

Understanding tumours' defences

PhD research funded by the HRC has added important information to understanding how tumours evade the body's natural immune responses, helping scientists as they work to develop effective anti-tumour vaccines.

Dr Haley Ataera, who graduated from Victoria University of Wellington with a PhD in Biomedical Science in May, has been investigating regulatory T cells (Treg) and whether tumours hijack them so they can reduce the body's immune response.

Her PhD supervisor during the project, Professor Franca Ronchese who is the Cancer Immunotherapy Group leader at the Malaghan Institute, says these regulatory cells are meant to suppress any overactivation of the immune system or autoimmunity, which can be fatal.

"We need these regulatory cells to have a properly functioning immune system but unfortunately tumours seem to be very clever at taking advantage of this type of immune cells and we find that in tumours they tend to accumulate."

Professor Ronchese says immunologists know tumours are different from normal cells in the body, so they should, in theory, activate a spontaneous immune response, but they often don't.

"These immune cells in the tumour don't do their job – is it because the regulatory T cells turn them off?"

Dr Ataera's research found that this does not appear to be the case in some tumours, such as the melanoma she was investigating.

"Although we can deplete the regula-

tory cells to a large extent, we still do not see a much better immune response to these tumours," Professor Ronchese explains.

"This tells us something that is important, although maybe not surprising, that the tumours are quite clever and they do not just rely on one mechanism to escape immune responses."

This is important information for the work Professor Ronchese's group is doing on dendritic cells, the cells of the immune system that normally detect infections and trigger an immune response.

"We know that the dendritic cells in the tumours are not very good and that was what we were trying to find out. Are the regulatory cells turning off the dendritic cells in the tumours? The answer from Dr Ataera's thesis is no, that does not seem to be the case in this tumour at least."

Professor Ronchese says now that they know the dendritic cells are not being turned off by the regulatory cells they can look at ways of activating them better.

"At the moment we make complicated anti-tumour vaccines, which involves taking blood out of patients, making dendritic cells from this blood, and putting it back into the patient together with tumour components to start an immune response. If we could activate the dendritic cells that are already in the tumour it would be a lot simpler, a lot faster and probably better because the response would be tailored to the patient."

The other avenue of research would be to try and understand why the regulatory cells are there, she says.



Professor Franca Ronchese

Key words:

- Tumours, immune system, regulatory cells, autoimmunity, dendritic cells

Aims of this research:

- To establish how tumours evade the body's natural immune responses
- To assist with developing effective anti-tumour vaccines

"We know if we deplete them the tumours grow more slowly. What are they doing if they are not affecting the dendritic cells? Are they stopping other cell types? Are they stopping the immune response later on?"

Dr Ataera is now working at the Center for Cell and Gene Therapy at the Baylor College of Medicine in Houston, Texas, where she is working on developing an anti-tumour vaccine to treat neuroblastomas.

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