CCLG RESEARCH PROJECT UPDATE

Confirming bloodstream markers of children's kidney cancer

Project title: Validating circulating biomarkers of Wilms tumour

Lead researcher: Professor Matthew Murray, University of Cambridge

Project Stage: Ongoing (started January 2023, planned end December 2025)

Funded by: CCLG and CCLG Special Named Funds including Bethany's Wish, Daniel's Rainbow Fund, Finlay's Fund, Freddie's Fight and The Georgie B Fund

ABOUT THE PROJECT

Wilms tumour is the most common kidney cancer in children, with around 80 new cases each year in the UK. Almost 9 in 10 children are now cured but, despite intensive treatment, some children's cancer returns. Wilms tumour is normally diagnosed with a biopsy, where a small piece of the tumour is removed surgically, but this comes with risks for small children and doesn't always give information about the whole tumour.

Biomarkers are tiny molecules found in the body that tell doctors more about a disease. At the moment there are no biomarkers routinely used for Wilms tumour. Treatment regimes are currently based on changes in the Wilms tumour cells, but treatments are not always successful for high-risk patients. We urgently need a better way to show which patients are high-risk, differences in tumours, and to see whether a treatment is working.

Professor Matthew Murray at the University of Cambridge believes that circulating biomarkers, found in the blood or urine of patients, are the answer to improving Wilms tumour care. His team hope to find biomarkers that they can use to create a non-invasive test to diagnose Wilms tumour. MicroRNA, tiny pieces of genetic code released from tumours into the blood stream, are the best candidate for a Wilms tumour biomarker. Lab tests can detect very small amounts of microRNA in the bloodstream and can tell doctors more about tumour makeup and genetic differences.

Professor Murray's team will be looking at samples from children with Wilms tumour, taken when they were diagnosed. They have already found potential biomarkers, and will be looking at whether these potential biomarkers can be found in the blood and urine samples. Showing that the biomarkers apply to lots of children with Wilms tumour is the first step in moving the new test towards clinical use. Along with this, the team will be comparing different biomarkers with patient's history to see whether any of the biomarkers can tell doctors new information about patients, such as the type of Wilms tumour, without the need for surgery.

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PROGRESS

Prof Murray's team has shown that levels of microRNA fragments, also called 'miRNAs', are different between healthy patients and Wilms tumours patients. They used a sensitive laboratory test to measure the amounts of hundreds of unique miRNAs in blood samples. They found 18 miRNAs that were at very different amounts between the two groups.

The first step was to confirm that a cheaper and more practical test could still detect the differences, to make it more transferable to the clinic. This test couldn't detect some of the miRNA differences, so the team focused on seven miRNAs. These were consistently able to distinguish between healthy patients and Wilms tumour patients.

WHAT'S NEXT?

The seven miRNAs will now be used to test blood samples from more children with Wilms tumour. This will confirm that they can diagnose Wilms tumour - not just in the small test group of children, but in all patients.

Prof Murray hopes that the miRNA test can be tested in future clinical trials. Future research could also look at why the miRNAs are different in Wilm tumour, such as whether they are playing a role in the cancer's growth. This could support the development of new treatments.

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Bethany's Wish
Wilms' tumour research fund

Daniel's Rainbow Fund

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