

What are the effects of radiation and chemotherapy on children's developing brains?

Project title: Mechanisms of Neurotoxicity in Childhood Cancer Therapy

Lead researcher: Professor Olaf Ansorge, University of Oxford

Project Stage: Just started (October 2024)

Funded by: Funded by CCLG and CCLG Special Named Fund
Ben Pavitt's Legacy of Love Fund

ABOUT THE PROJECT

The developing brain is very sensitive and damage from cancer treatment can affect learning and mental health. Radiotherapy treatments can lead to physical changes in the brain, such as deformed blood vessels or secondary cancers. We do not know how these develop in different types of brain cells. This is an important topic for young people with cancer, their families, and doctors.

In this project, Professor Olaf Ansorge and his team at the University of Oxford will study the effects of radiation and chemotherapy on the brain. Ten families have generously donated their children's brain tissue for Prof Ansorge's research. This was only possible through close collaboration and communication with the families and the Oncology team, led by Dr Shaun Wilson at Oxford Children's Hospital. All children responded to treatment but later had their tumours grow back. Whole brain samples are very rare but essential for this type of research, as healthy brain samples are never taken during life.

The project has two goals:

1. To understand how radio- or chemotherapy affects healthy nerve cells and blood vessels.
2. To understand how these treatments affect any surviving cancer cells.

Professor Ansorge's team will study multiple types of healthy brain cells, as they believe cancer treatments can affect each cell differently. They will look for changes in the DNA of the cells to find both DNA damage and changes to genes.

The researchers will also look at cancer cells that have survived treatment and new cancers caused by treatment. They will compare relapsed cancer cells and new ones after treatment to those from the original tumours, and then compare these to relevant healthy brain cells from the same individuals.

Professor Ansorge's project will create one of the first comprehensive datasets on how chemotherapy and radiotherapy affect human brain cells. It will help researchers understand what causes the long-term effects of childhood cancer treatment on the healthy brain and what treatment strategies could prevent them.



This project was funded by Ben Pavitt's Legacy of Love Fund, a Special Named Fund at Children's Cancer and Leukaemia Group raising funds for research into all childhood cancers.