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The human body has cells that keep watch for any diseases or germs which may threaten it. These are called Dendritic cells and when they recognise any pathogens (bugs) invading the body they swallow them up and break them down into pieces that can be recognised by T cells, which the immune system releases to fight the disease.



Dr. Patrizia Stoitzner

T cells are the army of the immune system and there are two different types that each play a vital role in keeping the body healthy. One is known as the helper T cell, which signals the other immune cells to respond to the invasion, the other is known as the killer T cell because it is able to kill infected cells and tumour cells. A more efficient immune response can be achieved when both of these types of T cells react to an infection, alerting and protecting the body from disease at the same time.

Langerhans cells are a type of Dendritic cell which sit on the outermost layers of the skin. Langerhans cells have many properties in common with other dendritic cells, including the ability to activate helper T cells, but until now it was not clear how effective they were at activating killer T cells.

Dr. Stoitzner's research has shown that Langerhans cells are perfectly able to activate killer T cells, and that they can take up proteins that are simply applied to skin in a cream. Cream application can be made more effective by combining it with "tape stripping", where the dead outer layer of the skin is removed by applying and removing tape several times



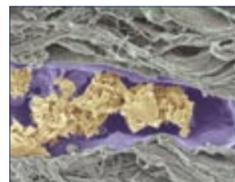
before the cream. Tape stripping also makes local Langerhans cells more active and better able to activate both helper and killer T cells.

This finding is important because it suggests that there is potential to adapt this method to treat cancer with an application of cream on the skin. We hope that this breakthrough may be the first step towards a non-invasive treatment for cancers particularly skin cancers which are a serious threat to New Zealanders.

Dr Stoitzner now plans to continue her research into this method of treatment at the Malaghan Institute and further develop her understanding of Langerhans cells and how they can be fully utilised to protect the body from cancer.



Langerhans cells in the Epidermis



Langerhans cells in the Lymph Vessel

Finding new ways to prevent an age old killer

The Infectious Diseases Group at the Malaghan Institute continues to research better ways to protect future generations from Tuberculosis in New Zealand.

The alarming statistics of Tb cases in New Zealand and elsewhere show this disease is no longer restricted to underdeveloped or impoverished countries of which it is normally associated. Our rate is higher, per capita, than that of the USA, Canada and Australia, with 400 cases notified annually and 10 in every 100,000 of our population being infected with the disease. The New Zealand authorities manage Tb with screening programmes for 'at risk' immigrants and the Tb Act, a mandatory prescription of medication and monitoring of patients by mobile nurses, who supervise the taking of antibiotics for a period of up to two years.

The strict enforcement of this act is to ensure the full course of antibiotics is taken, as many patients are relieved of the most debilitating symptoms (such as pain and fatigue) within the first months of treatment and may stop taking their medication before the disease has been killed. This is one of the reasons why Tb has remained a threat to human health for so long.

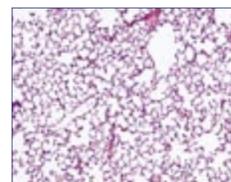
Another reason for the tenacity of Tuberculosis is that the disease is constantly evolving, growing smarter to our treatments, even to the point of becoming resistant, as some strains in New Zealand are already. Researchers at the Malaghan Institute are investigating two avenues that may hold the answer to achieving a better vaccine response to prevent the disease.

Regulatory T cells are the immune system's 'stop' signal; they can turn off the infection fighting killer T cells and infection detecting

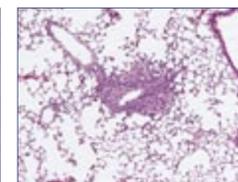
helper T cells. It is important they do this, once health is restored, to prevent excessive inflammation. In some instances the regulatory T cells are fooled by the infection and send the message to the other T cells to stop their work before the body has been cured. This means the infection is able to stay in the body.

The Malaghan Institute's Infectious Diseases Group is now exploring the possibility of getting rid of the regulatory T cells prior to vaccination, to get a bigger and longer immune response. PhD student, Kylie Quinn, has recently had a paper on this research accepted for publication in Immunology and Cell Biology, a journal regarded around the world as a leading voice for immunology breakthroughs.

Kylie's research is looking at the vaccine currently being used internationally (BCG or Bacille Calmette Guerin), which gives the body a weakened form of the disease to teach the immune system how to fight a real Tb infection. By blocking the regulatory T cells prior to this 'mini-infection' entering the body,



Healthy Lungs



Lungs infected with TB

a greater immune response occurs. Kylie is now researching whether the strength of the memory of the immune response is translated to combating an actual infection.

Another area of interest to the Infectious Diseases Group is looking into new ways of teaching the immune system to fight the disease, through vaccination to establish a

memory of what Tb looks like. The mini-infection used in the current Tb vaccine (BCG) is a small dose of live, weakened micro-organisms. Because the vaccine is live there is a certain element of risk with the vaccination, for example if your immune system is weakened in any way the side effects of vaccination at that time could be detrimental to your health.

An alternative vaccine being developed at the Malaghan Institute uses DNA. This DNA represents the proteins found in TB and can create the same response by the immune system as the actual disease. The immune system remembers that protein and when the same proteins are presented again, through a real infection, the body instantly remembers what it is looking at and how to fight it.

We hope that in our continued research and application of these discoveries we can develop an effective and practical method of protecting the human body, with minimal risk to health, from a disease which has threatened for thousands of years. If we can achieve this, as our part in the worldwide fight against Tuberculosis, hopefully future generations will live in a world free of this disease.

Ryman Healthcare supports Malaghan cancer research

The Malaghan Institute is honoured to have been chosen as the recipient of the Ryman Healthcare Charitable Grant for 2006. Our nomination for this funding was supported by the residents of Ryman Healthcare Retirement Villages throughout the country, and we are very humbled to have been chosen over some very worthy causes to receive this grant.



We, at the Malaghan Institute, are preparing a nationwide tour through all of the Ryman Healthcare Retirement Villages, informing their residents of our work, particularly our Cancer research which will be the beneficiary of this funding.

We would particularly like to thank the residents of the Ryman Healthcare Retirement Villages as this grant is made available through their efforts in fundraising throughout the year and is matched by Ryman Healthcare.

If you would like any further information about Ryman Healthcare Retirement Villages please visit: www.rymanhealthcare.co.nz

The Ultimate Gift

The ultimate gift to show your support for the research of the Malaghan Institute, and our hopes for a disease free future, is a bequest in your will.

As a charity, the Malaghan Institute relies on the generosity of its supporters to continue our work, and a gift in your will is a way of ensuring our research into Cancer, Asthma, Arthritis, Multiple Sclerosis and Infectious Diseases will protect future generations from disease well beyond your lifetime.

To receive information about leaving a gift in your will and how these funds are managed, please tick the box below and enter your contact details on the reverse of this form.

Yes, please send me information on how I can leave a gift in my will and invest in a disease-free future



