Breakthrough in cancer treatments and prevention of subsequent heart failure

Researchers from Heart Research Australia are working on a project that has the incredible potential to make cancer cells more responsive to cancer treatment and potentially eliminate the risk of developing heart failure at a later stage.

A commonly used group of cancer treatment drugs called ‘anthracyclines’, which includes the common drug Doxorubicin, although effective can lead to side effects such as heart damage and heart failure.

50% of patients with severe heart failure will die within 1 year of diagnosis.[i]

Heart Research Australia’s Chair of Cardiology, Professor Helge Rasmussen, and his co-investigator Dr Chia-chi Liu, are leading a project which has the amazing potential to make a significant improvement in the lives of cancer and cardiac patients.

Professor Rasmussen and his team were investigating a group of proteins, called ‘FXYD proteins’ when they realised one of the proteins, FYXD 3, was overexpressed in some cancer cells including breast, pancreas, prostate and bowel cancer cells. Their test tube experiments proved that the FXYD3 protein protects the cancer cells, making them less responsive to treatments such as Doxorubicin.

The team have now developed a peptide (a small protein-like substance) which when applied to some cancer cells, “wipes out” the protective effect of the FYXD 3 protein.

“In our studies, when we put the peptide on breast cancer cells and treated it with Doxorubicin, it amplified the effect of the Doxorubicin tenfold.” says Professor Rasmussen.

While these results are from test-tube experiments, if Professor Rasmussen and his team could prove this action to have the same effect on some cancers in people, it is possible doctors could use a tenfold lower dose of Doxorubicin (for example) and still get the same results from the treatment.

In doing so, this would reduce damage to the heart, and likely eliminate the risk of developing heart failure.

Professor Rasmussen is cautiously optimistic, but does acknowledge that this research not only has the potential to reduce damage to the heart, it could also lead to a cure for some cancers.

“Heart damage is often now the limiting factor in cancer treatment. You can treat the cancer, but if you damage the heart, it doesn’t always recover. Sometimes people get their cancer treated or even cured, but then they can die from heart failure,” says Professor Rasmussen.

“Our work is extremely exciting as it has the potential to drastically change the way we treat cancer.”

Fast Facts[ii]:

- Around 100,000 Australians are living with heart failure.
- 20–30% of patients with mild to moderate heart failure will die within one year
- 50% of patients with severe heart failure will die within one year

- Aboriginal and Torres Strait Islander peoples experience chronic heart failure at a younger age and are more likely to die than non-Indigenous Australians

- Heart failure costs are estimated to be more than $1 billion per annum


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