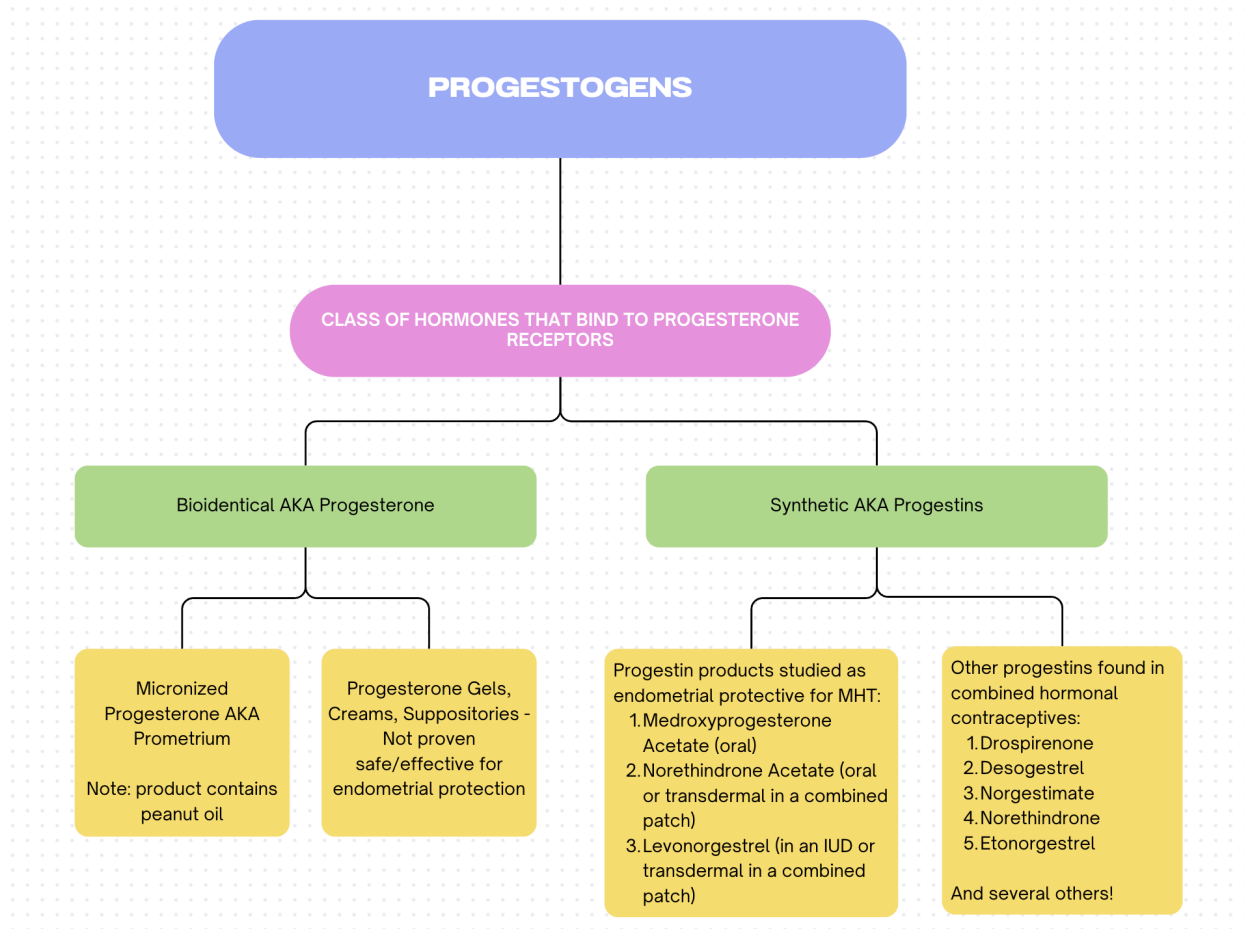


# All Things Menopause™ Hormone Hierarchy Explained

## PROGESTERONE, PROGESTOGEN, PROGESTIN, BIOIDENTICAL, NATURAL, SYNTHETIC????



**Progestogens** is a term used to describe the category of hormones that bind to progesterone receptors in the body.

**Progesterone** is the hormone we make in our bodies after we ovulate. It is produced by the post-ovulation follicle, known as the corpus luteum.



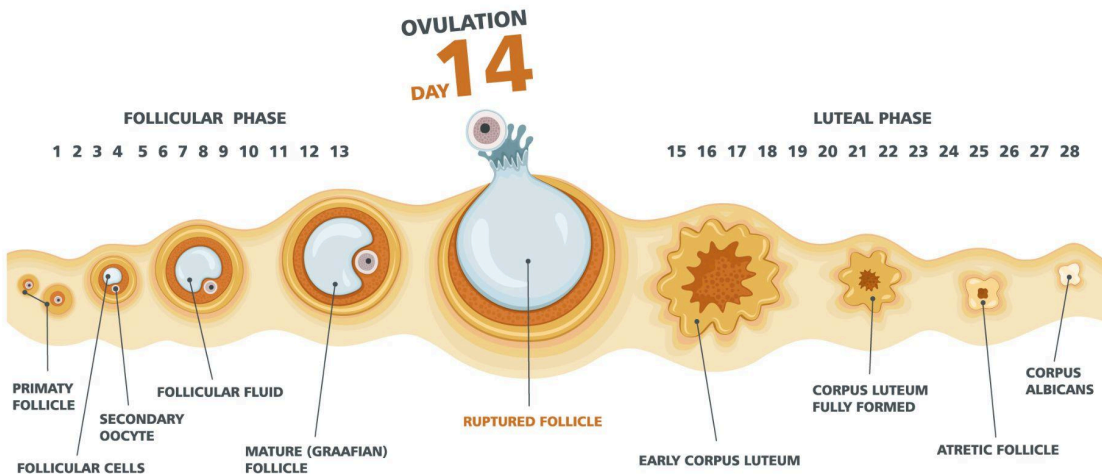


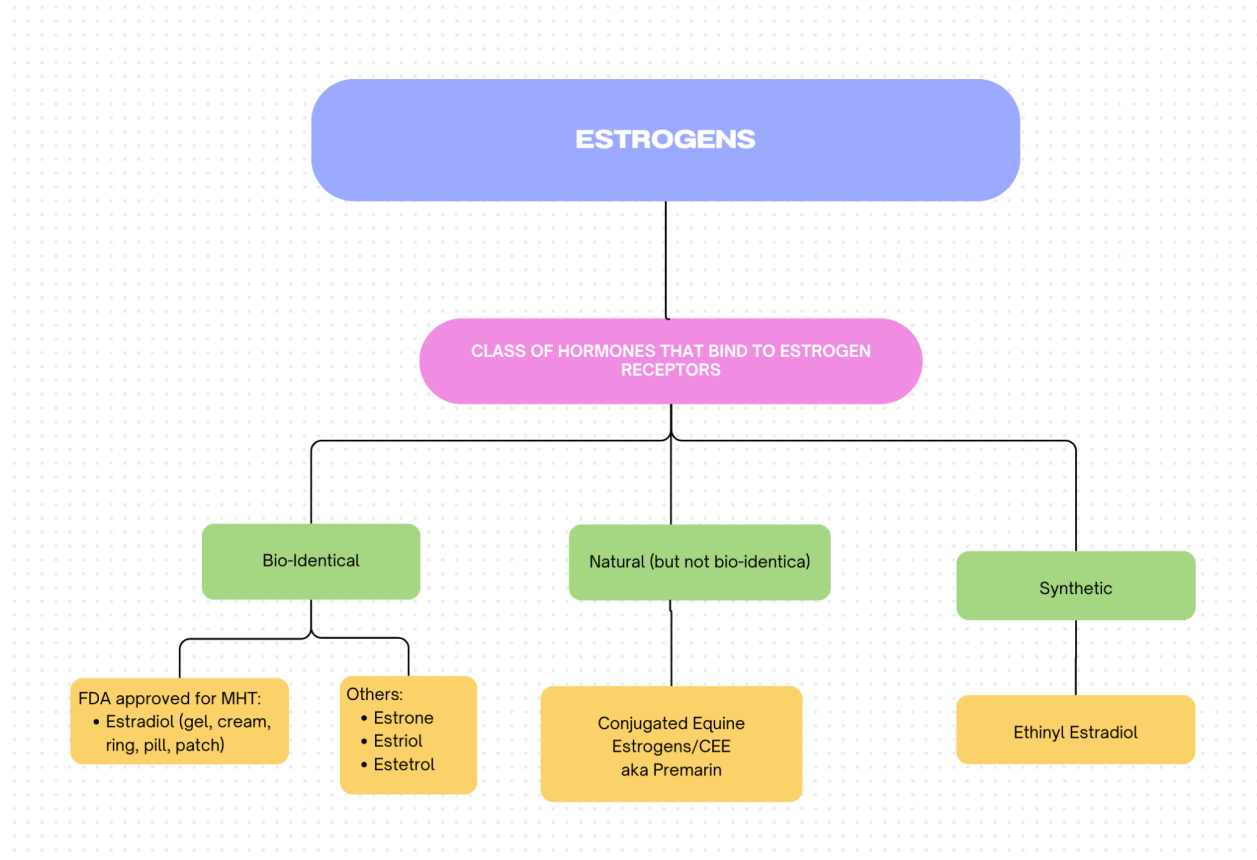
Figure: The life cycle of an ovarian follicle. Begins as an immature oocyte and develops into a mature, fluid-filled (graafian) follicle. Ovulation occurs, ejecting the oocyte from the follicle. The remaining follicle tissue becomes the corpus luteum (latin: “white body”) which emits large amounts of progesterone for about 14 days, after which it completes its cycle and undergoes cell death.

**Micronized progesterone** is a hormone drug that is synthesized in a lab, and derived from compounds found in wild yams. The chemical structure is identical to the progesterone made by the corpus luteum. “Micronized” means they have packaged it into tiny particles so that it can be absorbed more easily. On a pill bottle, it may say “progesterone” or the brand name “Prometrium.”

**Progestins** refers to the group of synthetic hormones that are structurally similar to progesterone but have some differences, and can produce slightly different effects. There are several classes and many different types of synthetic progestins. Many are used for hormone therapy, contraception (either alone or part of a combined estrogen/progestin formulation), and some are even used for certain cancer treatments.



## ESTROGENS? BIOIDENTICAL? NATURAL??



Similarly, **Estrogens** refers to hormones that can bind estrogen receptors.

**Bioidentical estrogens:** **Estradiol** is the predominant and most potent estrogen produced by our bodies (mainly by the ovary) during reproductive years. We also produce **estrone** (converted from an adrenal androgen in tissues like fat cells), and this becomes the predominant estrogen in postmenopause, in the absence of using hormone therapy. **Estriol** and **estetrol** are two additional hormones produced by humans in special circumstances: estriol is produced by the placenta, and estetrol comes from the fetal liver. Estriol is also seen outside of pregnancy as it is a breakdown product of estrogen, found in the urine. All of these hormones are available for medical use for various reasons, though only estradiol and estetrol have FDA-approved formulations. (estradiol in menopause hormone therapy and estetrol as part of an oral contraceptive pill, brand name Nextellis.) When used medically, the hormones are



synthesized in a lab from plant sterols (wild yams again, or soy), or can be converted from other hormones.

**CEE/Premarin:** is a natural hormone product that is extracted from pregnant horse urine, and contains about 10 different estrogens, which includes estradiol but also several other estrogens that are not made by humans.

**Synthetic estrogens:** most common is **ethinyl estradiol** which is used in most formulations of combined hormonal contraception (i.e. the birth control pill.) Ethinyl estradiol carries a higher risk of blood clots than estradiol. **Estradiol valerate** is another synthetic estrogen that is quickly converted into the bioidentical estradiol in the body, plus valerate. (the effects of the valerate byproduct are not totally clear, but some research shows there may be some potential health benefits such as improving insomnia and helping the gut microbiome, but this is not well established.) This estrogen is available in the US in a birth control pill combined with the progestin dienogest, under the brand name Natazia. It is also available in injectable form with an FDA-approved product for menopausal hormone therapy. Another similar injectable estrogen, estradiol cypionate, is an FDA approved product for hot flashes as well.

