

Regenerating The Thymus

What do we know?

Our immune system fights infection with a specialised type of white blood cell called the 'T cell', which are made in an organ called the thymus. The thymus is therefore essential for a healthy immune system.

As we age, the thymus degenerates - becoming smaller and less able to produce the T cells necessary to fight infection.

Currently, there are very few therapies available for improving or restoring thymus function.

However if scientists were able to regenerate the thymus, this could help to boost the immune system and lead to treatments for a number of conditions affecting the thymus, such as DiGeorge Syndrome.

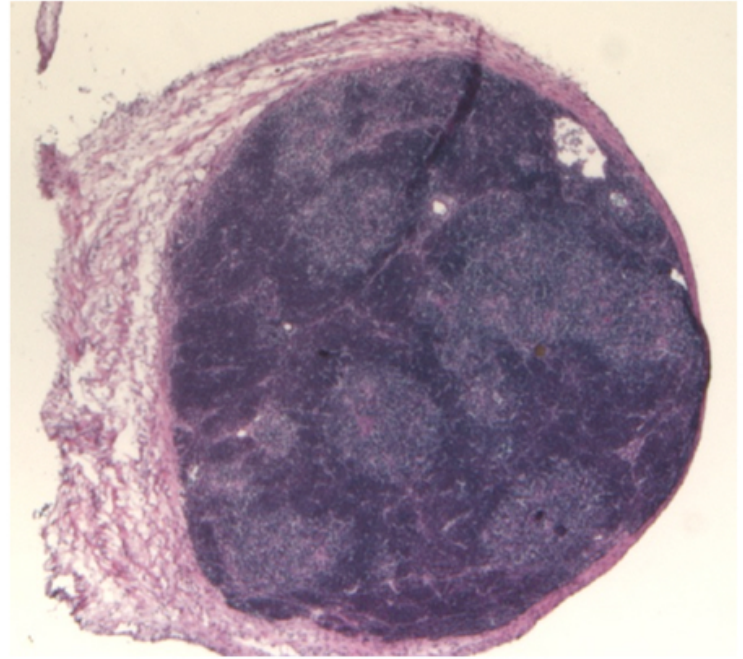


Image of a thymus organoid stained with Haematoxylin and Eosin dyes.

Image: Nick Bredenkamp, MRC CRM, University of Edinburgh.

What are researchers investigating?

Given how essential the thymus is for a healthy immune system, scientists are currently trying to understand how they can use stem cells to repair and regenerate this organ.

Scientists have shown that when you take thymus 'progenitor cells' (stem cell-like cells), from a mouse and transplant into a mouse that lacks a thymus, the cells go on to make a fully functioning thymus.

Currently, researchers are investigating:

1. How to engineer thymus tissue in the lab for transplantation and
2. Ways to encourage the thymus to regenerate itself after it has been damaged or has degenerated with age.

What are the challenges?

Much of the current research investigating stem cells as a potential tool to regenerate and repair the thymus has been performed in mice. Discovering whether these findings also work in humans is the current and future big challenge for scientists. For example, before scientists can investigate whether human thymus progenitor cells can create a functional thymus when transplanted, they first need to work out how to grow thymus progenitor cells in the lab and make enough of these cells for transplantation.