**Name: Obiesie chukwudaalu chukwudi**

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**Assignment**

**1. Write on estrogen and progestin**

**2. Drugs used as antifertility drug**

Answers

**Estrogen, or oestrogen, is the primary female [sex hormone](/wiki/Sex_steroid%22%20%5Co%20%22Sex%20steroid). It is responsible for the development and regulation of the female [reproductive system](/wiki/Reproductive_system%22%20%5Co%20%22Reproductive%20system) and [secondary sex characteristics](/wiki/Secondary_sex_characteristic%22%20%5Co%20%22Secondary%20sex%20characteristic). There are three major [endogenous](/wiki/Endogeny_%28biology%29%22%20%5Co%20%22Endogeny%20%28biology%29) estrogens in females that have estrogenic hormonal activity: [estrone](/wiki/Estrone%22%20%5Co%20%22Estrone), [estradiol](/wiki/Estradiol%22%20%5Co%20%22Estradiol), and [estriol](/wiki/Estriol%22%20%5Co%20%22Estriol). The [estrane](/wiki/Estrane%22%20%5Co%20%22Estrane) [steroid](/wiki/Steroid%22%20%5Co%20%22Steroid)[estradiol](/wiki/Estradiol%22%20%5Co%20%22Estradiol) is the most potent and prevalent of these.**

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**There are different types of estrogen:**

### **Estrone**

**This type of estrogen is present in the body [after menopause](https://www.hormone.org/your-health-and-hormones/glands-and-hormones-a-to-z/hormones/estrone%22%20%5Ct%20%22_blank). It is a weaker form of estrogen and one that the body can convert to other forms of estrogen, as necessary.**

### **Estradiol**

**Both males and females produce estradiol, and it is the most common type of estrogen in females during their reproductive years.**

**[Too much](https://www.hormone.org/your-health-and-hormones/glands-and-hormones-a-to-z/hormones/estradiol%22%20%5Ct%20%22_blank) estradiol may result in acne, loss of sex drive, osteoporosis, and depression. Very high levels can increase the risk of uterine and breast cancer. However, low levels can result in weight gain and cardiovascular disease.**

### **Estriol**

**Levels of estriol rise [during pregnancy](https://www.hormone.org/your-health-and-hormones/glands-and-hormones-a-to-z/hormones/estriol%22%20%5Ct%20%22_blank), as it helps the uterus grow and prepares the body for delivery. Estriol levels peak just before birth.**

**Function**

**Estrogen enables the following organs to function:**

****Ovaries:** Estrogen [helps stimulate](https://www.britannica.com/science/estrogen%22%20%5Ct%20%22_blank) the growth of the egg follicle.**

****Vagina:** In the vagina, estrogen [maintains the thickness](https://www.ncbi.nlm.nih.gov/books/NBK538260/%22%20%5Ct%20%22_blank) of the vaginal wall and promotes lubrication.**

****Uterus:** Estrogen enhances and maintains the mucous membrane that lines the uterus. It also regulates the flow and thickness of uterine mucus secretions.**

****Breasts:** The body uses estrogen in the formation of breast tissue. This hormone also helps stop the flow of milk after weaning.**

**Levels of estrogen**

**Estrogen levels vary among individuals. They also fluctuate during the menstrual cycle and over a female’s lifetime. This fluctuation can sometimes produce effects such as mood changes before menstruation or hot flashes in menopause.**

**Factors that can affect estrogen levels include:**

* **pregnancy, the end of pregnancy, and breastfeeding**
* **puberty**
* **menopause**
* **older age**
* **overweight and [obesity](/info/obesity/how-much-should-i-weigh.php)**
* **extreme dieting or [anorexia nervosa](/articles/267432.php)**
* **strenuous exercise or training**
* **the use of certain medications, including steroids, ampicillin, estrogen-containing drugs, phenothiazines, and tetracyclines**
* **some congenital conditions, such as Turner’s syndrome**
* **[high blood pressure](/articles/159283.php)**
* **[diabetes](/info/diabetes/)**
* **primary ovarian insufficiency**
* **an underactive pituitary gland**
* **polycystic ovary syndrome (PCOS)**
* **tumors of the ovaries or adrenal glands**

 **PROGESTINS**

**A progestogen, also referred to as a progestagen, gestagen, or gestogen, is a type of [medication](/wiki/Medication%22%20%5Co%20%22Medication) which produces effects similar to those of the [natural](/wiki/Natural_product%22%20%5Co%20%22Natural%20product)female [sex hormone](/wiki/Sex_hormone%22%20%5Co%20%22Sex%20hormone) [progesterone](/wiki/Progesterone%22%20%5Co%20%22Progesterone) in the body. A progestin is a *[synthetic](/wiki/Synthetic_compound%22%20%5Co%20%22Synthetic%20compound)*progestogen. Progestogens are used most commonly in [hormonal birth control](/wiki/Hormonal_contraception%22%20%5Co%20%22Hormonal%20contraception) and [menopausal hormone therapy](/wiki/Menopausal_hormone_therapy%22%20%5Co%20%22Menopausal%20hormone%20therapy).They can also be used in the treatment of [gynecological conditions](/wiki/Gynecological_condition%22%20%5Co%20%22Gynecological%20condition), to support [fertility](/wiki/Fertility%22%20%5Co%20%22Fertility) and [pregnancy](/wiki/Pregnancy%22%20%5Co%20%22Pregnancy), to lower [sex hormone](/wiki/Sex_hormone%22%20%5Co%20%22Sex%20hormone) levels for various purposes, and for other indications.Progestogens are used alone or in combination with [estrogens](/wiki/Estrogen_%28medication%29%22%20%5Co%20%22Estrogen%20%28medication%29). They are available in a wide variety of [formulations](/wiki/Drug_formulation%22%20%5Co%20%22Drug%20formulation) and for use by many different [routes of administration](/wiki/Route_of_administration%22%20%5Co%20%22Route%20of%20administration).Examples of progestogens include natural or [bioidentical](/wiki/Bioidentical%22%20%5Co%20%22Bioidentical) [progesterone](/wiki/Progesterone_%28medication%29%22%20%5Co%20%22Progesterone%20%28medication%29) as well as progestins such as [medroxyprogesterone acetate](/wiki/Medroxyprogesterone_acetate%22%20%5Co%20%22Medroxyprogesterone%20acetate) and [norethisterone](/wiki/Norethisterone%22%20%5Co%20%22Norethisterone)**.



## **What are progestins?**

**Progestins are synthetic forms of the body’s naturally-occurring hormone [progesterone](/articles/cycle-a-z/progesterone-101).**

**Progestins were designed to interact with progesterone receptors in the body in order to cause progesterone-like effects (1,2). This means that they do some of what the body’s natural progesterone does. For instance, progestins can cause changes to the *endometrium*(the lining of the uterus) that prevent it from *proliferating*(building up) too much, and that can help it support implantation and the continuation of an early pregnancy (1,2,3).**

**Progestins were originally developed because natural progesterone isn't absorbed well when taken as a pill by mouth and is *metabolized*(processed) by the body too quickly to have much effect (2,4). Now progesterone is available in a *micronized* (smaller particle) form that is absorbed easier and lasts longer in the body (4), but only progestins—not micronized progesterone—are used in birth control.**

## **What are progestins used for?**

### **Progestins in hormonal birth control**

**Progestins are present in all forms of [hormonal birth control](/articles/sex/cycle-science-hormonal-contraception-and-your-body), either alone in progestin-only methods (like the implant, hormonal IUDs, injection, or mini-pill) or with an estrogen in combined hormonal birth control (like most pills, patch, vaginal ring, and some injections) (4).**

**Progestins prevent pregnancy by inhibiting [ovulation](/articles/cycle-a-z/ovulation-101-what-is-it-how-does-it-work)and reducing the amount and stretchiness of [cervical mucus](/articles/cycle-a-z/wet-sticky-what-your-discharge-is-telling-you), making it unfriendly to [sperm](/articles/cycle-a-z/what-is-sperm-what-are-human-eggs) that are trying to enter the uterus**

## **How do progestins differ from natural progesterone?**

**Before we get into potential side effects of progestins, some important background info.**

**If you are wondering whether to take a progestin-containing birth control or medication, it’s important to know about the different kinds of progestin and how they might affect your body.**

**Progestins are created in a lab, usually starting with a hormone as a building block. Most progestins are created from testosterone, some from progesterone, and one is a type of *spirolactone*(class of synthetic hormones that can impact the body’s salt and water balance) (1,2,4).**

**Progestins are sometimes grouped in "generations," which refer to how long they have been on the market. A more useful classification system to understand their effects is to group them by structure based on the hormone from which they were created (4).**

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**The chemical structure of progestins is different from natural progesterone. These small changes in shape will impact the way they interact with hormone receptors in your body.**

**Progestins may attach to more than just progesterone receptors in the body.**

**Progestins may also bind to receptors for:**

**[androgens](/articles/cycle-a-z/androgens-101)**

**[estrogens](/articles/cycle-a-z/estrogen-101)**

**other hormones, like mineralocorticoids, or glucocorticoids (hormones produced by the adrenal glands)**

**If progestins bind to these receptors, they can cause different side effects—depending on whether the progestin activates or blocks the receptor (2).**

**That doesn’t necessarily mean there will be any noticeable changes for someone (2). For example, just because a progestin is androgenic (binds to androgen receptors), doesn’t necessarily mean someone taking that progestin will notice androgen-like effects such as increased acne or excess hair growth.**

## **Progestin side effects**

**If there are progestins in your birth control, hormone therapy, or how you manage medical conditions, you may experience side effects.**

**Side effects of progestin can be related to:**

**the dose or strength of a particular progestin (5)**

**the specific hormone receptors with which the progestin is interacting (5)**

**or a person’s individual response to a progestin**

**Understanding what causes side effects can be further complicated by the fact that different effects may be produced when a progestin is combined with different doses of estrogen.**

***When progestins are combined with estrogens (as they are in combined hormonal birth control), the side effects may not always be straightforward or easy to predict, since the two components can interact and sometimes counteract each other (5).***

**Not everyone’s response to birth control will be the same, but for some people the specific formulation and type of progestin will matter. Sometimes a simple change in dose or type of birth control can improve side effects.**

## **Birth control side effects related to the dose or potency of progestin**

**Birth control side effects can occur if the dose of progestin isn’t high enough (progestin deficiency) or if the attachment between the progestin and the progesterone receptors isn’t strong enough, due to the slightly different shapes of different progestins (5).**

## ****Side effects related to progestin deficiency****

**bleeding or spotting while taking active (hormone-containing) birth control pills during days 10-21 of the pill pack**

**heavy withdrawal bleeding**

**increased cramping (5)**

**Someone could also experience side effects if the progestin dose is higher than the progesterone levels their body are naturally accustomed to.**

## ****Side effects related to progestin excess****

**elevated blood pressure**

**feeling tired or sleepy**

***hypoglycemia*(low blood sugar)**

**decrease in period length (5)**

### **Androgen-related side effects of progestins in birth control**

**Progestins that bind to androgen receptors can cause androgen-like side effects in some people, such as [acne](/articles/cycle-a-z/skin-and-the-cycle-how-hormones-affect-your-skin), [hirsutism](/articles/cycle-a-z/hirsutism-and-the-menstrual-cycle), or changes in cholesterol**

**Androgen-like side effects are particularly present for people using progestin-only birth control methods—like the hormonal IUD, minipill, implant, or injection—which contain no estrogen (12).**

**If you suspect that your birth control is causing acne, hirsutism, or other androgenic-changes, it helps to figure out which progestin is in your particular method and see if it is an**

**androgenic progestin.**

### ****Androgenic progestins****

**levonorgestrel (implant, hormonal IUDs, pill, emergency contraception)**

**norethindrone (mini-pill)**

**norethindrone acetate (pill)**

**norgestimate (pill)**

**desogestrel (pill, mini-pill)**

**etonogestrel (implant, vaginal ring)**

**norelgestromin (patch)**

**gestodene (pill)**

**medroxyprogesterone acetate (weakly) (injection/shot) (1,2,5,13)**

## **Anti-androgenic side effects of progestins in birth control**

**In general, combined hormonal birth control methods—ones with both progestin *and*estrogen— improves androgen-related effects like [acne and hirsutism](/articles/sex/birth-control-your-skin-and-your-hair) (14,15).**

**This is because the estrogen component suppresses the ovaries’ production of androgens, and increases the amount of a protein called *sex hormone binding globulin*(SHBG). SHBG ties up androgens found in the blood and keeps them from entering the cells in the skin and hair follicles (5,6).**

**Some progestins are anti-androgenic themselves, meaning they bind to the androgen receptor and block androgens from attaching to it, but they can’t be activated. These anti-androgenic progestins may be even more beneficial for treating acne and hirsutism when combined with estrogen, because they lower the amount of androgen available in the blood and also block androgens (1,16).**

### ****Anti-androgenic progestins****

**chlormadinone acetate (pill)**

**cyproterone acetate (pill)**

**drospirenone (pill)**

**dienogest (pill) (1,2,5,13)**

## **Bloating and other progestin side effects**

**Progestins that bind to *mineralocorticoid or glucocorticoid*receptors can cause side effects related to salt and water balance in the body (1). Mineralocorticoidsand glucocorticoids are hormones produced by the adrenal glands, which sit on top of the kidneys.**

**Progestins that bind to glucocorticoid receptors and increase glucocorticoid activity, can cause bloating (1).**

### ****Progestins with glucocorticoid activity****

**chlormadinone acetate (pill)**

**cyproterone acetate (pill)**

**medroxyprogesterone acetate (injection/shot)**

**gestodene (weakly) (pill)**

**etonogestrel (weakly) (implant, vaginal ring) (2)**

**On the other hand, progestins that bind to mineralocorticoid receptors and have anti-mineralocorticoid activity can decrease water retention and bloating (1).**

### ****Progestins with anti-mineralocorticoid activity****

**gestodene (pill)**

**drospirenone (pill) (1,2)**

## **Progestins and the risk for blood clots**

**Deep vein thrombosis (DVT) is a condition where [blood clots](/articles/sex/hormonal-birth-control-and-blood-clots) develop in the veins (often in the legs), and can be life-threatening if they travel to the lungs, heart, or brain.**

****Progestin-only methods are generally not thought to increase risk for blood clots** (17,18). But when combined with estrogen in combined hormonal birth control, the type of progestin may make a difference in the risk for blood clots (1,18).**

**A large study in Denmark showed that people using birth control containing the progestins desogestrel, gestodene, and drospirenone were twice as likely to develop a blood clot in a vein than people using birth control containing levonorgestrel (18). Another study that combined data from six studies did not find a connection between progestin type and the risk for blood clots.**

**2. The drugs used to control the population (by family planning) are called antifertility drugs. Antifertility drugs are hormones (mixture of synthetic estrogen and progesterone derivatives). Examples include norethindrone and ethinyl estradiol.**

**In The development of antibiotics has lead to a long and healthy life. This has further increased the expectancy of life. The rise in population has caused many issues in terms of food resources, employment, environmental problems etc. To avoid these problems the population growth needs to be controlled. These problems have led to the evolution of the concept of family planning. Family planning helps in taking the right decision about the timing to have a child and maintain a proper age difference between two children. It gives the methods to avoid pregnancy and helps in controlling population and avoiding health risks associated with premature births. Birth control pills were invented as one of the components of family planning. Antifertility drugs are chemical substances which suppress the action of hormones that promote pregnancy. These drugs actually reduce the chances of pregnancy and act as a protection. Antifertility drugs are made up of derivatives of synthetic progesterone or a combination of derivatives of estrogen and progesterone.**

**Antifertility drugs are actually synthetic hormones. When progesterone pills are taken, the mucus in the cervix gets thickened. This makes it very difficult for sperm to enter the uterus and fertilize the egg and hence chances of pregnancy are reduced. Progesterone is a hormone which suppresses ovulation in women. The synthetic progesterone derivatives are more potent as compared to natural progesterone. Norethindrone is an example of synthetic progesterone which is one of the most commonly used antifertility drugs. Ethynylestradiol is a combination of derivatives of estrogen and progesterone.**

## ****Benefits of Antifertility Drugs****

**These drugs generally do not have many side effects, weight gain is the only issue known to be reported. These drugs are very useful if taken in the proper dose, following are its significant benefits:**

1. **They cause no interference in sexual activities and risk of pregnancy is reduced.**
2. **They might cause the reduction in menstrual bleeding.**
3. **They can be taken immediately after childbirth.**

**These drugs should not be taken without the consultation of a doctor. The cycle of the medicine should be maintained. The chance of cancer in the uterus is reduced if the pills are taken in long-term dose. They also provide protection against pelvic inflammatory diseases. Progesterone acts as an anti-inflammatory drug and regulates the immune system.**

**We have seen the details of antifertility drugs, its composition, and benefits. For any further query on this topic kindly install Byju’s the learning app and have a thoughtful journey of concepts.**