

THE WALTER AND ELIZA HALL INSTITUTE OF MEDICAL RESEARCH (WEHI)

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## **Major discovery raises prospect of better patient care by improving platelet life span**

Scientists at WEHI have made a discovery with potentially profound implications for the care of patients, especially those undergoing cancer chemotherapy.

The research team led by Drs Benjamin Kile and David Huang has discovered that platelet life span is controlled by two key molecules. The discovery raises the prospect of developing a new drug to prolong the life span of platelets stored in blood banks, effectively increasing the availability of this life-saving blood product.

An undesirable side effect of cancer chemotherapy is extensive bruising and potentially life-threatening bleeding. This is caused by the unintended depletion of platelets, tiny circulating blood cells that are essential for blood clotting and wound healing. Consequently, the well being of some patients depends upon platelet transfusions, particularly during the vulnerable periods that follow anti-cancer treatment. The significant demand for high quality platelets, coupled with their short shelf life of only five days, presents major logistical challenges in clinical practice.

The scientific team has found that two specialised molecules act in opposition to each other to control platelet life span by regulating the process known as "apoptosis." This term refers to the normal and healthy self destruction of old, damaged and surplus cells. One protein (known as Bcl-x<sub>L</sub>) acts to preserve the life of the platelet, while the other protein (Bak) prepares the cell to self-destruct after its usual life span within the body - about a week. Problems can arise when the normal and balanced process of apoptosis goes awry.

WEHI's Dr David Huang said, "Apoptosis is an essential process, common in other cells, but the central role it plays in controlling the life span of the highly specialised platelet has not been previously appreciated. With this new knowledge, we are in a much stronger position to devise better therapies for the management of platelet-related diseases."

Dr Kile added, "For fifty years doctors have speculated about what controls platelet life span. We now know the identity of the precise molecular switch responsible. The team is now actively pursuing a drug development program aimed at

manipulating this switch in order to prolong the life span of blood bank platelets, increasing their availability to patients receiving cancer treatment and others in danger of serious bleeding”.

At the opposite end of the scale, shortening platelet life span may be useful in the treatment of other diseases. For instance, too many platelets can trigger dangerous blood clots leading to strokes or heart attacks. Reducing platelet life span may therefore prove valuable in the prevention and management of these life-threatening conditions.

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*Refer to the attached illustration.*

The scientific research was generously funded by the Australian National Health and Medical Research Council (NHMRC); the State Government of Victoria (DIIRD); the Australian Research Council (ARC); the Australian Cancer Research Foundation (ACRF); the Cancer Council of Victoria; the National Cancer Institutes (US); the US-based Leukemia and Lymphoma Society ([www.lls.org](http://www.lls.org)); and MuriGen Pty Ltd ([www.murigen.com.au](http://www.murigen.com.au)), a company based at the WEHI Biotechnology Centre in Bundoora, Victoria.

The scientific team based at WEHI is headed by Dr Kile and Dr Huang, and includes

Dr Kylie Mason, Dr Marina Carpinelli, Dr Jamie Fletcher, Dr Janelle Collinge, Ms Adrienne Hilton, Ms Sarah Ellis (Peter MacCallum Cancer Centre), Ms Priscilla Kelly, Dr Paul Ekert (Children’s Cancer Centre, Royal Children’s Hospital), Professor Donald Metcalf and Dr Andrew Roberts.

The findings of the scientific team are published in the 23 March 2007 issue of the prestigious international journal, *Cell*.

Dr Benjamin Kile and Dr David Huang are available for interview.

Contact: Mr Brad Allan, WEHI Communications Manager: telephone +61 3 9345 2345; mobile 0403036116. Email [allan@wehi.edu.au](mailto:allan@wehi.edu.au)

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