

Child Leukaemia

Dr Pam Kearns and Dr Victoria Weston

Our research is based within the School of Cancer Sciences in Birmingham University. We work in close collaboration with other research groups in the School and with doctors at the Birmingham Children's Hospital. Our research encompasses laboratory-based research, pre-clinical evaluation of promising new anti-leukaemia drugs and clinical trials for children and young people with leukaemia.

The overall aim of our research is the development of better treatments for children with leukaemia. Although, most children with leukaemia can be cured with current treatments, some children have a very resistant leukaemia that is difficult to cure. The key to successful development of new therapies lies in a greater understanding of the underlying reason why some children with leukaemia are not cured by currently available drugs. Our research is focused on investigating the biology of leukaemia that fail to respond to currently available drugs and developing new treatments directed to overcoming this resistance.

Recent work by Dr Victoria Weston has identified a population of highly chemotherapy resistant acute myeloid leukaemia cells, which may contain the leukaemia stem cells responsible for relapse in a subgroup of high-risk patients. These are currently being characterised further to identify new potentially effective therapeutic targets. In ALL, she is investigating the role of a specific type of intracellular component called 'microRNAs' in poor responses to chemotherapy. Specific microRNAs may be targeted as a new approach to treatment for resistant leukaemias.

Within leukaemia cells there are chemical pathways that determine whether the cells will be killed by chemotherapy. We are researching both how these pathways are altered in leukaemia cells resulting in protection from chemotherapy and which new drugs can be developed to overcome these protection mechanisms.

All new drugs must be tested for their effectiveness and safety in the laboratory before being used clinically and we have developed accurate and sensitive laboratory models of paediatric leukaemias to test if these new drugs are better than current treatments. This pre-clinical assessment is allowing us to evaluate which are the promising drugs to take into the clinic and how they should be combined with current conventional treatments.

Dr Pam Kearns is the clinical lead for the Children's Cancer Trials Team who are the designated National Trials Unit for childhood cancer and leukaemia trials, developing and running national and international trials across the network of paediatric oncology tertiary referral centres in the UK. For leukaemia in children and young people, the trials include the national phase III clinical trial for children with newly diagnosed acute lymphoblastic leukaemia (UKALL 2011) and international collaborations on early drug development trials for resistant acute lymphoblastic and myeloid leukaemias,

As one of UK's largest tertiary referral centres for childhood cancer, Birmingham Children's Hospital treats 1 in 10 children with cancer or leukaemia in the UK. The Hospital is part of the paediatric network of specialist 'Experimental Cancer Medicine Centres' delivering early phase drug development clinical trials, providing access to new treatments for children with leukaemia in our region.

Dr Pam Kearns is a Senior Lecturer and Honorary Consultant in Paediatric Oncology and the Director of the School of Cancer Sciences, Cancer Research UK Clinical Trials Unit and the lead for the Children's Cancer Trials Team.

Dr Victoria Weston is a Senior Post Doctoral Fellow in the School of Cancer Sciences and works with Dr Kearns, leading research in the molecular mechanisms underlying chemo-resistance and relapse in acute myeloid leukaemia and acute lymphoblastic leukaemia, with the goal of informing and testing new targeted therapeutic approaches.