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PRIME MINISTER'S SCIENCE PRIZES
AOTEAROA NEW ZEALAND

2021 TE PUIAKI KAIPŪTAIAO ĀNAMATA FUTURE SCIENTIST PRIZE

Going for gold to improve skin cancer treatment

Carol Khor, a Year 13 student at Burnside High School in Christchurch, has won the Prime Minister's Te Puiaki Kaipūtaiao Ānamata Future Scientist Prize for her research into improving drug treatment for skin cancer.

Melanoma is the most deadly form of skin cancer and New Zealand leads the world in rates of skin cancer with up to 3,000 people diagnosed with melanoma each year in Aotearoa.

There are some cancer drugs that target melanoma cells but unfortunately some melanomas can become resistant, so the treatment fails.

To do her research, Carol worked with mentors Therese Featherston and Professor Mark Hampton at the Centre for Free Radical Research at the University of Otago, Christchurch with funding from the New Zealand Health Research Council.

Cancer cells are under higher oxidative stress levels than normal cells due to inflammation and tumour metabolic activity. "Therefore, by disrupting antioxidant pathways, we can potentially target therapy towards cancer cells," Carol explained.

Carol's research looked at combining the cancer drug vemurafenib with auranofin, a gold-containing compound known to inhibit the antioxidant system in melanoma cells. Auranofin is an old drug previously used for treating rheumatoid arthritis.

Combining the drugs resulted in higher numbers of melanoma cell death and the results were much greater than with the cancer drug alone.

Carol found that she could use auranofin at doses that did not kill cells by itself. "This is desirable as the gold compound is not cancer cell specific. However, when combined with the cancer specific drug, I recorded a significant decrease in cell viability. This is a promising result towards delivering a higher efficacy treatment towards the targeted cancer cells."

All of Carol's work was done with cells grown in the laboratory. A lot more work is required before this research can be translated into clinical studies.

Carol is in her last year of high school but is continuing to work at the Centre for Free Radical Research. "The preliminary results led to more questions which I wish to answer and I have been fortunate to have been given the chance to continue this investigation here at the labs. Together with the redox group, we aim to publish these findings in a journal by the end of the year as a contribution to the wider scientific community."

Carol has been motivated in her research by those who have spoken to her about their own experience or experience of someone they know with melanoma. "Learning about affected individuals and how their lives are negatively impacted made me realise the importance of the work we are undertaking. I am super fortunate to be part of the group that strives to fight against cancer."

The award comes with a prize of $50,000 to support tertiary education. Carol intends to further her studies in the field of science or medicine, excited by the potential for cutting-edge technological advancements and exciting findings. “No matter where I end up, I believe my desire to innovate and create will lead me towards the right path.”

Her mentor Therese Featherston says her and her colleagues at the Centre for Free Radical Research are “over the moon” that Carol has won the award and say it is extremely well deserved. “Carol has worked so hard in the lab from day one. She’s an incredibly intelligent person and her future is going to be so bright.”

Mō Te Puiaki About the Prize

TE PUIAKI KAIPŪTAIAO ĀNAMATA FUTURE SCIENTIST PRIZE

Awarded to a secondary school tauira student for outstanding achievement in carrying out a practical and innovative science, mathematics, technology or engineering project.

This is one of five prizes awarded each year.

The Government of New Zealand introduced The Prime Minister’s Science Prizes in 2009 as a way of raising the profile and prestige of science among New Zealanders, in Aotearoa and internationally.

www.pmscienceprizes.org.nz/