

STEM CELLS

You are made of billions of cells. And every one of those cells has a speciality. It might send messages to your muscles, or make chemicals that help digest your food. Some clean your blood, while others fight off infection. There are hundreds of different types.

But they all evolved from stem cells. Stem cells are found inside your bones and blood. Together, they are like a factory that makes all the specialised cells in your body.

Scientists think stem cells could transform healthcare as we know it.

BIOLOGY FACT

Stem cells in your bone marrow make about two million red blood cells every second!

www.eurostemcell.org

MEET THE SCIENTIST

Kamil Kruczek is a PhD student. His research investigates ways to use stem cells to try and treat blindness.

He grows stem cells in the laboratory, and then directs them to develop into a type of nerve cell in the eye called cone photoreceptors. Kamil says: "Because cone cells are necessary to see, if they die, the animal or person goes blind."

His research aims to find out if this type of blindness can be cured by replacing the dead cells with the healthy cells he grows in the lab. "I worked out how to isolate cone cells and transplant them into laboratory mice. These transplanted cone cells survive and some end up in between host animal's own light-sensitive cells. Hopefully, one day this could become a way to treat loss of sight."



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What's the fuss about?

Scientists want to use stem cells to replace dead cells in diseased areas and regenerate damaged body parts – for example, to make skin grafts for burns patients and to treat blood cancers such as leukaemia. Stem cells could help treat blindness, Alzheimer's, muscular dystrophy, spinal damage, heart disease and more. They've got enormous potential, but not everyone is happy with the idea. This is largely because of where we get stem cells from.

Why are stem cells controversial?

Scientists take stem cells from three places – adults, umbilical cord blood and embryos.

Adults can choose to donate stem cells to a stem cell bank – a bit like giving blood. Once a baby's born, it doesn't need its umbilical cord anymore so stem cells can be taken from it without hurting anyone.

But embryonic stem cells is a hotly debated topic. If a stem cell is taken from an embryo, then that embryo can never be born. So, when does an embryo become a person? Should we be using them to help others?

Some people say "no" – the embryo isn't a person yet, so it's OK to use it for helping others. Some people say "yes" –

it has the potential to become a person, and we shouldn't destroy it. It's a difficult ethical question.

At the time of writing, embryonic stem cells are only used in research, not in medical treatments.

Why use embryonic stem cells when we have other options?

Embryonic stem cells have great potential; they can turn into any cell in the body. In comparison, adult stem cells usually only make one specialised cell type, and most donations will be from blood stem cells. Similarly, umbilical cord blood stem cells will only produce blood cells.



There may be an alternative – reversing specialised cells.

By finding a way to turn specialised cells back to stem cells, scientists may be able to avoid using embryos altogether. This idea requires a lot more research, but it could mean stem cell treatments become more common in the future.