effects associated with this agent, you should read paragraph 8-5. When you dispense the product, you must provide the patient with a PPI. If the product is being dispensed as a contraceptive, you should tell the patient to take the medication until it is gone. Since this preparation may affect the clotting of the blood, the patient should be told to inform the doctor or dentist the drug is being taken before any surgery is attempted. Furthermore, a female of childbearing age that is taking this product should be told that the drug can cause birth defects if it is taken during pregnancy. Diethylstilbestrol is available in tablet and suppository form.

8-13. SPECIFIC PROGESTIN AGENTS

**IMPORTANT NOTE:** You must give the patient the PPI when you dispense these products.

a. Medroxyprogesterone (Provera®). This product is used in the treatment of amenorrhea and dysmenorrhea and in progestin replacement therapy. Side effects associated with this agent are few when it is taken in cycles. This product is available in tablet and injectable forms.

b. Hydroxyprogesterone (Delalutin®). This product is used in the treatment of amenorrhea and in the palliative treatment of uterine cancer. For the side effects associated with this agent, read paragraph 8-7. Delalutin® is available in an injectable form.

c. Dydrogesterone (Duphaston®). Dydrogesterone is used in the treatment of amenorrhea and in the palliative treatment of uterine cancer. For a description of the side effects associated with this product, you should read paragraph 8-7. This product is available in an injectable dosage form.

d. Megestrol (Megace®). Megestrol is only used in the treatment of cancer of the breast and endometrium. For product side effects, see paragraph 8-7.

e. Norethindrone (Micronor®). Norethindrone is used in the treatment of amenorrhea and endometriosis and as an oral contraceptive. For the side effects associated with norethindrone, read paragraph 8-7.

f. Norgestrel (Ovette®). Norgestrel is only indicated for use as an oral contraceptive. See paragraph 8-7 for a description of the side effects associated with this agent.
g. **Progesterone (Luteogan®)**. Progesterone is used in the treatment of amenorrhea and functional uterine bleeding. For the side effects associated with this agent, you should read paragraph 8-7.

### 8-14. SPECIFIC ANDROGEN AGENTS

a. **Danazol (Danocrine®)**. Danazol is used in the treatment of endometriosis. (Endometriosis is a condition in which there is uncontrolled growth of uterine endometrium.) Side effects associated with danazol include increased oiliness of the hair or skin, acne, decreased breast size, and unnatural hair growth. This product is available in capsule form.

b. **Fluoxymesterone (Halotestin®)**. Fluoxymesterone is used as an androgen hormonal supplement. Side effects associated with this agent include closing of the epiphyseal closures, hypercalcemia, and edema. This product should not be given to boys who are in puberty because of its effect on the epiphyseal closures. Fluoxymesterone is available in tablet form.

c. **Methyltestosterone**. Methyltestosterone is used as an androgen replacement. Side effects associated with this product include hypercalcemia, edema, and development of male secondary sexual characteristics (if used in women). Methyltestosterone is supplied in oral, buccal, or sublingual tablets.

### 8-15. INTRODUCTION

For years people have been searching for a truly safe and effective contraceptive. Both physical and chemical means have been tried to prevent the process of fertilization. Some chemical means have been found which prevent contraception; however, this means also highly undesirable side effects. The topic of contraception will be presented and discussed in this section. Specifically, the methods of contraception will be examined in relation to their advantages and disadvantages.

### 8-16. METHODS OF CONTRACEPTION

Immediately below, some methods of contraception are discussed. You are probably familiar with most of these methods.

a. **Abstinence**. Abstinence, in this sense, means that one refrains from engaging in sexual intercourse. Theoretically, this means that abstinence is 100 percent effective in preventing pregnancy. However, intercourse does not have to occur in order for fertilization of the egg to occur. If sperm are deposited in one way or another in or around the vagina, it is possible that sperm could move themselves up the vaginal canal and eventually fertilize the egg.
b. **Coitus Interruptus/Withdrawal.** In this method, the penis is withdrawn from the vagina before ejaculation of sperm occurs. The advantages of this method are two: (1) no chemicals are involved and (2) no devices are used. The disadvantage of this method is that the method sounds better than it actually is. Realistically, some movement of sperm from the penis takes place before ejaculation. Actually, about one-fourth of the couples who practice this method end up with the female pregnant.

c. **Rhythm Method.** In an earlier lesson (see para 6-13), the topic of the female’s monthly period (cycle) was discussed. Knowing what is involved in this cycle allows one to predict quite accurately (for many women) when intercourse could result in pregnancy. Many women have 28-day cycles, but other women deviate from this 28-day pattern. Various methods (for example, use of the basal body thermometer (BBT)) have been used to increase the accuracy of the method. As you might think, this method can be used to prevent pregnancy as well as to plan pregnancy. An advantage of this method is that no chemicals are used. A disadvantage is that miscalculation can result in pregnancy. Approximately one-fourth of the couples who used this method found that the female became pregnant.

d. **Spermicide Method.** The spermicide method involves the use of foams, creams, jellies, and suppositories to kill sperm after ejaculation has occurred. Individuals using this method should carefully follow the directions supplied with the spermicidal product. In terms of effectiveness, about 22 percent of the couples using this method find that the female becomes pregnant. One advantage of this product is that no hormones are involved. There are two primary disadvantages associated with this method. First, some products can cause irritation. Second, most products require that they be applied inside the vagina approximately 15 minutes before intercourse is to occur. This takes planning and is somewhat inconvenient.

e. **Prophylactic (Condom) Method.** In this method, a condom is used to cover the penis in order that ejaculated sperm cannot enter the vagina. Hence, this method is a mechanical block against pregnancy. This method also serves to reduce the chances of contracting of venereal disease from the sexual partner. In terms of effectiveness of pregnancy prevention, approximately 10 of 100 couples who use this method find the female becomes pregnant. The advantage of this method is that no chemicals are used and the method is convenient. The disadvantage of this method is that it affects the spontaneity of the sexual act. In addition, the condom may be defective. If defective, sperm can escape from the condom and enter the vagina. You should remember to use only a surgical lubricant (like K-Y® Jelly) on the condom since petroleum can dissolve the vulcanized rubber that is used to make most condoms.
f. **Diaphragm.** This method involves the use of a mechanical block in conjunction with spermicide. Specifically, a mechanical device is inserted in the vagina. A spermicidal product is applied around the diaphragm. Theoretically, this mechanical/chemical block should prevent pregnancy. Actually, approximately five of 100 couples who use this method find the female pregnant. The advantage of this method is that no hormone is used. The disadvantages of this method are that the diaphragm must be fitted (requires a prescription) and there is some difficulty in inserting the diaphragm.

g. **Intrauterine Device (IUD).** This method involves the use of a mechanical device (like a coil or loop) placed within the uterus. The IUD is believed to prevent the implantation of the fertilized ovum. There are various types of these intrauterine devices available. Some intrauterine devices contain chemicals (like copper or progesterone). Approximately five of 100 couples who use this method find the female becomes pregnant. The advantage of this method is that no chemicals are used (except in the two types that contain chemicals). Disadvantages associated with intrauterine devices are that they are not always inserted properly by the females and they can move and irritate tissue. Further, the intrauterine device can present problems to the female and fetus if the female becomes pregnant while the IUD is in place, if the IUD is removed there is a high likelihood of a miscarriage.

h. **Surgical Techniques.** A vasectomy is a surgical procedure that blocks the flow of sperm from the epididymis. This procedure is very effective. A tubal ligation is a surgical procedure that blocks the movement of ovum in the female. Both methods are extremely effective in making the individual sterile. The advantage of these surgical methods is that they are both effective and permanent. A disadvantage is that they are permanent, although some success has been achieved in surgically reversing the procedure.

i. **Oral Contraceptives.**

   (1) **Mechanism of action.** Oral contraceptives act by three methods:

   (a) Increase an estrogen level that inhibits ovulation by feedback action on the hypothalamus and subsequent suppression of the follicle-stimulating hormone (FSH) and lutinizing hormone (LH).

   (b) Increases progesterone levels prior to ovulation, which inhibit the implantation of the ovum within the uterus.

   (c) Affect the quality of the mucous in the vagina (the mucous becomes thick, scanty, and cellular) in order to hamper the movement of sperm.
(2) Types of oral contraceptives.

(a) Estrogen and progestin combination products. These preparations are supplied in a package containing 21 or 28 tablets. In that package, 21 of the tablets contain a combination of estrogen and progestin and seven tablets contain inert ingredients or iron (25 milligrams of elemental iron per tablet).

(b) Low dose progesterone products. These products contain progesterone. A tablet is to be taken each day of the cycle.

(c) High dose estrogen (DES). This tablet is taken within 72 hours of intercourse. High dose estrogen is not a routinely used oral contraceptive. It is only used in cases of rape and incest.

(3) Side effects. Some significant side effects are associated with the use of oral contraceptive agents. Some of these are:

(a) Breakthrough bleeding. This side effect is seen in patients taking low-dose estrogen.

(b) Thromboembolic disease. Symptoms associated with this particular side effect include severe headache, blurring or loss of vision, flashing lights, leg pains, chest pains, and shortness of breath.

(c) Candida vaginitis. This is a yeast infection of the vagina. This side effect is sometimes seen in patients taking high progestin products.

(d) Edema and breast enlargement. This side effect is seen most often in patients taking high estrogen and/or progestin products.

(e) Nausea and vomiting. This side effect is most often observed in patients taking high estrogen products.

(f) Skin reactions. Increased pigmentation can be aggravated by sunlight. This side effect is more common in individuals who have darker skin. This type of side effect is observed most often in patients who are taking high estrogen products.

(g) Libido changes. Oral contraceptives sometimes affect the individual’s sex drive.

(h) Rebound fertility. Rebound fertility involves the increased likelihood of pregnancy. The cause of this side effect is unknown.
8-17. GENERAL DIRECTIONS FOR TAKING ORAL CONTRACEPTIVES

The patient should begin taking the medication on the fifth day after menstrual flow begins. Then, one tablet should be taken daily until all the tablets are gone. The patient should stop for seven days (if taking the 21-day packet) and then repeat the 21-day cycle. For patients who have 28-day packets, they should not stop taking tablets between cycles. If the menstrual period does not occur, check with the physician to rule out pregnancy.

NOTE: It is advisable to use alternative methods of contraception when using “the pill” for the first cycle. That is, use a combination of condom/spерmicidal foam. Always provide the patient with a PPI each time you dispense an oral contraceptive.

8-18. GOAL OF CONTRACEPTIVE THERAPY

a. The goal of contraceptive therapy is to use as low a dose as possible. If a tablet is missed, it should be taken when remembered. If the patient vomits within two hours after taking the tablet, a second tablet should be taken. When in doubt, the patient should use a second method of contraception.

b. Not all estrogens and progestins are equipotent. For example, norethindrone acetate is twice as potent as norethindrone. Therefore, the lowest weight combination is not necessarily the least potent.

8-19. EXAMPLES OF ORAL CONTRACEPTIVES BY TYPE


(1) Norethindrone (NOR-QD®, MICRONOR®).

(2) Norgestrol (Ovrette®).

b. Combination Products (Estrogen and Progesterone).

(1) Norethindrone/mestranol (Ortho-Novum®).

(2) Nogestrel/ethinyl estradiol (Ovral®).

(3) Ethynodiol acetate/ethinyl estradiol or mestranol (Demulen®).

(4) Norethindrone/ethinyl estradiol (Brevicon®).
8-20. PRECAUTIONARY STATEMENT

Oral contraceptives (just like any other type of legend drug) should not be given to friends. A physician must individually select the agent and tailor the dosage based on the history and needs of the patient. A physical examination should be performed every six months to one year. One part of this examination should be the PAP smear. Remember that oral contraceptives are potentially dangerous. A person should never be unless they have been prescribed for the person.

Section V. OVULATION INDUCING AGENT

8-21. INTRODUCTION

In some instances the physician may desire to stimulate ovulation in order that the patient can become pregnant. This section will focus on an agent that will stimulate ovulation.

8-22. CLOMIPHENE CITRATE (CLOMID®), AN OVULATION INDUCING AGENT

a. Properties. Clomiphene is a nonsteroidal compound. This agent has properties that are estrogenic and antiestrogenic properties. It has been used to stimulate ovulation in order that the female can become pregnant (if the male partner has adequate sperm production).

b. Dispensing Information. Frequently, a two or three month supply of Clomid® is dispensed to the patient since a month of therapy is usually not successful.

c. Side Effects. Side effects associated with this agent include enlarged ovaries (this can be painful), hot flashes, and multiple pregnancies.

Continue with Exercises

Return to Table of Contents
EXERCISES, LESSON 8

INSTRUCTIONS: The following exercises are to be answered by marking the lettered response that best answers the question or best completes the incomplete statement or by writing the answer in the space provided.

After you have completed all the exercises, turn to “Solutions to Exercises” at the end of the lesson and check your answers.

1. Progesterone is best described as:
   a. The hormone responsible for female secondary sexual characteristics.
   b. The hormone that prepares the female's body for pregnancy and helps maintain pregnancy.
   c. The hormone that affects the growth of bone during puberty (closes epiphyses of long bones).
   d. The hormone responsible for the development of the uterus, vagina, and fallopian tubes.

2. Estrogen is used in the palliative treatment of breast cancer and prostatic cancer. This means that:
   a. Estrogen lessens the severity of symptoms or pain, but it does not cure the patient.
   b. Estrogen causes a complete remission of the cancer in the patient.
   c. Estrogen is used in combination with other agents in order to slow the spread of the cancer throughout the body.
   d. Estrogen can be used to treat cancers that have not spread throughout the body.
3. When you dispense diethylstilbestrol to a patient you must:
   a. Inform the patient that the drug is used in estrogen replacement therapy and in the palliative treatment of breast and prostate cancer.
   b. Tell the patient to take the medication until it is gone.
   c. Tell the patient that the drug has been known to cause atrophic vaginitis in women who are of childbearing age.
   d. Provide the patient with a patient package insert (PPI).

4. The diaphragm method of birth control involves the use of:
   a. A mechanical device placed within the uterus.
   b. A spermicide in conjunction with a mechanical block inserted in the vagina.
   c. A condom used to cover the penis in order that ejaculated sperm cannot enter the vagina.
   d. A dome-shaped rubber device that is placed over the opening of the vagina.

5. Which of the following statements best describes a mechanism of action associated with some oral contraceptive agents?
   a. Some oral contraceptives make vaginal secretions (mucous) watery and noncellular in order to hamper the movement of the sperm.
   b. Some oral contraceptives increase progesterone levels that inhibit ovulation by feedback action on the hypothalamus and subsequent suppression of the follicle-stimulating hormone and luteinizing hormone.
   c. Some oral contraceptives increase progesterone levels prior to ovulation, which inhibit the implantation of the ovum within the uterus.
   d. Some oral contraceptives block the action of the follicle-stimulating hormone by depressing the action of the cilia of the fallopian tube.
6. Which of the following describes the category of oral contraceptives commonly referred to as "combination products"?

   a. Progesterone and estrogen products are together in the same product.
   
   b. Progesterone and androgen drugs are combined in order to affect ovulation and ovum implantation in the uterus.
   
   c. Estrogen and clomiphene citrate is combined in order to prevent pregnancy.
   
   d. Estrogen and androgens are administered in separate dosage forms in order to simulate pregnancy and interfere with progesterone levels in the blood.

7. Select the side effect associated with the use of oral contraceptives.

   a. Breakthrough bleeding.
   
   b. Hypertension.
   
   c. Hypotension.
   
   d. Hypoglycemia.

8. Which of the following statements should be told to the patient who has just started to take an oral contraceptive?

   a. The patient can miss as many as two consecutive days of taking the oral contraceptive, if the monthly menstrual cycle is regular.
   
   b. Use alternative methods of contraception when using “the pill” for the first cycle.
   
   c. If the patient vomits within two hours after taking the tablet, the patient should wait until the next day to take the next tablet.
   
   d. If the patient is on a trip and forgets to bring the oral contraceptive with her, she can take as many as three oral contraceptive tablets from a friend.
9. Diethylstilbesterol (DES) is used:
   a. Routinely as an oral contraceptive by many women.
   b. To prevent pregnancy in cases of rape and incest.
   c. To stimulate the production of milk.

10. Select the side effect associated with the use of clomiphene citrate.
   a. Increased likelihood of becoming pregnant.
   b. Changes in sex drive.
   c. Candida vaginitis.
   d. Multiple pregnancies.

**SPECIAL INSTRUCTIONS FOR EXERCISES 11 THROUGH 14.** In exercises 11 through 14, match the trade name listed in Column B with its corresponding generic name listed in Column A.

```
<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. ___ Clomiphene citrate</td>
<td>a. Clomid®</td>
</tr>
<tr>
<td>12. ___ Norgestrel</td>
<td>b. Halotestin®</td>
</tr>
<tr>
<td>13. ___ Norethindrone/mestranol</td>
<td>c. Ortho-Novum®</td>
</tr>
<tr>
<td>14. ___ Fluoxymesterone</td>
<td>d. Ovrette®</td>
</tr>
</tbody>
</table>
```

Check Your Answers on Next Page
SOLUTIONS TO EXERCISES, LESSON 8

1. b (para 8-2b)
2. a (para 8-4b)
3. d (para 8-12e)
4. b (para 8-16f)
5. c (para 8-16i(1)(b))
6. a (para 8-19)
7. a (para 8-16i(3)(a))
8. b (para 8-17, Note 1)
9. b (para 8-12e)
10. d (para 8-22c)
11. a (para 8-22)
12. d (para 8-13f)
13. c (para 8-19b(1))
14. b (para 8-14b)

Return to Table of Contents