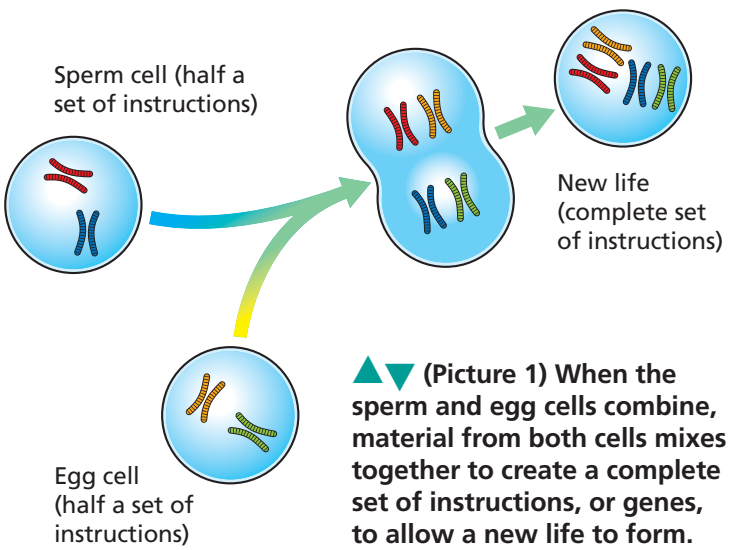
6 A new human life begins

Human life depends on passing chemical instructions to new cells.

Humans are immensely more complicated than plants. But, just as with all living things, human life requires the right set of ingredients to make new cells, and some instructions (Picture 1). The instructions are chemical packages called **GENES**. They contain the information for making all of the substances needed for life.

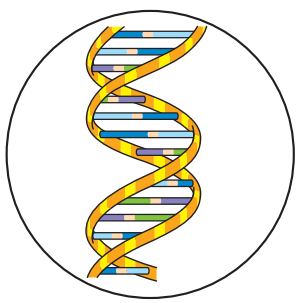
Genes

Think of the way genes work as a recipe book which lays down rules for working with ingredients.



▲▼ **(Picture 1) When the sperm and egg cells combine, material from both cells mixes together to create a complete set of instructions, or genes, to allow a new life to form.**

A gene is a specific piece of information in the form of chemical instructions. Very large numbers of such genes are needed to provide all the instructions for a living thing. Genes are found on structures called chromosomes inside the middle part of the cell, called the nucleus.



There are more than sixty billion cells in the human body and nearly all of them have their own genetic information. These hold the secrets of how we develop.

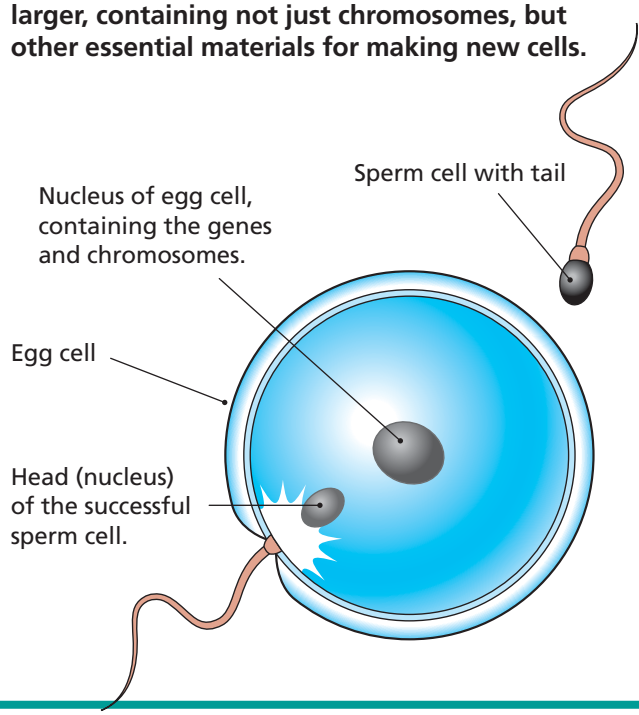
Fertilisation

Men carry half of the instructions to form new life in special sex cells called **SPERM**, and women carry the other half in special cells called **EGGS**.

A man and a woman have to unite to provide a way for the sperm to reach the eggs (Picture 2).

▼ **(Picture 2) The sperm has to travel to the egg. This is easier if it is carrying relatively little 'baggage'. So it is 'slimmed down', mainly containing just chromosomes. Its tail helps it swim to the egg.**

The female egg does not travel and so it keeps most of the original cell material and is larger, containing not just chromosomes, but other essential materials for making new cells.



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During fertilisation, the genes from each parent combine to form a complete set of instructions again. The newly fertilised egg can now begin to grow.

Growing

The fertilised egg grows by dividing many, many times (Picture 3).

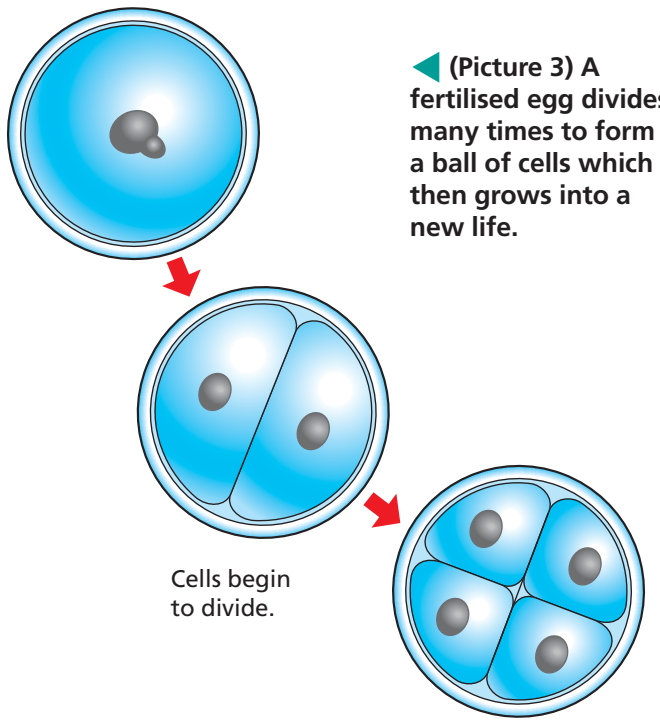
At first, the growing person, called an embryo, does not look much like a human. But as cells become instructed to specialise in various ways, the growing body becomes much more recognisable.

Thus, what begins as a tiny shapeless ball of cells, folds over, stretches, uncurls and grows limbs (Picture 4). During this process genes instruct cells how to give the properties that will provide for life.

Once a baby is born, the changes do not stop, but continue throughout life. But by birth, the fastest changes are finished and as people get older, the changes occur more and more slowly.

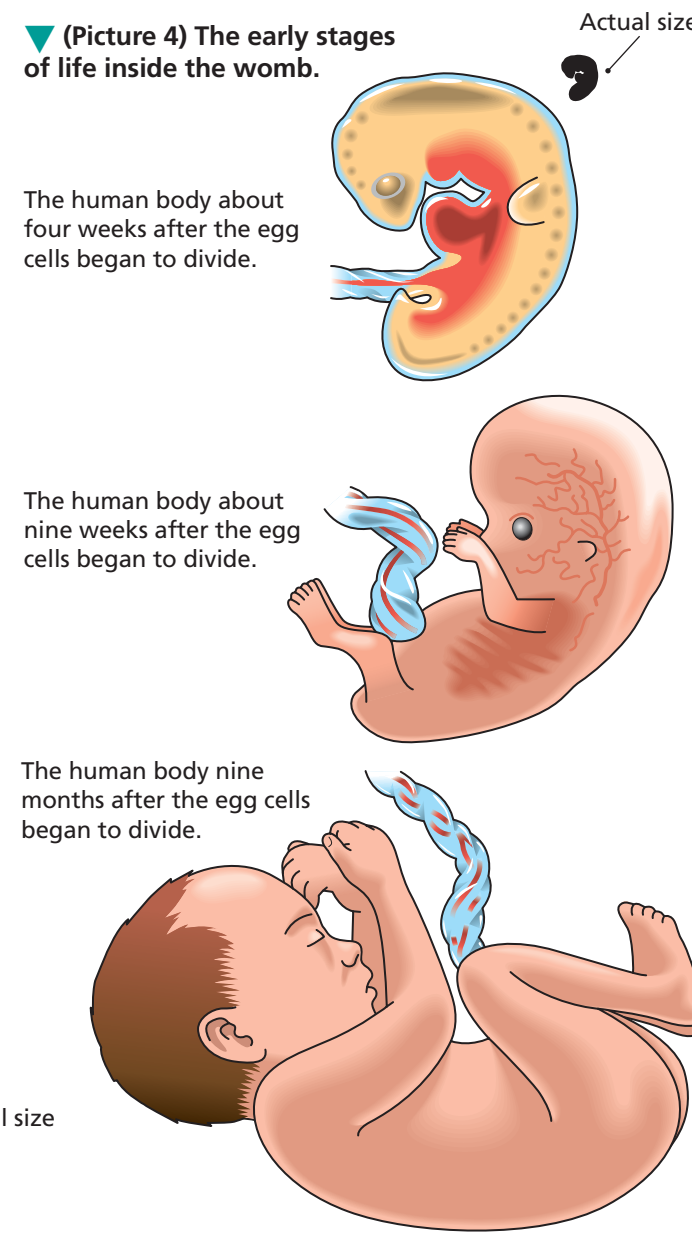
Summary

- **Life begins when genes from a man and a woman come together in a fertilised egg.**
- **The original egg keeps dividing and growing using the instructions from its genes.**



◀ (Picture 3) A fertilised egg divides many times to form a ball of cells which then grows into a new life.

▼ (Picture 4) The early stages of life inside the womb.



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