EuroStemCell

Last Updated: 25.11.2015

Regeneration: what does it mean and how does it work?

What do we know?

Salamanders, planarians and a number of other species regrow damaged or missing body parts. This is regeneration.

Some human organs, e.g. liver and skin, also regenerate when they are damaged.

Regeneration can happen in many different ways using pluripotent or tissue-specific stem cells. Some regeneration happens without stem cells at all (e.g. the regeneration of Zebra fish hearts).

Studying regeneration in other species will help us understand how the human body heals and repairs itself. This could help researchers develop regenerative medicines to help the human body more fully heal.

The salamander can regenerate the limb, heart, tail, brain, eye tissues, kidney, brain and spinal cord throughout life.

Image: Orizatriz, Wikimedia Commons

What are researchers investigating?

Researchers are investigating many aspects of regeneration, from the signals that turn on regenerative processes to why stem cells in humans don't regenerate the way salamanders do.

Many scientists are interested in understanding what promotes stem cells to form a blastema, an accumulation of stem cells at the point of tissue damage.

What are the challenges?

Studies in animals like salamanders are also attempting to determine how stem cells know what parts of the body need to be regrown and where they are in the body's 'map', two things stem cells in mammals don't do.

Researchers are very interested in understanding what signals turn stem cells 'on' when regeneration is needed, and keep them 'off' when they're not needed.

For more information visit: **www.eurostemcell.org/regeneration**