



Menopause

How is menopause defined? Menopause is formally defined as the time of the last menstrual period in a woman who has not had a hysterectomy. Thus it is usually diagnosed some time after it has actually occurred.

As periods can be irregular in women approaching the menopause, menopause can only be diagnosed with certainty 12 months *after* the last menstrual period.

The young ovary consists of incompletely developed eggs (germ cells) surrounded by specialised hormone producing cells which form a supportive structure. The cells which produce oestrogen encase the developing eggs in multiple little nests. These cells are called **follicular cells** and the nests of the developing eggs are known as **follicles**. Menopause occurs when there is extensive deterioration of these important follicular cells and the immature eggs (ova) within. Thus the necessary sex hormones can no longer be produced and fertilisable eggs can no longer develop. Blood levels of the hormones oestrogen and progesterone fall and women at this time may experience symptoms of oestrogen insufficiency.

Loss of ova (eggs) with age:

Before birth the ovaries of a healthy 20 week old fetus contain approximately 7.5 million immature eggs (ova). By birth this number has fallen to two million and by puberty only about 300 000 remain. It is not understood why so many ova are necessary in the first place, or what determines their loss. We know that when the number of healthy ova reaches 25 000, usually at about thirty–seven years of age, the rate of loss accelerates culminating in menopause at the average age of 51.5 years. When the rate at which the ova disappear is accelerated earlier, menopause occurs earlier.

Hormones changes as menopause approaches:

During the fertile years the ovaries produce **sex hormones**. A hormone is a chemical messenger that is transported through the body in the bloodstream to act elsewhere. Oestrogen, progesterone and testosterone are the main sex hormones or chemical messengers produced by the ovaries.

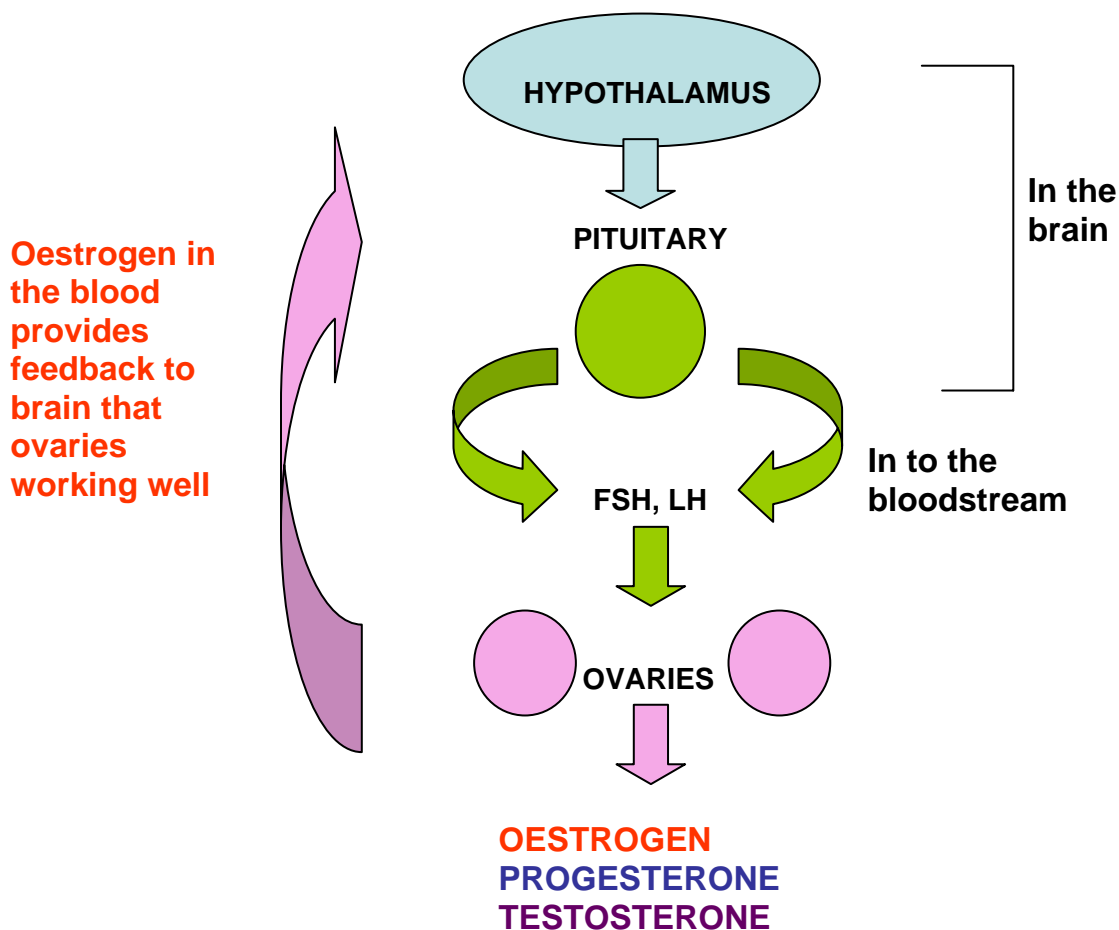
Parts of the body where oestrogen has important actions include

- BRAIN
- HEART and BLOOD VESSELS
- BONE
- BREAST
- UTERUS
- VAGINA
- SKIN
- FAT

- URINARY TRACT
- BOWEL
- LIVER

Communication between the brain and the ovaries

Normally, the function of the ovaries is directed by the **pituitary gland**, which is situated in the middle of the brain, which sends hormonal signals to the ovaries. The pituitary gland in turn is controlled by the region of the brain called the **hypothalamus**. The hypothalamus acts as the master control box for reproductive function. The pituitary produces the hormones FSH (follicle stimulating hormone) and LH (luteinising hormone) which act on the ovaries to stimulate the development of a mature egg every 28 days. The release of the mature egg from the ovary by this process is called **ovulation**.





When the health of the hormone producing cells of the ovaries (the follicular cells) deteriorates, oestrogen levels fall and this change is detected by both the hypothalamus and the pituitary gland. The pituitary gland responds by producing greater amounts of both FSH and LH in an attempt to switch the ovaries back on.

Therefore as menopause approaches blood levels of FSH and LH rise. Oestradiol levels may fluctuate and progesterone levels also vary considerably.

The greatest predictor of the age at which a woman will experience menopause is the age at which her mother went through menopause

Surgical menopause: Women who have had their ovaries surgically removed also have the same increases in FSH and LH because they are no longer able to produce sufficient oestrogen and the pituitary produces more FSH and LH to stimulate the ovaries even though they are no longer there.

Menopausal Symptoms:

Because of the hormone fluctuations leading up to and around the time of menopause, women may experience intermittent symptoms ranging from hot flushes and night sweats when oestrogen levels fall through to breast tenderness and swelling and heavy or irregular bleeding when oestrogen levels rise.

Commonly reported menopausal symptoms include:

- **hot flushes**
- **night sweats**
- **crawling sensations on skin**
- **anxiety**
- **irritability**
- **sleep disturbances**
- **lessened memory**
- **lessened concentration**
- **vaginal dryness**
- **fatigue**
- **muscle/joint pains**
- **overall diminished wellbeing**

Women may experience none of these symptoms, or several.

Symptoms of menopausal hormonal changes may start several years before menopause, even whilst regular periods are occurring due to the changing hormone levels. Symptoms may last for MANY years in some women

There is no cut-off age at which menopausal symptoms begin or end.



Why does menopause occur at all?

There is a decline in fertility with ageing in female primates (apes), however menopause, or the total end to reproductive capacity in the middle of life, is virtually unique to human females.

Evolutionary biologists believe menopause developed at a very early stage in human evolution, probably as long as 1.5 million years ago. This is most likely as a result of natural selection, such that women survived longer if they became infertile during mid adulthood.

Human infants are totally helpless for the first few months of life and then continue on to many years of childhood dependence. Thus in early human evolution, females who lost their fertility at an earlier stage were not only protected from the increasing health risks of additional pregnancies, nutritional deficiencies, exhaustion and risk of maternal death, but were able to fully devote themselves to nurturing and protecting their highly dependent offspring.

In the past menopause is believed to have occurred much earlier than today, probably as early as thirty–five to forty years. Over thousands of years of evolution menopause has gradually occurred later in female adult life in the context of increasing human life expectancy.