ACRF CENTENARY CANCER RESEARCH CENTRE

Centenary Institute life saving research
Cancer. Inflammation. Cardiovascular.

1 in 4 people worldwide are dying from conditions caused by thrombosis.[1]

Thrombosis is the formation of a blood clot in a blood vessel. It is generally described by the type of blood vessel affected (i.e. venous or arterial thrombosis) and the precise location of the blood vessel or the organ it supplies. Commonly known examples are deep vein thrombosis (DVT) or a coronary artery.

Our blood is responsible for flowing continuously and smoothly throughout our body, and being able to quickly shut-off potential leaks when we experience an injury. While this process is often life-saving, it can also be deadly. Once a clot has formed, it can slow or block normal blood flow, and even break loose to cause life-threatening damage to our organs.

A group of international researchers, led by three from Centenary, has set out to better understand how blood clots are formed. The results of their study have recently been published in the peer-reviewed scientific journal eLife. The development has the potential to be life-changing for many Australians.

Thrombosis is closely linked to heart attacks, stroke and cancer. Statistics show cardiovascular disease alone accounts for 29 per cent of all deaths in Australia[2], while it is estimated the number of new cancer cases diagnosed in Australia this year will be 138,321[3]. With thrombosis a common complication of diabetes, it is also important to note that in 2015, 16,400 Australians died from diabetes, with type 2 diabetes accounting for more than half of these cases.[4]

Co-lead author of the study, Dr Joyce Chiu from the ACRF Centenary Cancer Research Centre, believes the discovery is a major breakthrough in the field.

"Emerging evidence shows that a family of enzymes (known as oxidoreductases) are released from platelets and blood vessel linings in reaction to injury, and are essential for blood clotting to occur. However, scientists have so far been unable to determine the exact function of these enzymes in this process.

Our study has progressed our understanding by showing how one particular type of oxidoreductase, ERp5, inhibits platelet clumping - thereby hindering blood clotting. It does so by breaking a chemical bond in a key receptor protein (known as an integrin) on the platelet surface.

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Currently patients with thrombosis can be treated with anti-clotting therapeutics that target platelet integrins, but they can also cause life-threatening bleeding as a side effect. Our findings will help us develop safer anti-clotting drugs because we can now modulate integrin function via this chemical bond," says Dr Chiu

Dr Chiu and the team are now not only one-step closer to better understanding the mechanisms involved in blood clotting, they are closer to changing and saving lives.

2018 has so far been an exceptional year for Centenary. Our scientists (including some of our young PhD students) are behind several ground-breaking discoveries which have received international recognition including:

- **A game-changing discovery in diagnosing genetic heart disease** – our Molecular Cardiology Program has led a study, showing for the first time how whole genome sequencing can boost the diagnostic pick-up rate in people with hypertrophic cardiomyopathy (a potentially deadly inherited heart condition, involving a thickening of the heart muscle) by up to 20 per cent.

- **A new hope for those at risk of world's third deadliest cancer** – our Liver Enzymes in Metabolism and Inflammation Program has created a more realistic model of primary liver cancer; placing medical researchers in a much better position to develop more effective treatments for the third-most common cause of cancer death worldwide.

- **Boosting the human body's fight against melanoma** – our Skin Imaging and Inflammation Laboratory has uncovered a new pathway in the body which fights cancer; paving the way for the development of drugs that improve the prognosis of patients with melanoma and other types of cancer.

- **It takes two to tango: effect of calcium on iron levels crucial to human health** – our Structural Biology Program has developed a new framework for understanding how iron is transported around the body, making leeway for the development of more targeted therapies for people suffering from iron-related chronic health conditions, such as anaemia.

Visit our latest news to read more about our life saving research advancements.

[1] http://www.worldthrombosisday.org/issue/thrombosis/
[2] National Heart Foundation, 2017. HeartWatch Survey, customised data, April 2018.
[3] canceraustralia.gov.au
[4] https://www.aihw.gov.au/reports/diabetes/diabetes-snapshot/contents/how-many-australians-have-diabetes