Worldwide gene mapping boosts leukaemia research

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An international project has mapped for the first time the sets of genes used in virtually every cell in the human body, boosting the resources of WA leukaemia researchers.

Harry Perkins Institute of Medical Research's Professor Peter Klinken and Dr Louise Winteringham were among 250 researchers in 20 countries working on the FANTOM 5 project (Functional Annotation of the Mammalian Gerome) led by Japan's Riken Institute.

Its map or atlas of gene activity across the human body has been published in the international journal *Nature*.

As a specialist in myeloid leukaemia, Dr Winteringham says the gene atlas also provides her with tools to investigate more closely the role of microRNAs (miRNA) in diseases like leukaemia and anaemia where red blood cells don't form, in a way that has not been done before.

"MicroRNAs are a recently discovered category of RNA, molecules which are closely related to DNA which play a significant role in regulating many aspects of normal cell growth and development by regulating gene expression," Dr Winteringham says.

"Importantly, microRNAs are now being trialled as a new form of treatment for some cancers.

"We were involved in looking at a leukaemia cell and what genes need to

be turned on for it to start differentiating again.

"This is really important in understanding where to target therapies—what sort of proteins are missing in those cells or what type of genes are not working properly.

MicroRNA sequencing helps targeted cancer therapies

"As part of that we have been able to sequence all the microRNAs that are changing during that maturation process.

"MicroRNAS are really amazing because they can target many different genes all at once.

"It is like they can control whole networks of genes rather than just specific genes.

"One of the unique things about the data set we have, is that we know what microRNAs are changing and we also know what genes are changing so we can marry-up the microRNAs with their target genes which has never really been able to be done before."

Dr Winteringham says the atlas information is incredibly significant, providing an important reference for researchers worldwide on the types of genes 'turned on' for cells to become specific to a particular organ or cell type; liver, hair or brain cells for example.

She says that's vital information for scientists investigating how cells change to become diseased and for those working in developmental biology.