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Research discovery inspires young scientist

Lina Happo in the lab a WEHI



PhD research has helped explain why certain cancers don't respond to conventional chemotherapy and inspired a young scientist to keep building her career. **Rebecca Scott** reports.

GRADUATE STUDIES

A young researcher has made an important discovery which could improve chemotherapy treatment for cancer patients.

Lina Happo was always interested in science and how the body works. It was this interest which led her to undertake her PhD investigating the causes of cancer cell resistance to chemotherapy drugs in the University's Medical Biology Department at the Walter and Eliza Hall Institute (WEHI).

"In my honours year I was lucky to be involved in an exciting project, investigating programmed cell death in cancer, under the supervision of Professor Andreas Strasser

and Dr Clare Scott from the Molecular Genetics of Cancer Division at the WEHI," she says.

"I decided to continue the project in my PhD and am thrilled with the results. I have had great supervisors who have helped me start an exciting medical research career."

Ms Happo's research has helped uncover why certain cancers do not respond to conventional chemotherapy, highlighting the potential to predict treatment success or failure in patients with tumours by identifying certain genes.

It was for this work that Ms Happo was recently recognised as the Victorian winner of the 2011 AusBiotech/GSK Student Excellence Award.



"Entering into the competition and winning this state award has given me the opportunity to present my research to a wide audience and to meet and interact with scientists from across a wide variety of disciplines," she says.

Ms Happo's work investigates the particular group of proteins known as BCL2 that are involved in a process called programmed cell death, which regulates cell survival and death. Programmed cell death (apoptosis) plays an important role in protecting us from cancer and autoimmune diseases. Abnormalities within the BCL2 protein family are common in human cancers and contribute to resistance of tumour cells to anti-cancer drugs.

She was able to determine that the combination of three so called 'pro-death' genes regulate the efficient killing of lymphoma cells following treatment with chemotherapy drugs, in a mouse model. The finding has great potential for chemotherapy treatment in patients with cancer.

"When people get treated with conventional chemotherapy, DNA in tumour cells gets damaged and this instructs them to undergo programmed cell death," she says.

"What we did was look at which proteins are important for this cell death to occur following chemotherapy.

"The exciting discovery was that there are three proteins that act together

to efficiently kill the lymphoma cells post treatment.

"We have known that pro-death proteins of the BCL2 family are involved in programmed cell death following treatment with conventional chemotherapy drugs, but we didn't know which ones or which combination of genes were most critical," she says.

It is hoped that researchers will be able to assess the genetic make up of a cancer patient (to determine if they have these specific genes) which will then help to predict if a patient is going to benefit from the chemotherapy or not.

"It may become a biomarker for treatment to determine success or failure in patients," she says.

"In this way, researchers will be able to choose the best course of treatment for cancer patients, so they can avoid treatments that don't work and have unfortunate side effects as well."

Ms Happo's next career move is to undertake a Doctor of Medicine at the University of Melbourne.

"I have had such a great opportunity to work both at the bench with exceptional scientists and alongside clinician-scientists who have opened a window into the clinical world. It appeals to me to engage further in my medical research career with the best and most comprehensive professional medical training."