Canterbury Medical Research Foundation

Final report for Project Grant PRO(16/06)

Grant recipient

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Grant details

GRANT TYPE	Project Grant	FUNDING ROUND	2016 PRO
GRANT REFERENCE	PRO(16/06)	GRANT AMOUNT	$89,561

Final report

1. Report for the Scientific Assessing Committee

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111.1 KiB

2. Brief summary

Mitochondria are the powerhouse of the cell, the site where food is converted to energy. A decline in mitochondrial function and an increase in oxidative stress has been linked with ageing; however, non-invasive methods to quantify mitochondrial health have been absent until now. From a single blood draw we were able to investigate both mitochondrial health and markers of oxidative stress. We used live cells isolated from freshly-drawn human blood to quantify mitochondrial function in a Seahorse Analyzer, a machine that can measure oxygen consumption and determine mitochondrial function in live cells in real time. Pilot work had demonstrated that the mitochondrial reserve capacity of monocytes and lymphocytes decreased in response to hydrogen peroxide treatment, and that monocytes were much more resistant to treatment. We were able to show that monocytes and lymphocytes isolated from a healthy elderly cohort (70-80 years old) did not show a decrease in mitochondrial function compared with a younger group (18-25 years old), and furthermore, showed a similar response to oxidative stress. We also investigated the redox status of peroxiredoxins, antioxidant proteins that cycle between reduced and oxidized states in the presence of peroxides. Prx3 in platelets was found to be more oxidized than Prx2 (in red blood cells), which was interesting given platelets are particularly resistant to treatment with hydrogen peroxide; however, no change in redox state of either protein was detected with regard to ageing. Our results suggest mitochondrial function in blood cells does not decrease with age and that their ability to respond to oxidative stress remains robust.

3. Photographs

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4. Feedback