

## Can we prevent leukaemia in children?

**Project title:** Modelling prophylactic (microbial) prevention of childhood acute lymphoblastic leukaemia

**Lead researcher:** Professor Sir Mel Greaves, Institute of Cancer Research

**Project Stage:** Complete (March 2020)

**Funded by:** CCLG and Toti Worboys Fund, Elliott's Warrior Fund, Captain Ciara Killing Cancer and #GoTeamHuey



### ABOUT THE PROJECT

Acute leukaemia is the most common type of paediatric cancer. Although acute lymphoblastic leukaemia (ALL) is an oncology 'success story', having gone from no chance of survival to a 90% cure rate, treatments are still toxic and traumatic to children. Prevention would clearly be better.

Infection has been considered a possible cause of childhood ALL for a long time. Unlike in some animals like cats where a specific virus causes leukaemia, research suggests that it is a lack of exposure to common infections that could be the trigger. Other factors include embryos getting specific genetic mutations whilst in the womb, further mutations between the ages of two and six, and an over-the-top reaction to an infection that then progresses to ALL. It is thought that this reaction is because the immune system hasn't been exposed to enough bacteria and viruses (microbes) early on, so does not 'know' what a sensible reaction would be.

Professor Sir Mel Greaves' team at the Institute of Cancer Research think that exposure to microbes could help prevent ALL. His team are developing model systems to study leukaemia in mice. These will allow them to test the possibility that leukaemia is preventable with exposure to harmless bacteria early in life. Their long-term hope is to prevent leukaemia in children.

### RESULTS

The team have found strong evidence to show that common infections can trigger B-cell precursor acute lymphoblastic leukaemia (ALL). Common infection could trigger ALL in children who are susceptible for two reasons:

1. they have a 'pre-malignant' population of mutant blood cells from in the womb that don't cause obvious problems
2. they have not been exposed to enough common microbes early on

This was a pilot project, which means that the researchers were testing the basis of their big idea (that microbes and ALL can be linked).

The results from this follows what researchers have previously observed in children - that early life exposure to common and benign microbes, in the form of the gut 'microbiome' protects from later, infection-driven ALL. The gut microbiome of infants comes from their mothers and other close contacts, and is the collection of bacteria and other microbes which prepare our immune system for appropriate responses to infections later in life.

## WHAT'S NEXT?

The team have received a large CRUK grant to continue their valuable research. They will now move on to the next phase in which the researchers will test if they can prevent ALL by transplanting either microbes either alone or as a group. This offers the exciting prospect of a preventative intervention for children that could reduce the risk of childhood cancer.



This project was funded by Special Named Funds at Children's Cancer and Leukaemia Group raising funds for research into childhood leukaemia.



Children's  
Cancer and  
Leukaemia  
Group

the EXPERTS  
in CHILDHOOD  
CANCER

© CCLG 2023

Children's Cancer and Leukaemia Group  
Century House, 24 De Montfort Street, Leicester LE1 7GB  
Registered charity in England and Wales (1182637)  
and Scotland (SC049948).

0333 050 7654

[info@cclg.org.uk](mailto:info@cclg.org.uk)

[www.cclg.org.uk](http://www.cclg.org.uk)



ChildrensCLG



CCLG\_UK



CCLG\_UK