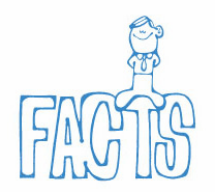
Understanding Your Fertility

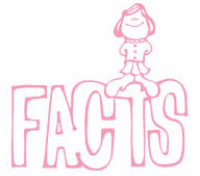
Fertility is a precious gift which enables couples to have children
and enjoy the blessings of family life.
However, not all couples are equally blessed with this gift.
Many are very fertile and conceive easily,
some conceive with difficulty,
while others wonder if they will ever conceive at all.

These pages give a simple explanation of how male and female fertility work and complement each other, enabling couples to plan, space and limit family size, without using any invasive form of contraception.

A few "Fertility Facts" to think about:



A man is fertile all the time,
producing millions of sperm
at each act of intercourse



A woman, by contrast, usually produces
one egg per monthly cycle which can be fertilised
for about 12 hours

Sperm can live for 3 - 6 days before ovulation,
given good conditions

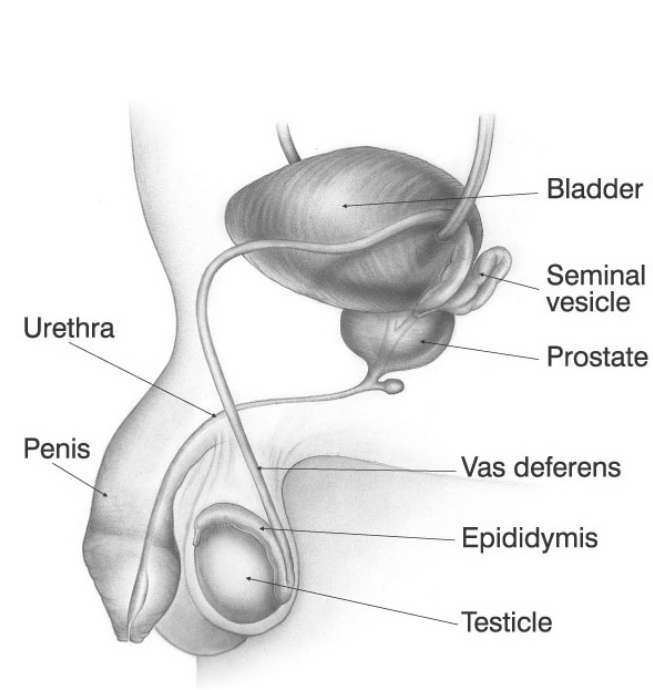
So conception can occur from intercourse up to 6 days before ovulation.
Allowing a further 3 days for the release and life span of the egg,
the rest of the cycle is infertile.

Understanding the above facts helps you to see how precise the fertile window is in each cycle. This tutorial explains the natural signs and symptoms in a woman's cycle which show her when she is fertile and when she is not. It draws all these signs together to provide a means of family planning which is effective, yet has no health risks or side-effects. It is often called **Fertility Awareness,** or more commonly, **Natural Family Planning.**

After reading this tutorial, if you wish to learn more about charting your cycle, please down load the tutorial "HOW TO CHART CYCLES".

A simple view of male fertility

A man begins to produce sperm in early adolescence, and normally continues to do so throughout his entire life.



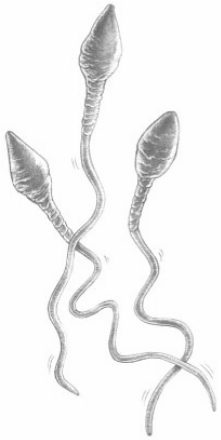
In this illustration we see a simplified view of a man's reproductive system. Inside each testicle is a metre of tubules where sperm are produced, at an estimated rate of a thousand per second.

Once produced, the sperm work their way along the tubules towards the epididymis in each testicle, where they are stored and matured. During intercourse they are propelled rapidly out along the vas deferens tubes, past the bladder and the seminal vesicles.

They enter the prostate gland, where they combine with fluids called "seminal fluid" before travelling along the urethra and out of the penis.

The total content of the ejaculation measures about 5 mls. (a teaspoonful), but it can contain between 1 - 400 million sperm.

Sperm Life—Key to Fertility



Sperm are visible only under a microscope and look like tadpoles.

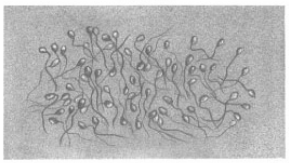
Sperm swim like tadpoles, by vigorous movement of their tails. Once ejaculated from the man, their life-span is affected by acid or alkaline conditions.

<u>In acid conditions</u> sperm clump together and are destroyed within minutes, maximum life a couple of hours. (Fig. A)
<u>In alkaline conditions</u> they thrive, swim vigorously and can live for several days. (Fig. B)

It is surprising to learn that a woman's vagina is acidic for much of her monthly cycle—*to fight bacteria.* There is only a short time leading up to ovulation when a unique secretion makes the vagina alkaline and able to support sperm life. These alkaline days are the only days when pregnancy is possible.

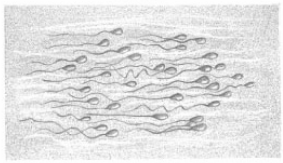
Once couples learn to recognise the acid and alkaline phases of the woman's cycle, they can plan their family naturally, simply by planning or avoiding intercourse in the **alkaline fertile phase** of the cycle.

Fig. A



acidic conditions destroy sperm

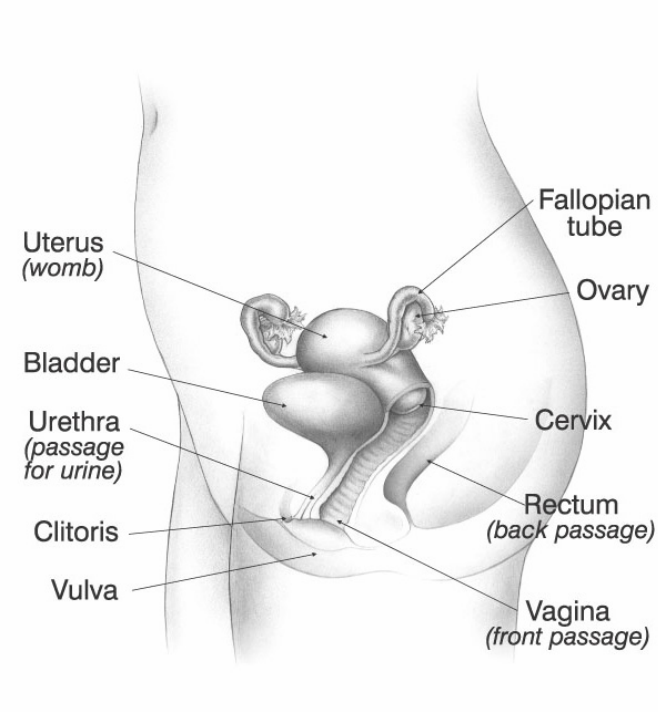
Fig. B



alkaline fertile mucus enhances sperm life and mobility

Understanding a woman's fertility

This simplified side view of the pelvic area shows the location of her reproductive system.



The outer vaginal area is called the vulva and three passages lead down to this area.

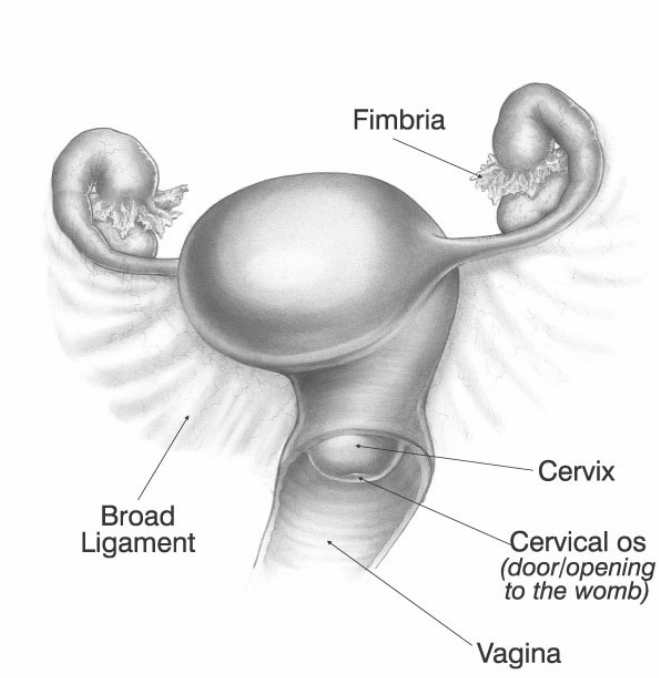
The first passage is **the urethra**, the urine duct which leads down from the bladder.

The back passage is **the rectum or bowel passage** which is the end of the intestines leading down from the stomach.

The middle passage is the **vagina** where intercourse occurs. Towards the top of the vagina is **the cervix** which acts as the door to the womb.

At the upper broad end of the womb are the **two fallopian tubes** which end in delicate fingers called fimbria. They caress the surface of each **ovary,** searching for a ripening follicle (egg sac), ready to receive the egg when it is released at ovulation.

Lower Illustration: Front view of the womb, isolated from the structures around it.



For fertilisation (conception) to take place, sperm have to swim from the vagina, through the cervix, up into the womb and along the tubes to unite with the egg in **the outer third of the fallopian tube.** But the journey is full of hazards.

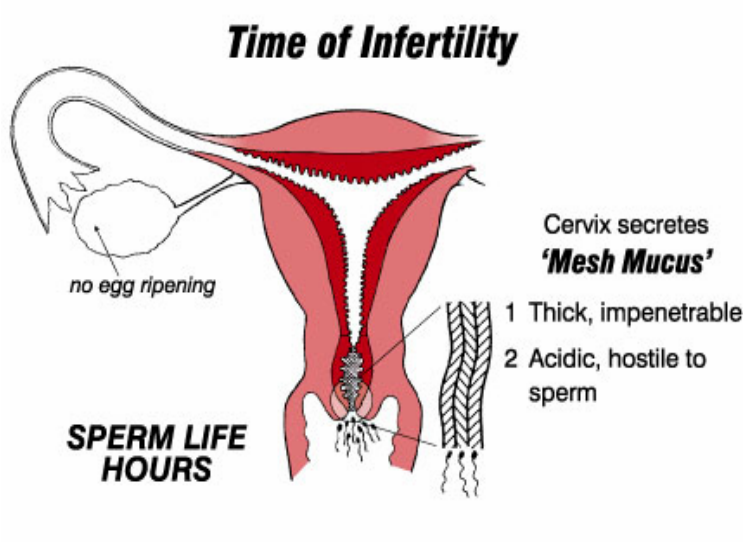
The first problem they meet is **vaginal acidity**, which exists for much of the monthly cycle and destroys sperm life.

The second hurdle is the cervical os, the door to the womb, which acts like a valve controlling the access of sperm. For much of the woman's monthly cycle, **it remains tightly closed and sealed**, blocking the access of sperm, confining them to the acid vagina where they are destroyed.

For a few days before ovulation, **the cervix opens wide and secretes an alkaline mucus** to entice the sperm upwards into the cervix so that they can travel up into the tubes to fertilise the egg on its release. This is the only time pregnancy is possible. This is explained more fully in the next two diagrams.

The role of the cervix

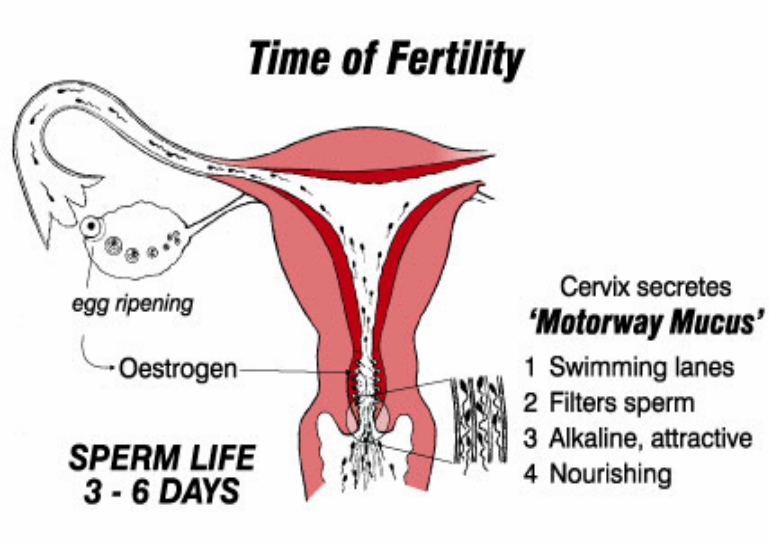
To understand the important role of the cervix, we need to see the womb in cross section.



When there is no egg ripening in the ovary, the doorway to the womb (*cervical os*) is pinched shut to keep sperm out.

In addition, the passage through the cervix (*cervical canal)* is blocked by a white sticky mucus, produced from glands inside the cervix. This mucus is highly acidic and has a mesh structure, like a fishing net, to trap and destroy sperm. In these conditions, **sperm cannot enter the cervix and their life expectancy in the vagina will be minutes, rather than hours.**

When this 'mesh mucus' is present, pregnancy cannot occur.



This illustration shows how everything changes once an egg is selected in the ovary. As the egg follicle ripens, it produces a hormone **oestrogen** which is the signal for the cervix to open.

The oestrogen also stimulates the glands in the cervix to disperse the mesh mucus and produce instead a wet slippery mucus with **swimming lanes** along which sperm can move easily, as if on a "motorway". This new mucus is **alkaline** and contains glucose and other nutrients vital to sperm survival. It appears for approx. 6 days before ovulation and then dries up quickly. **In this mucus, sperm can swim up into the cervix and survive for 3—6 days.**

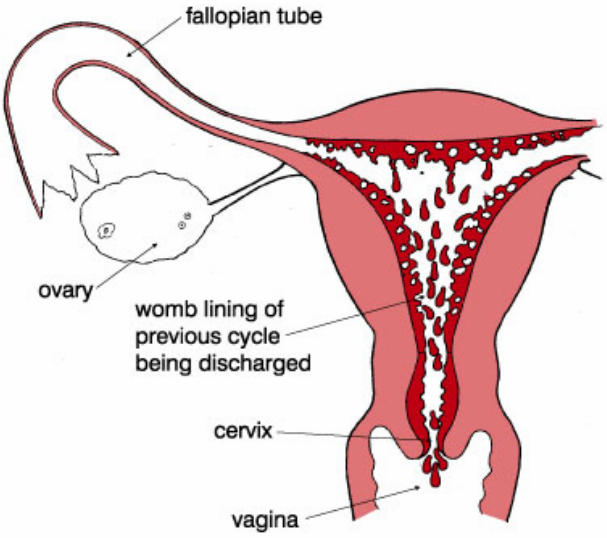
Pregnancy can occur only when this 'motorway mucus' is present

In Summary

The **"mesh" mucus** blocks the passage of sperm, preventing pregnancy from occurring.
The "motorway" mucus prolongs the life of sperm and enables them to swim through the cervix and womb and into the fallopian tubes, in search of the egg.
If couples learn to recognise these mucus changes, they can use the information to plan, space and limit their family size simply by observation and the appropriate timing of intercourse.

Understanding a Woman's Cycle

Menstruation



First day of period is Day 1 of a new cycle

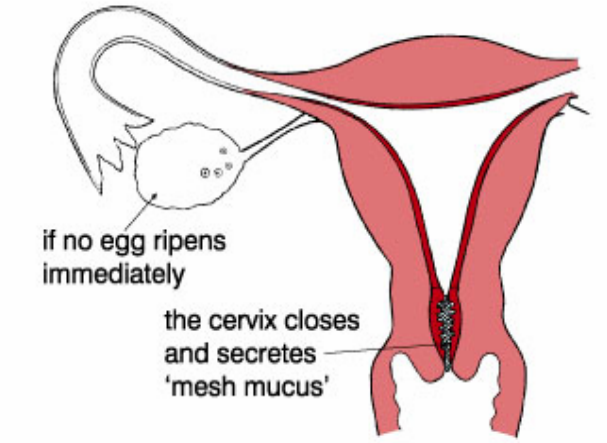
For Natural Family Planning purposes, the first day of the menstruation (period) is counted as **the first day of a new cycle.**

The period (*which lasts between 4–6 days usually*) is simply the unused lining of the previous cycle being washed away amid blood loss so that a new cycle can start.

It must be pointed out that not all "bleedings" are menstruations. For example, in the teen age years, or the pre-menopause years, or in stress situations, women can bleed erratically and mistakenly count some of these bleeds as their usual menstruation.

A true period is a bleeding which follows about 10 – 16 days after an ovulation.

After menstruation, variable infertility ...



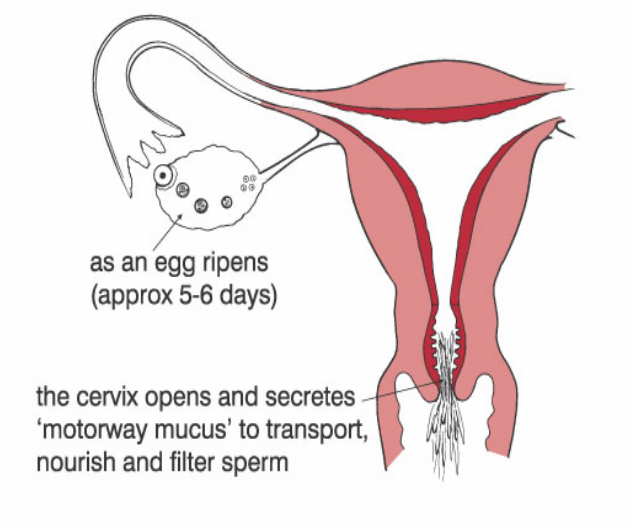
As the period draws to an end, if the egg for that cycle has not yet been chosen, the cervix is pinched shut and the thick sticky "mesh" mucus fills the cervix. The woman is then in an infertile phase of her cycle.

How long does this phase last? It varies from woman to woman, and even for the same woman at different stages in her life.

Women whose cycles are very regular, may find they have the same number of infertile days month after month, but other women will find variations. Some cycles will have fewer days, others more days. Some women with very short cycles may have none at all, but may go straight into the fertile phase.

Careful observation and instruction is needed in this phase of the cycle to accurately identify the genuinely infertile days at the start of a cycle.

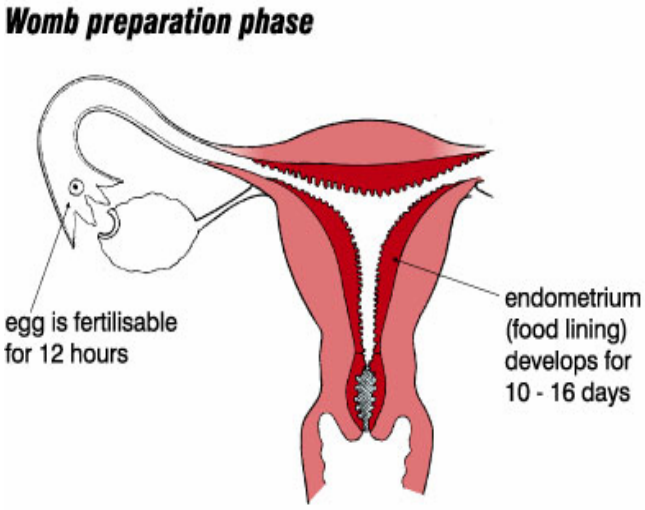
Onset of the fertile time



Eventually, at some point after the period, the egg for that cycle will be chosen and its follicle will grow very quickly in the ovary. In approximately six days, it will be ready to burst and shed its egg - ovulation.
(*This growth spurt can be seen very clearly with ultrasound.)*

As already explained, the cervix opens and changes the mesh mucus into "motorway" mucus, which is **alkaline** and rich in nutrients. **The woman is in the fertile phase of her cycle!**

Now sperm can enter the cervix and survive in little pockets in the walls (cervical crypts) for several days. They are primed and given the qualities they need to reach and fertilise the egg. At first, the "motorway" mucus looks cloudy and wet. Nearer ovulation, it becomes more clear, abundant, stretchy and slippery like raw egg-white.



The stage is now set for the high point of the cycle – ovulation!

To burst the follicle and release the egg, a new hormone called **Luteinising Hormone (LH)** is sent by the brain. (*Test kits for this hormone can be bought in pharmacies*).

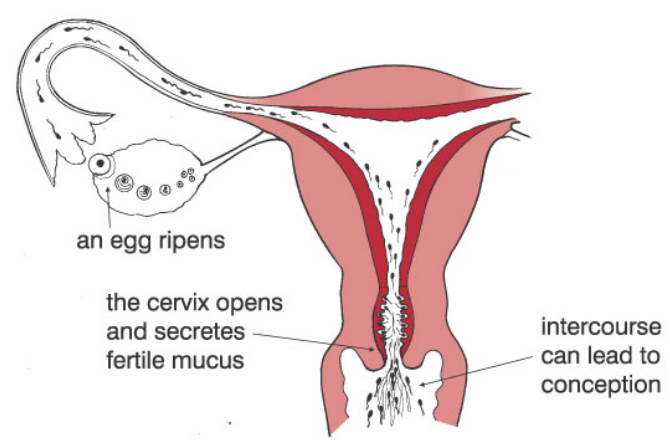
The released egg is sucked into the fallopian tubes and now remains fertilisable for about 12 hours.

The ruptured follicle is not wasted. Instead, it is re-cycled to become the **Corpus Luteum,** which produces the next hormone called **Progesterone** (*pregnancy hormone*).

Progesterone stops any further ovulations, thickens the mucus to seal the womb and builds up the womb lining (*endometrium***)** ready to receive and nourish the baby, if conceived. **Every cycle is the same up to this point.** Whether conception occurs or not will all depend on whether the couple had intercourse in the fertile phase of the cycle, when the motorway mucus was present. The next page shows a conception cycle.

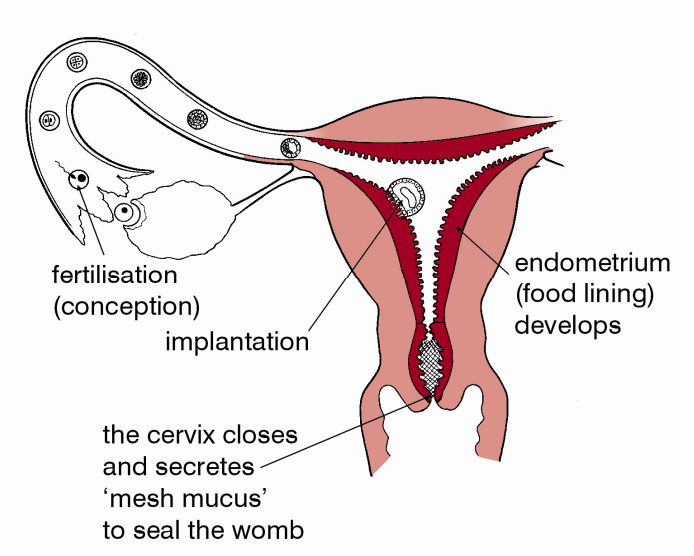
A Conception Cycle

Intercourse in the fertile phase



If a couple had intercourse in the egg ripening, fertile mucus phase of the cycle, the sperm will find perfect swimming conditions from the vagina into the open cervix, where they will be stored in the cervical crypts. They will be well fed, matured, primed and released upwards in regular convoys over the next few days to travel through the womb into the fallopian tubes in search of the egg.

Conception and Implantation



If a sperm penetrates the crust of the egg, then fertilisation (conception) is achieved: – **Day 1 of the new baby's life.**

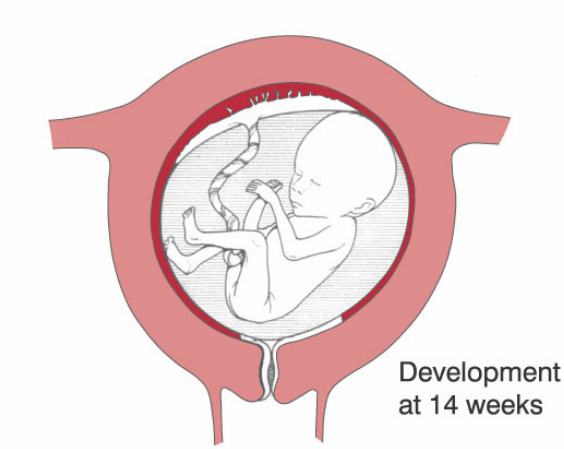
The baby's cells divide rapidly as it is propelled down the fallopian tube towards the waiting womb and its nutritious lining.

Within hours of ovulation, the fertile mucus begins to dry up and the mesh mucus returns to seal the womb.

By Day 8: the baby has implanted in its mother's womb and is sending messages to prevent menstruation.
By Day 17: the placenta is established; the baby's own blood cells have begun to develop.
By Day 20: the foundation for the entire nervous system is established.
Day 21: **the baby's heart starts to beat!**

The baby's rapid growth continues in its mother's womb, now cushioned by a fluid sac. The mesh mucus plug continues to function for nine months, sealing the womb and protecting the baby from infection. It is dislodged during at the onset of labour.

The unseen life of the baby



Day 30:
There is regular blood flow within a closed vascular system. The ears and nose start to develop.

Day 42:
The skeleton is now complete and reflexes are present. The liver, kidneys and lungs are formed.

Day 42:
Electrical brain wave patterns can be recorded.

Day 56:
All organs are functioning; growth and maturity are all that occur now, in the same way that a child grows into an adult.

Day 65:
The baby can make a fist and will grasp an object stroking the palm of its hand. It will also leap up and down in the womb with movements co-ordinated.

Week 16:
Baby is half its birth length, and its heart pumps fifty pints of blood a day.

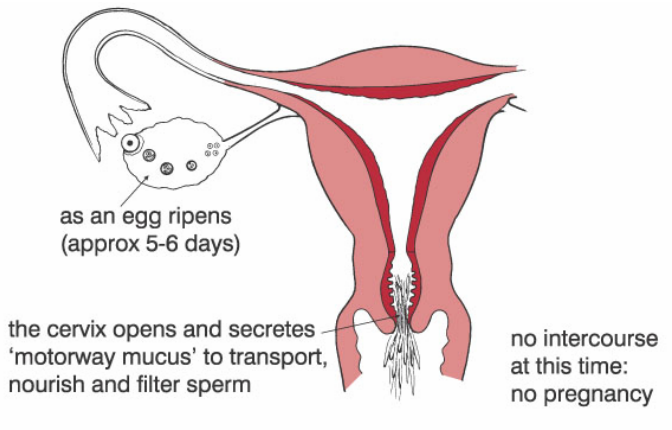
Week 20:
Hair appears on the baby's head and it weighs approx. l lb. (450g)

Week 28:
The baby can open its eyes and can hear its mother's digestive processes and heart beat.

Week 40:
The baby emerges in labour and birth and the fertility cycle is complete –
a child is born.

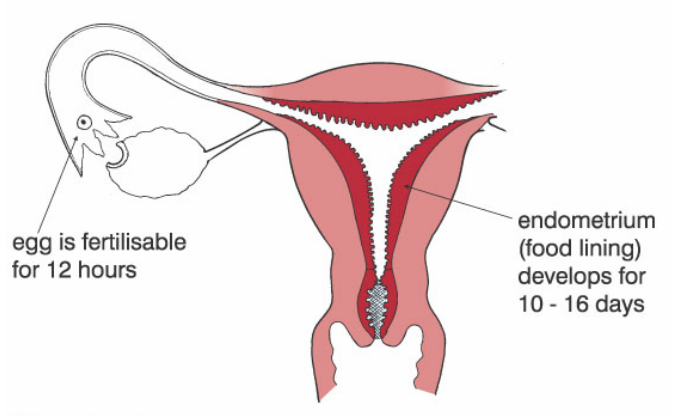
The cycle without pregnancy

The egg ripening phase



If, however, no intercourse took place in the egg-ripening phase, when the fertile "motorway" mucus was being secreted from the cervix, then the egg cannot be fertilised. It dies quickly and the cycle will end differently!

Ovulation and womb preparation

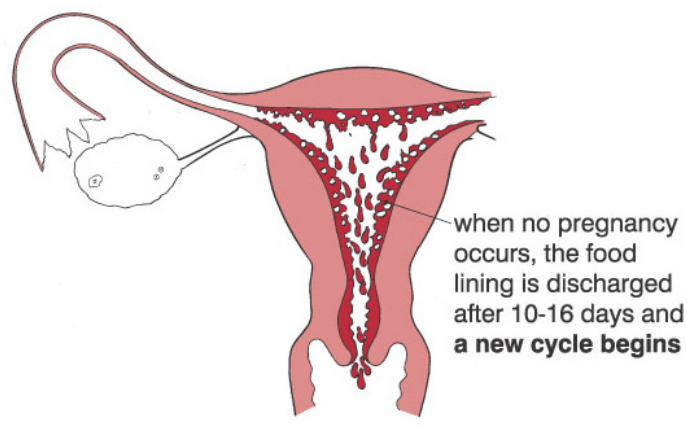


The empty egg follicle will convert to a **corpus luteum** and produce the hormone **progesterone** which will thicken the womb lining for about 10 – 16 days.

The cervix will pinch shut again and the mesh mucus plug will be re-installed in the cervical canal.

Progesterone will also stop any more eggs being released in that cycle.

Leading to menstruation



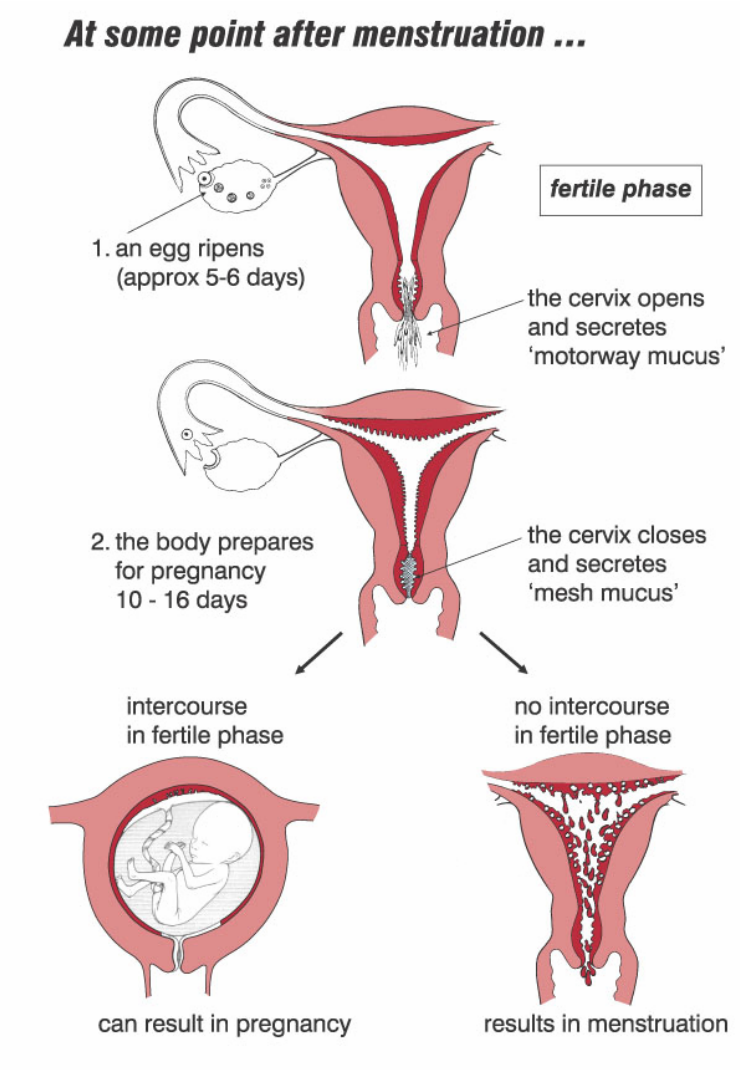
At the end of this 10-16 day phase after ovulation, because no conception occurred, the progesterone fades away.

The thickened womb lining is not needed because pregnancy did not occur and it is discharged amid blood loss over the next 4 – 6 days, constituting the next menstruation.

So the period marks the end of this cycle – and becomes Day 1 of the new cycle! And the whole process starts again ….

Summarizing the events of the cycle

A cycle starts with the first day of menstruation. How the cycle ends will depends on whether the couple had intercourse in the egg ripen fertile phase.



The Pregnancy Cycle

At some point after menstruation (variable phase), an egg will be chosen and begin to ripen. As it ripens, the fertile "motorway" mucus is produced to attract and feed sperm. (*top diagram)*

If intercourse takes place in the fertile phase the egg can be fertilised. The womb lining will thicken, the cervix will be closed and sealed with mesh mucus. *(middle diagram)*

The baby can implant in the enriched womb lining to continue its growth and development to birth. (*bottom left diagram*)

The Cycle without pregnancy occurring

If no intercourse takes place in the fertile mucus phase, the egg cannot be fertilised. *(top diagram)*

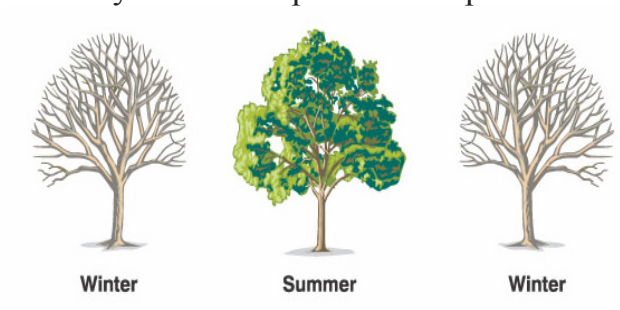
The unfertilised egg dies quickly, the womb lining builds up as usual for 10—16 days and the cervix is sealed with a thick "mesh" mucus plug. *(middle diagram)*

However, because no conception and implantation occurred, after 10 – 16 days the womb lining will be discharged in menstruation. (*bottom right diagram)*

– and the whole process starts again with a new cycle

Charting the fertility cycle

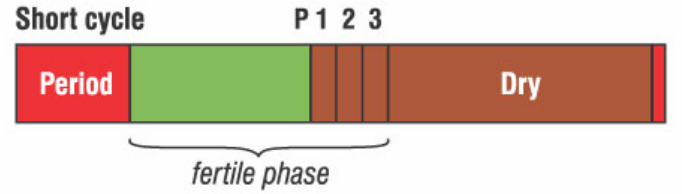
Cycles can be explained and charted in many different ways. This colour scheme, based on the seasons of the year as seen in trees, helps to highlight the fertile and non-fertile phases of the cycle. **Red** represents the period**.**



Brown (*the bare winter tree)* represents the "winter" time of the cycle – the infertile time when the "mesh" mucus plug is present, blocking the access of sperm

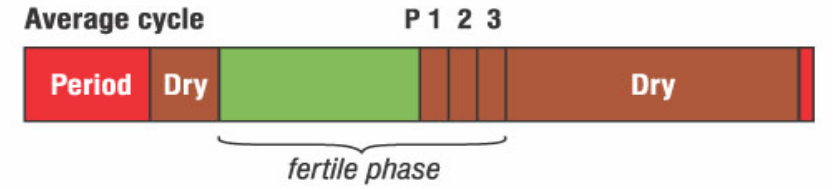
Green *(the green summer tree)* represents the "summer" time of the cycle - the fertile time, when the egg is ripening and the "motorway" mucus is being secreted.

Below are three cycle patterns displayed with this colour scheme.



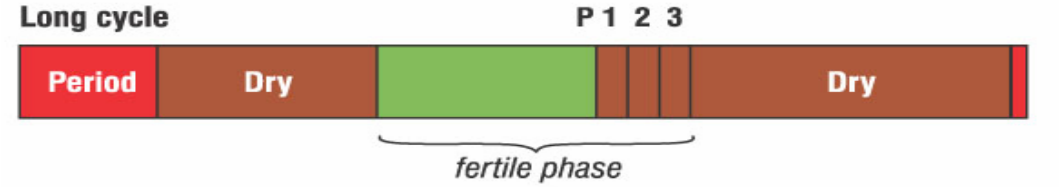
a short cycle (22—24 days)

Fertile mucus *(green block*) starts straight after the period, possibly even before the period has actually stopped. The mucus continues for about 5—6 days and the last day of it is called PEAK Day (*peak of fertility)* - marked **P** on the chart. Ovulation occurs around PEAK Day. After a count of 3 dry days (*brown block 1,2,3)* to allow for the release and lifespan of the egg, the remaining brown days are infertile till the next period starts.



an average cycle (27—31 days).

A few DRY infertile days (*brown block)* usually follow the period. Then the fertile mucus appears (*green block)* and leads up to ovulation around PEAK Day. After the count of 3 dry days after Peak, the rest of the cycle is infertile *(brown block*) until the next period starts.



A long cycle 5-6 weeks +

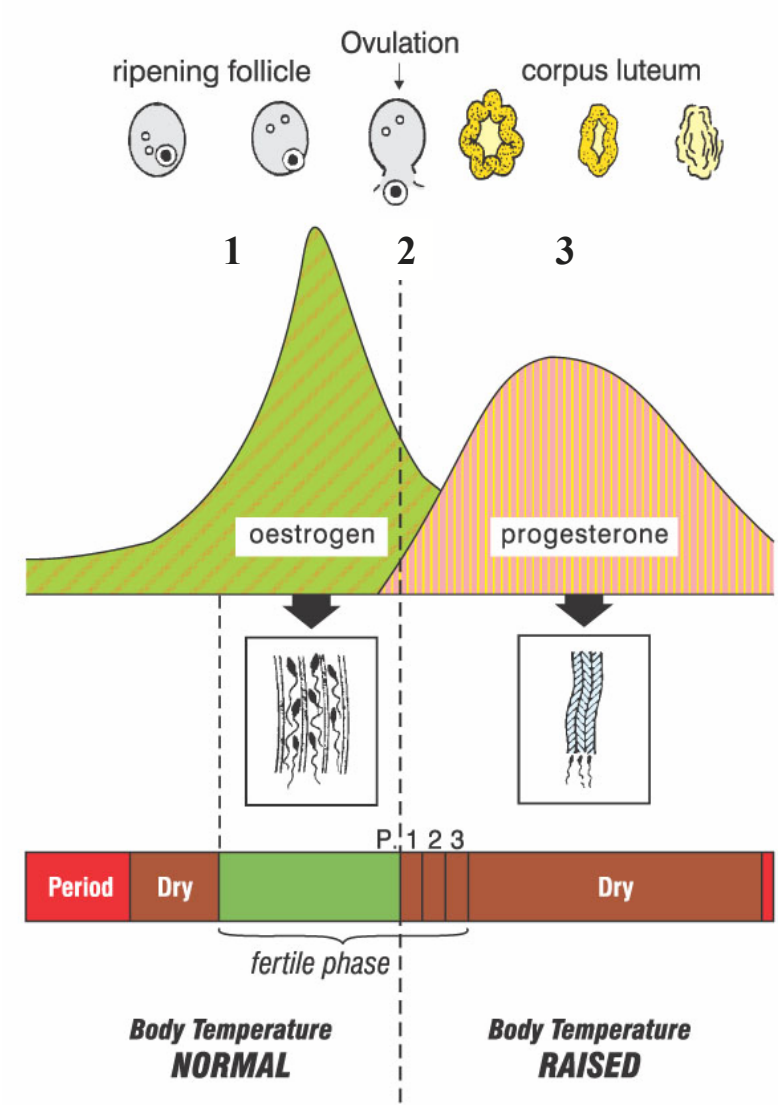
The DRY infertile days after the period (*brown block*) stretch to several days (even weeks, in really long cycles)**.** Eventually the fertile mucus appears *(green block),* leading up to ovulation around PEAK Day. After the count of 3 dry days after PEAK, to allow for the release and life span of the egg, the rest of the cycle is infertile (*brown block).*

For those trying to achieve pregnancy, the **PEAK Day** (the last day of the fertile mucus i.e. *last day of green block*) is the **most fertile day of the cycle!**

The above charts are not intended to be used alone. Please see subsequent pages to learn how to double check symptoms using the Temperature and other indicators.

Understanding the hormone pattern of the cycle

None of the events of the cycle happen by chance. They are all controlled by chemical messengers called hormones. The two main hormones in a woman's cycle – **oestrogen and progesterone** - are explained in the diagram below.



1. Oestrogen comes in increasing amounts from the ripening egg follicle and causes the cervix to open and secrete fertile "motorway" mucus till the egg is ready for release. The last day of fertile mucus is called **Peak Day** – peak of fertility.

2. The dotted vertical line represents **luteinizing hormone (LH)** which triggers ovulation.

3. The empty follicle converts to a yellow structure, the corpus luteum– and produces the dominant hormone **progesterone** which:

- glues up the mucus,
- builds up the womb lining,
- stops all further ovulation in that cycle.

Allowing three days after Peak Day, for the mucus to thicken, all the remaining days of the cycle are infertile until the start of the next period.

The event of ovulation can also be confirmed by another sign – **a rise in body temperature.** This well researched method has been used world-wide with great success since the 1950's, as a natural means of family planning .

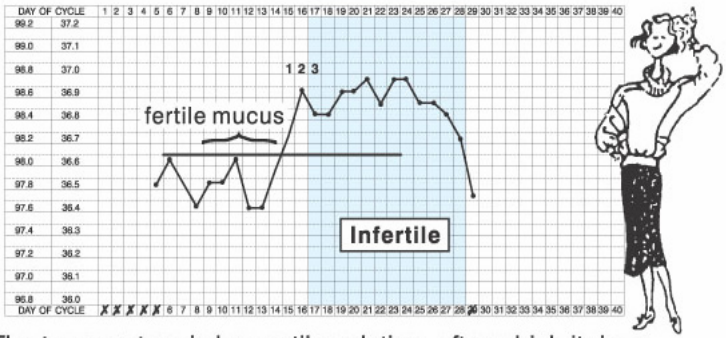
Effects of fertility on body temperature

Before ovulation a woman's body temperature is normal, because oestrogen has no effect on body temperature.

However, **after ovulation**, progesterone in her body causes her temperature to rise and remain high till the next period starts. This is explained in the next illustration.

The Temperature Indicator in Natural Family Planning

Normal body temperature levels vary in different women. But whatever the level, there will be a sustained rise after ovulation due to the effects of Progesterone.

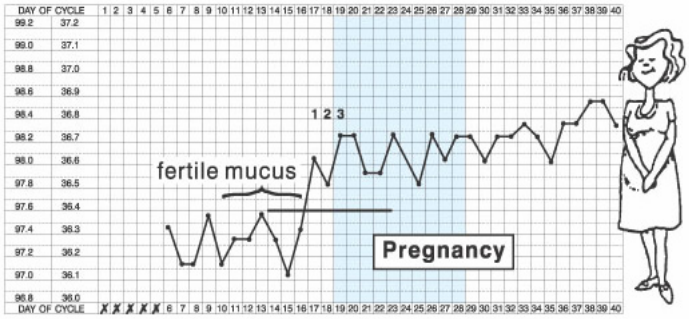


The temperature is low until ovulation, after which it rises for 10-16 days, and drops back with onset of period.

The top chart shows how the temperature stays at a lower level until ovulation.

After ovulation, it rises to a higher level (about 0.3 centigrade).

It falls back to the low level 10-16 days later, and the period starts.



If pregnancy is achieved, no period arrives, and the temperature remains up throughout pregnancy.

If pregnancy is achieved *(lower illustration),* the temperature remains up (for nine months in fact).

To make this method work

The temperature must be taken:

- before getting out of bed in the morning
- at the same time each day
- the readings must be recorded on a special chart.

(*See Guidelines Booklet)*

Statistical success of the Temperature Method

When a temperature chart is properly kept and 3 genuinely raised temperatures have been recorded, the rest of the cycle is infertile, with the same surprise pregnancy rate as female sterilisation **- that is, virtually zero.**

Limitations of the Temperature Method

- It gives no warning of when fertility begins.
- It only confirms when ovulation is over.
- Body temperature can be disturbed by various factors, illness, alcohol, oversleeping etc. (*See Guidelines Booklet*)

It was not until the 1960's that the mucus symptom was understood and publicised by Drs. Evelyn and John Billings. It came to be included in temperature charting to give a combined double-check approach.

This combined approach, called the **Sympto-Thermal Method,** is the approach preferred by the Fertility Education Trust.

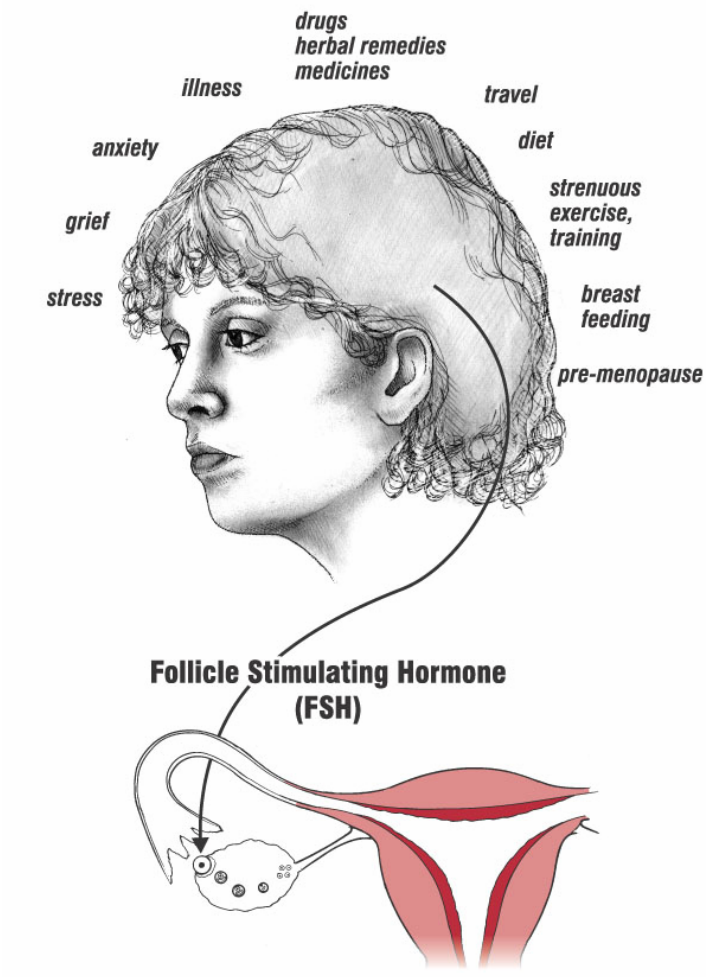
Other minor signs related to the fertility cycle

There are many other natural signs that women recognise in their cycle:

- many women get pains around the time of ovulation, in their side or groin.
- breast fullness or even tenderness is common **after ovulation**, sometimes intermittent, sometimes lasting solidly till the start of the period.
- pre menstrual tension, or PMS – pre-menstrual syndrome– is a nuisance side effect of the cycle for many women. Many who suffer have benefited from changes in diet. More information may be obtained from www.pms.org.uk.

The effects of stress and other factors on a woman's cycle

Some women have incredibly regular cycles, no matter what stresses occur in their lives. For others, exams, a driving test, or an interview at the end of the month can lengthen a cycle by two weeks! This illustration shows some of the more common situations that can interfere with the hormone signals, usually causing the cycle to run late.



Stress and anxiety are the most common causes of cycle disturbance.

Bereavements, illness in the family or in the woman herself can also play a part.

A variety of drugs, medicines, herbal remedies can interfere with the normal pattern of hormone activity, resulting in cycle changes.

Air travel causes many cycles to run late, as does poor diet, excessive exercise and weight training. When the training is extreme, the cycles can stop completely as seen in competing athletes.

Breastfeeding and the premenopause phase involve specific hormone changes which inevitably affect a woman's cycles.

Once a woman knows her symptoms, she can recognise these unusual events and their effects on her cycle without any sense of alarm or concern.

If you want to learn to chart your cycle, please go to tutorial 'Guidelines to Charting'.