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**OESTROGEN**

**oestrogen**, is the primary female [sex hormone](https://en.m.wikipedia.org/wiki/Sex_steroid). It is responsible for the

development and regulation of the female [reproductive system](https://en.m.wikipedia.org/wiki/Reproductive_system) and [secondary sex characteristics](https://en.m.wikipedia.org/wiki/Secondary_sex_characteristic). There are three major [endogenous](https://en.m.wikipedia.org/wiki/Endogeny_(biology)) estrogens in females that have estrogenic hormonal activity: [estrone](https://en.m.wikipedia.org/wiki/Estrone" \o "Estrone), [estradiol](https://en.m.wikipedia.org/wiki/Estradiol" \o "Estradiol), and [estriol](https://en.m.wikipedia.org/wiki/Estriol" \o "Estriol). The [estrane](https://en.m.wikipedia.org/wiki/Estrane" \o "Estrane) [steroid](https://en.m.wikipedia.org/wiki/Steroid) [estradiol](https://en.m.wikipedia.org/wiki/Estradiol" \o "Estradiol) is the most potent and prevalent of these.

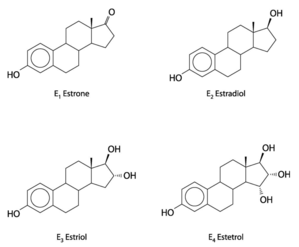
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| [*Drug class*](https://en.m.wikipedia.org/wiki/Drug_class) | |
| [Estradiol](https://en.m.wikipedia.org/wiki/Estradiol), the major estrogen sex hormone in humans and a widely used medication. | |
| **Class identifiers** | |
| **Use** | [Contraception](https://en.m.wikipedia.org/wiki/Hormonal_contraception), [Menopause](https://en.m.wikipedia.org/wiki/Menopause), [hypogonadism](https://en.m.wikipedia.org/wiki/Hypogonadism), [transgender women](https://en.m.wikipedia.org/wiki/Transgender_women), [prostate cancer](https://en.m.wikipedia.org/wiki/Prostate_cancer), [breast cancer](https://en.m.wikipedia.org/wiki/Breast_cancer), others |
| [**ATC code**](https://en.m.wikipedia.org/wiki/Anatomical_Therapeutic_Chemical_Classification_System) | [G03C](https://en.m.wikipedia.org/wiki/ATC_code_G03C) |
| [**Biological target**](https://en.m.wikipedia.org/wiki/Biological_target) | [Estrogen receptors](https://en.m.wikipedia.org/wiki/Estrogen_receptor) ([ERα](https://en.m.wikipedia.org/wiki/ER%CE%B1), [ERβ](https://en.m.wikipedia.org/wiki/ER%CE%B2), [mERs](https://en.m.wikipedia.org/wiki/Membrane_estrogen_receptor" \o "Membrane estrogen receptor) (e.g., [GPER](https://en.m.wikipedia.org/wiki/GPER), others)) |
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Estrogens are synthesized in all vertebrates[[1]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid7083198-1) as well as some insects.[[2]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-Mechoulam_2005-2) Their presence in both vertebrates and insects suggests that estrogenic sex hormones have an ancient evolutionary history. The three major naturally occurring forms of estrogen in women are [estrone](https://en.m.wikipedia.org/wiki/Estrone" \o "Estrone) (E1), [estradiol](https://en.m.wikipedia.org/wiki/Estradiol" \o "Estradiol) (E2), and [estriol](https://en.m.wikipedia.org/wiki/Estriol" \o "Estriol) (E3). Another type of estrogen called [estetrol](https://en.m.wikipedia.org/wiki/Estetrol" \o "Estetrol) (E4) is produced only during pregnancy. Quantitatively, estrogens circulate at lower levels than androgens in both men and women.[[3]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-Burger2002-3) While estrogen levels are significantly lower in males compared to females, estrogens nevertheless also have important physiological roles in males.[[4]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid11403894-4)

Like all [steroid hormones](https://en.m.wikipedia.org/wiki/Steroid_hormone), estrogens readily [diffuse](https://en.m.wikipedia.org/wiki/Diffusion) across the [cell membrane](https://en.m.wikipedia.org/wiki/Cell_membrane). Once inside the cell, they bind to and activate [estrogen receptors](https://en.m.wikipedia.org/wiki/Estrogen_receptor" \o "Estrogen receptor) (ERs) which in turn [modulate](https://en.m.wikipedia.org/wiki/Regulation_of_gene_expression) the [expression](https://en.m.wikipedia.org/wiki/Gene_expression) of many [genes](https://en.m.wikipedia.org/wiki/Gene).[[5]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-isbn978-1-85996-252-7-5) Additionally, estrogens bind to and activate rapid-signaling [membrane estrogen receptors](https://en.m.wikipedia.org/wiki/Membrane_estrogen_receptor) (mERs),[[6]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid23756388-6)[[7]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid22538318-7) such as [GPER](https://en.m.wikipedia.org/wiki/GPER) (GPR30).[[8]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid17222505-8)

In addition to their role as natural hormones, estrogens are used as [medications](https://en.m.wikipedia.org/wiki/Medication), for instance in [menopausal hormone therapy](https://en.m.wikipedia.org/wiki/Menopausal_hormone_therapy) and [hormonal birth control](https://en.m.wikipedia.org/wiki/Hormonal_birth_control).

TYPES AND EXAMPLES

[](https://en.m.wikipedia.org/wiki/File:Chemical_structures_of_major_endogenous_estrogens.png)

[Chemical structures](https://en.m.wikipedia.org/wiki/Chemical_structure) of major [endogenous](https://en.m.wikipedia.org/wiki/Endogenous) estrogens, including [estrone](https://en.m.wikipedia.org/wiki/Estrone" \o "Estrone) (E1), [estradiol](https://en.m.wikipedia.org/wiki/Estradiol" \o "Estradiol) (E2), [estriol](https://en.m.wikipedia.org/wiki/Estriol" \o "Estriol) (E3), and [estetrol](https://en.m.wikipedia.org/wiki/Estetrol" \o "Estetrol) (E4).[[9]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid18464023-9)

The four major naturally occurring estrogens in women are [estrone](https://en.m.wikipedia.org/wiki/Estrone" \o "Estrone) (E1), [estradiol](https://en.m.wikipedia.org/wiki/Estradiol" \o "Estradiol) (E2), [estriol](https://en.m.wikipedia.org/wiki/Estriol" \o "Estriol) (E3), and [estetrol](https://en.m.wikipedia.org/wiki/Estetrol" \o "Estetrol) (E4). Estradiol is the predominant estrogen during reproductive years both in terms of absolute serum levels as well as in terms of estrogenic activity. During [menopause](https://en.m.wikipedia.org/wiki/Menopause), estrone is the predominant circulating estrogen and during pregnancy estriol is the predominant circulating estrogen in terms of serum levels. Given by [subcutaneous injection](https://en.m.wikipedia.org/wiki/Subcutaneous_injection) in mice, estradiol is about 10-fold more potent than estrone and about 100-fold more potent than estriol.[[10]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-Labhart2012-10) Thus, estradiol is the most important estrogen in non-pregnant females who are between the [menarche](https://en.m.wikipedia.org/wiki/Menarche) and menopause stages of life. However, during [pregnancy](https://en.m.wikipedia.org/wiki/Pregnancy) this role shifts to estriol, and in postmenopausal women estrone becomes the primary form of estrogen in the body. Another type of estrogen called [estetrol](https://en.m.wikipedia.org/wiki/Estetrol" \o "Estetrol) (E4) is produced only during pregnancy. All of the different forms of estrogen are synthesized from [androgens](https://en.m.wikipedia.org/wiki/Androgen), specifically [testosterone](https://en.m.wikipedia.org/wiki/Testosterone) and [androstenedione](https://en.m.wikipedia.org/wiki/Androstenedione), by the [enzyme](https://en.m.wikipedia.org/wiki/Enzyme) [aromatase](https://en.m.wikipedia.org/wiki/Aromatase).

Minor endogenous estrogens, the biosyntheses of which do not involve [aromatase](https://en.m.wikipedia.org/wiki/Aromatase), include [27-hydroxycholesterol](https://en.m.wikipedia.org/wiki/27-hydroxycholesterol), [dehydroepiandrosterone](https://en.m.wikipedia.org/wiki/Dehydroepiandrosterone) (DHEA), [7-oxo-DHEA](https://en.m.wikipedia.org/wiki/7-oxo-DHEA), [7α-hydroxy-DHEA](https://en.m.wikipedia.org/wiki/7%CE%B1-hydroxy-DHEA), [16α-hydroxy-DHEA](https://en.m.wikipedia.org/wiki/16%CE%B1-hydroxy-DHEA), [7β-hydroxyepiandrosterone](https://en.m.wikipedia.org/wiki/7%CE%B2-hydroxyepiandrosterone), [androstenedione](https://en.m.wikipedia.org/wiki/Androstenedione) (A4), [androstenediol](https://en.m.wikipedia.org/wiki/Androstenediol) (A5), [3α-androstanediol](https://en.m.wikipedia.org/wiki/3%CE%B1-androstanediol), and [3β-androstanediol](https://en.m.wikipedia.org/wiki/3%CE%B2-androstanediol).[[11]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid23313336-11)[[12]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid23123738-12) Some estrogen metabolites, such as the [catechol estrogens](https://en.m.wikipedia.org/wiki/Catechol_estrogen) [2-hydroxyestradiol](https://en.m.wikipedia.org/wiki/2-hydroxyestradiol), [2-hydroxyestrone](https://en.m.wikipedia.org/wiki/2-hydroxyestrone), [4-hydroxyestradiol](https://en.m.wikipedia.org/wiki/4-hydroxyestradiol), and [4-hydroxyestrone](https://en.m.wikipedia.org/wiki/4-hydroxyestrone), as well as [16α-hydroxyestrone](https://en.m.wikipedia.org/wiki/16%CE%B1-hydroxyestrone), are also estrogens with varying degrees of activity.[[13]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid10865186-13) The biological importance of these minor estrogens is not entirely clear.

## Biological function[Edit](https://en.m.wikipedia.org/w/index.php?title=Estrogen&action=edit&section=2)

[Reference ranges for the blood content](https://en.m.wikipedia.org/wiki/Reference_ranges_for_blood_tests) of estradiol, the primary type of estrogen, during the [menstrual cycle](https://en.m.wikipedia.org/wiki/Menstrual_cycle).[[14]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-H%C3%A4ggstr%C3%B6m2014-14)

The actions of estrogen are mediated by the [estrogen receptor](https://en.m.wikipedia.org/wiki/Estrogen_receptor" \o "Estrogen receptor) (ER), a dimeric nuclear protein that binds to DNA and controls gene expression. Like other steroid hormones, estrogen enters passively into the cell where it binds to and activates the estrogen receptor. The estrogen:ER complex binds to specific DNA sequences called a [hormone response element](https://en.m.wikipedia.org/wiki/Hormone_response_element) to activate the transcription of target genes (in a study using an estrogen-dependent breast cancer cell line as model, 89 such genes were identified Since estrogen enters all cells, its actions are dependent on the presence of the ER in the cell. The ER is expressed in specific tissues including the ovary, uterus and breast. The metabolic effects of estrogen in postmenopausal women has been linked to the genetic polymorphism of the ER

While estrogens are present in both [men](https://en.m.wikipedia.org/wiki/Man) and [women](https://en.m.wikipedia.org/wiki/Woman), they are usually present at significantly higher levels in women of reproductive age. They promote the development of female [secondary sexual characteristics](https://en.m.wikipedia.org/wiki/Secondary_sexual_characteristic), such as [breasts](https://en.m.wikipedia.org/wiki/Breasts), and are also involved in the thickening of the [endometrium](https://en.m.wikipedia.org/wiki/Endometrium) and other aspects of regulating the menstrual cycle. In males, estrogen regulates certain functions of the [reproductive system](https://en.m.wikipedia.org/wiki/Reproductive_system) important to the maturation of [sperm](https://en.m.wikipedia.org/wiki/Sperm)[[17]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-titleScience_News_Online_(12/6/97):_Estrogens_Emerging_Manly_Alter_Ego-17)[[18]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid9393999-18)[[19]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-Science_Blog-19) and may be necessary for a healthy [libido](https://en.m.wikipedia.org/wiki/Libido)

### Overview of actions

* Structural
  + Mediate formation of female [secondary sex characteristics](https://en.m.wikipedia.org/wiki/Secondary_sex_characteristics)
  + Accelerate [metabolism](https://en.m.wikipedia.org/wiki/Metabolism)
  + Increase fat store
  + Stimulate [endometrial](https://en.m.wikipedia.org/wiki/Endometrium) growth
  + Increase [uterine](https://en.m.wikipedia.org/wiki/Uterus) growth
  + Increase [vaginal lubrication](https://en.m.wikipedia.org/wiki/Vaginal_lubrication)
  + Thicken the [vaginal](https://en.m.wikipedia.org/wiki/Vagina) wall
  + Maintenance of vessel and skin
  + Reduce [bone resorption](https://en.m.wikipedia.org/wiki/Bone_resorption), increase bone formation
* [Protein](https://en.m.wikipedia.org/wiki/Protein) synthesis
  + Increase [hepatic production](https://en.m.wikipedia.org/wiki/Hepatic_production) of [binding proteins](https://en.m.wikipedia.org/wiki/Binding_protein)
* [Coagulation](https://en.m.wikipedia.org/wiki/Coagulation)
  + Increase circulating level of [factors](https://en.m.wikipedia.org/wiki/Coagulation_factor) [2](https://en.m.wikipedia.org/wiki/Factor_II), [7](https://en.m.wikipedia.org/wiki/Factor_VII), [9](https://en.m.wikipedia.org/wiki/Factor_IX), [10](https://en.m.wikipedia.org/wiki/Factor_X), [plasminogen](https://en.m.wikipedia.org/wiki/Plasminogen)
  + Decrease [antithrombin](https://en.m.wikipedia.org/wiki/Antithrombin" \o "Antithrombin) III
  + Increase [platelet](https://en.m.wikipedia.org/wiki/Platelet) adhesiveness
  + Increase vWF (estrogen -> Angiotensin II -> Vasopressin)
  + Increase PAI-1 and PAI-2 also through Angiotensin II
* [Lipid](https://en.m.wikipedia.org/wiki/Lipid)
  + Increase [HDL](https://en.m.wikipedia.org/wiki/High_density_lipoprotein), [triglyceride](https://en.m.wikipedia.org/wiki/Triglyceride)
  + Decrease [LDL](https://en.m.wikipedia.org/wiki/Low_density_lipoprotein), fat deposition
* Fluid balance
  + Salt ([sodium](https://en.m.wikipedia.org/wiki/Sodium_in_biology)) and water retention
  + Increase [cortisol](https://en.m.wikipedia.org/wiki/Cortisol), [SHBG](https://en.m.wikipedia.org/wiki/SHBG)
* [Gastrointestinal tract](https://en.m.wikipedia.org/wiki/Gastrointestinal_tract)
  + Reduce bowel motility
  + Increase [cholesterol](https://en.m.wikipedia.org/wiki/Cholesterol) in [bile](https://en.m.wikipedia.org/wiki/Bile)
* [Melanin](https://en.m.wikipedia.org/wiki/Melanin)
  + Increase [pheomelanin](https://en.m.wikipedia.org/wiki/Pheomelanin" \o "Pheomelanin), reduce [eumelanin](https://en.m.wikipedia.org/wiki/Eumelanin)
* Cancer
  + Support hormone-sensitive breast cancers (see section below)
* [Lung function](https://en.m.wikipedia.org/wiki/Lung_function)
  + Promotes lung function by supporting [alveoli](https://en.m.wikipedia.org/wiki/Pulmonary_alveolus) (in rodents but probably in humans).[[21]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid15298854-21)
* [Uterus](https://en.m.wikipedia.org/wiki/Uterus) lining
  + Estrogen together with [progesterone](https://en.m.wikipedia.org/wiki/Progesterone) promotes and maintains the uterus lining in preparation for implantation of fertilized egg and maintenance of uterus function during gestation period, also upregulates [oxytocin](https://en.m.wikipedia.org/wiki/Oxytocin) receptor in myometrium
* [Ovulation](https://en.m.wikipedia.org/wiki/Ovulation)
  + Surge in estrogen level induces the release of [luteinizing hormone](https://en.m.wikipedia.org/wiki/Luteinizing_hormone), which then triggers ovulation by releasing the egg from the [Graafian follicle](https://en.m.wikipedia.org/wiki/Graafian_follicle" \o "Graafian follicle) in the [ovary](https://en.m.wikipedia.org/wiki/Ovary).
* [Sexual behavior](https://en.m.wikipedia.org/wiki/Sexual_behavior)
  + Promotes [sexual receptivity](https://en.m.wikipedia.org/wiki/Sexual_receptivity) in [estrus](https://en.m.wikipedia.org/wiki/Estrous_cycle" \o "Estrous cycle),[[22]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid22131419-22) and induces [lordosis behavior](https://en.m.wikipedia.org/wiki/Lordosis_behavior).[[23]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid21851428-23) In non-human mammals, it also induces [estrus](https://en.m.wikipedia.org/wiki/Estrous_cycle" \o "Estrous cycle) (in heat) prior to ovulation, which also induces [lordosis behavior](https://en.m.wikipedia.org/wiki/Lordosis_behavior). Female non-human mammals are not sexually receptive without the estrogen surge, i.e., they have no mating desire when not in [estrus](https://en.m.wikipedia.org/wiki/Estrous_cycle" \o "Estrous cycle).
  + Regulates the stereotypical sexual receptivity behavior; this lordosis behavior is estrogen-dependent, which is regulated by the [ventromedial nucleus](https://en.m.wikipedia.org/wiki/Ventromedial_nucleus) of the [hypothalamus](https://en.m.wikipedia.org/wiki/Hypothalamus).[[24]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid9638959-24)
  + [Sex drive](https://en.m.wikipedia.org/wiki/Sex_drive) is dependent on [androgen](https://en.m.wikipedia.org/wiki/Androgen) levels[[25]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid16037752-25) only in the presence of estrogen, but without estrogen, free testosterone level actually decreases sexual desire (instead of increases sex drive), as demonstrated for those women who have [hypoactive sexual desire disorder](https://en.m.wikipedia.org/wiki/Hypoactive_sexual_desire_disorder), and the sexual desire in these women can be restored by administration of estrogen (using oral contraceptive).[[26]](https://en.m.wikipedia.org/wiki/Estrogen#cite_note-pmid21514299-26) In non-human mammals, mating desire is triggered by estrogen surge in [estrus](https://en.m.wikipedia.org/wiki/Estrous_cycle" \o "Estrous cycle)

ANTIFERTILITY DRUGS

[Antifertility agents](https://www.sciencedirect.com/topics/medicine-and-dentistry/contraceptive-agent) are drugs that control fertility[1](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib1) and are also called [oral contraceptives](https://www.sciencedirect.com/topics/medicine-and-dentistry/oral-contraceptive-agent). These drugs affect and are involved in the [menstrual cycle](https://www.sciencedirect.com/topics/medicine-and-dentistry/menstrual-cycle) and ovulation in females. Estrogen and [progesterone](https://www.sciencedirect.com/topics/medicine-and-dentistry/progesterone) in combined form are given as birth control pills. The [antifertility](https://www.sciencedirect.com/topics/medicine-and-dentistry/contraception) substance is deemed to be active in females when it prevents fertilization, prevents ovulation, implantation, and destroys the [zygote](https://www.sciencedirect.com/topics/medicine-and-dentistry/zygote) or causes abortion. In males, it prevents [spermatogenesis](https://www.sciencedirect.com/topics/medicine-and-dentistry/spermiogenesis), inhibits [testosterone](https://www.sciencedirect.com/topics/medicine-and-dentistry/testosterone), or affects the [gonadotrophin](https://www.sciencedirect.com/topics/medicine-and-dentistry/gonadotropin" \o "Learn more about Gonadotropin from ScienceDirect's AI-generated Topic Pages) of the organs or the mortality of sperm. Currently, population size is being controlled in many developing countries.[2](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib2) [Oxyphenbutazone](https://www.sciencedirect.com/topics/medicine-and-dentistry/oxyphenbutazone" \o "Learn more about Oxyphenbutazone from ScienceDirect's AI-generated Topic Pages), [indomethacin](https://www.sciencedirect.com/topics/medicine-and-dentistry/indometacin), and [acetyl salicylic acid](https://www.sciencedirect.com/topics/medicine-and-dentistry/acetylsalicylic-acid) inhibit [prostaglandin](https://www.sciencedirect.com/topics/medicine-and-dentistry/prostaglandin) formation and manifest antifertility activities in albino male and female rabbits. The reproductive process is affected by indomethacin and oxyphenbutazone in male rabbits. Significant antiovulatory activity was exhibited by acetyl salicylic acid 300 mg/kg and indomethacin 3 mg/kg in the rabbits. Additionally, indomethacin exhibited anti-implantation activity. This shows that reproduction in female animals is affected by nonsteroidal anti-inflammatory drugs.[3](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib3) Antifertility activity in [antimalarial drugs](https://www.sciencedirect.com/topics/medicine-and-dentistry/antimalarial-agent) has been observed, because [amodiaquine](https://www.sciencedirect.com/topics/medicine-and-dentistry/amodiaquine" \o "Learn more about Amodiaquine from ScienceDirect's AI-generated Topic Pages) [blocks ovulation](https://www.sciencedirect.com/topics/medicine-and-dentistry/ovulation-inhibition) and disrupts the oestrous cycle.[4](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib4) It has also been observed that many plants may have spermicidal activity. Medicinal plants are a great [gift](https://www.sciencedirect.com/topics/medicine-and-dentistry/gamete-intrafallopian-transfer) of nature as a cure-all for a plethora of human problems. Various institutes in South Asia have long-established traditions of cultivating the faculties of the younger generation in the emerging field of science and technology. Currently, many scientists in that region have an ongoing mandate to educate and train the younger generation to facilitate future innovation and advancement in the field, while also working with venture capital elements and the corporate sector at the same time to optimize their research opportunities. It goes without saying that modern scientific investigation has proven the medicinal value of medicinal plants. Herbal medicines and their derivatives have been incorporated into traditional medicine virtually since the beginning of recorded history. But it is only in recent times that the broader use of medicinal plants is beginning to garner acceptance in the more expansive international domain. There are certain bottlenecks in the process, including but not limited to the lack of quality control and toxicological studies, the imperative to increase product shelf life, and compliance with international regulatory standards that need to be overcome before their full market potential can be realized. Various medicinal plants have antifertility activities  The Unani system of medicine is an indigenous treatment, very prevalent in South Asia and popular among large populations in India, Pakistan, Bangladesh, and Sri Lanka. More specifically, the extent of fertility in females and males are also being controlled by vaccines. The active mechanism in such a vaccine is typically the production of antibodies against [human chorionic gonadotropin](https://www.sciencedirect.com/topics/medicine-and-dentistry/chorionic-gonadotropin), though this vaccine causes sterility in male animals.[5](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib5) Additionally, the progression of spermatogenesis is suppressed in males by antifertility drugs. At this time, various drugs such as [triptolide](https://www.sciencedirect.com/topics/medicine-and-dentistry/triptolide" \o "Learn more about Triptolide from ScienceDirect's AI-generated Topic Pages), [tamoxifen](https://www.sciencedirect.com/topics/medicine-and-dentistry/tamoxifen), [gossypol](https://www.sciencedirect.com/topics/medicine-and-dentistry/gossypol), and testosterone are being used as antifertility agents.[6](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib6) Clinicians working in Europe, North America, and other industrialized countries are taking an interest in research dealing with [ethnopharmacology](https://www.sciencedirect.com/topics/medicine-and-dentistry/ethnopharmacology" \o "Learn more about Ethnopharmacology from ScienceDirect's AI-generated Topic Pages). Some of the medicinal plants discussed appear promising and may possibly lead to the development of products equally as effective as their corresponding existing drug. Furthermore, in an allopathic system, an effective [abortifacient](https://www.sciencedirect.com/topics/medicine-and-dentistry/abortifacient) (misprostol) can be administered orally or sublingually, and is extremely cheap but does have side effects. Consequently, due to existing side effects of [allopathic medicines](https://www.sciencedirect.com/topics/medicine-and-dentistry/allopathic-medicine), people are afraid of using these medicines. A review of the literature indicated the potential benefits of the use of a number of [plants/preparations](https://www.sciencedirect.com/topics/medicine-and-dentistry/plant-medicinal-product) for fertility regulation. Some local contraceptive agents have also been described in traditional medicine. An attempt has been made to document medicinal plants that are usually prescribed as antifertility agents or have been tested for their activity in vitro or in vivo.

## 2. Methodology

A bibliographic investigation was carried out by analyzing classical text and reference books, articles, and peer-reviewed papers, as well as a thorough consultation of worldwide accepted scientific databases. We performed CENTRAL, Embase, and PubMed searches using terms such as “antifertility”, “anti-implantation”, “antiovulation”, and “antispermatogenic” activity of plants.

## 3. Medicinal plants used as antifertility agents

### 3.1. Antiovulation activity

Polygonum hydropiper Linn belongs to the family Polygonaceae, which is in part valued for its roots and leaves and includes such active ingredients as [formic acid](https://www.sciencedirect.com/topics/medicine-and-dentistry/formic-acid), [acetic acid](https://www.sciencedirect.com/topics/medicine-and-dentistry/acetic-acid), beldianic acid, [tannin](https://www.sciencedirect.com/topics/medicine-and-dentistry/tannin), essential oil, and oxymethyl-anthraquinones. It is used in cases involving diarrhea, skin problems, [hemorrhoids](https://www.sciencedirect.com/topics/medicine-and-dentistry/hemorrhoid" \o "Learn more about Hemorrhoid from ScienceDirect's AI-generated Topic Pages), and dyspepsia. Biologically, these ingredients can have antioxidant, [antimicrobial](https://www.sciencedirect.com/topics/medicine-and-dentistry/antiinfective-agent), anti-inflammatory, and [antifertility](https://www.sciencedirect.com/topics/medicine-and-dentistry/contraception) effects in humans. In one study, Kapoor et al[7](https://www.sciencedirect.com/science/article/pii/S1726490115000647" \l "bib7) have reported on the antiovulatory activity in this plant. Their study using three types of extracts (petroleum, aqueous, and alcohol) was conducted to investigate the antifertility activity of this particular plant. Antifertility activity was observed in rabbits with copper-induced ovulation. [Petroleum ether](https://www.sciencedirect.com/topics/medicine-and-dentistry/petroleum-ether) extract of the roots of Polygonum hydropiper was found effective in inhibiting ovulation in 60% of the animals. Additionally, ≤ 40% inhibition was observed by all other extracts.