Transplanting thymus cells into patients may repair and restore the immune system

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The thymus plays a central role in the development of our immune system by producing important immune cells. However, this crucial organ deteriorates with age and is also vulnerable to harm from transplant surgery. An ageing thymus leaves older people often more susceptible to infections such as flu, while patients who undergo a bone marrow transplant, for example to treat blood cancer, can be left with thymus damage that affects the immune system.

Both of these groups - transplant patients and older people - represent significant numbers in Europe. By 2025, more than 20 percent of Europeans will be 65 or over, with a particularly rapid increase in numbers of over-80s. Meanwhile, by the end of 2012, 450 110 transplants were registered by the European Society for Blood and Marrow Transplantation (EBMT). Treatments are needed to repair and restore the immune system of these individuals, and ensure them a decent quality of life. The THYMISTEM initiative, led by the University of Edinburgh, is working to achieve this.

Studies show that transplanting thymus cells into patients can be an effective way to repair and restore the immune system; however the lack of a source for these specialised cells represents a major barrier. In the previous studies, scientists used cells from newborn babies that had been removed as a normal part of heart surgery. Cells from adult donors are shown not to have the same effect. The THYMISTEM team seeks to overcome this by finding new methods of producing thymus stem cells in the lab as an alternative source of cells for therapy.

Professor Clare Blackburn of the MRC Centre for Regenerative Medicine at the University of Edinburgh, who is leading the study, said, 'This exciting new project will test whether we can grow thymus stem cells in the lab and use these to make a fully functional organ for transplantation. We will then investigate how to produce these cells in sufficient quantities and high enough quality that they could, in the future, be transferred into patients.'

Professor Blackburn noted that gathering the diverse array of skill sets needed to carry out this project was made possible by EU funding. 'The THYMISTEM project includes stem cell biologists, immunologists, tissue engineers and two cell banks. All of our skills will be needed to achieve the project's overall goals and without this type of funding from the European Union, such a grouping could never be brought together'.

The THYMISTEM initiative is also collaborating with other major stem cell projects that have recently received funding from the EU under its FP7 programme. These include a project to develop insulin-producing cells for treating diabetes (HUMEN), research to produce bone and muscle-forming cells in the lab (PLURIMES) and a project to develop cell replacement therapies for neurological disorders (NEUROSTEMCELLREPAIR).

More information: Project factsheet: cordis.europa.eu/projects/rcn/110175_en.html

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