

Specialised abalone metabolites: Transport of *Haliotis iris* as case study



Dr Leonie Venter

Aquaculture Biotechnology Research Group, School of Science,
Auckland University of Technology, Auckland, New Zealand



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About me and my work

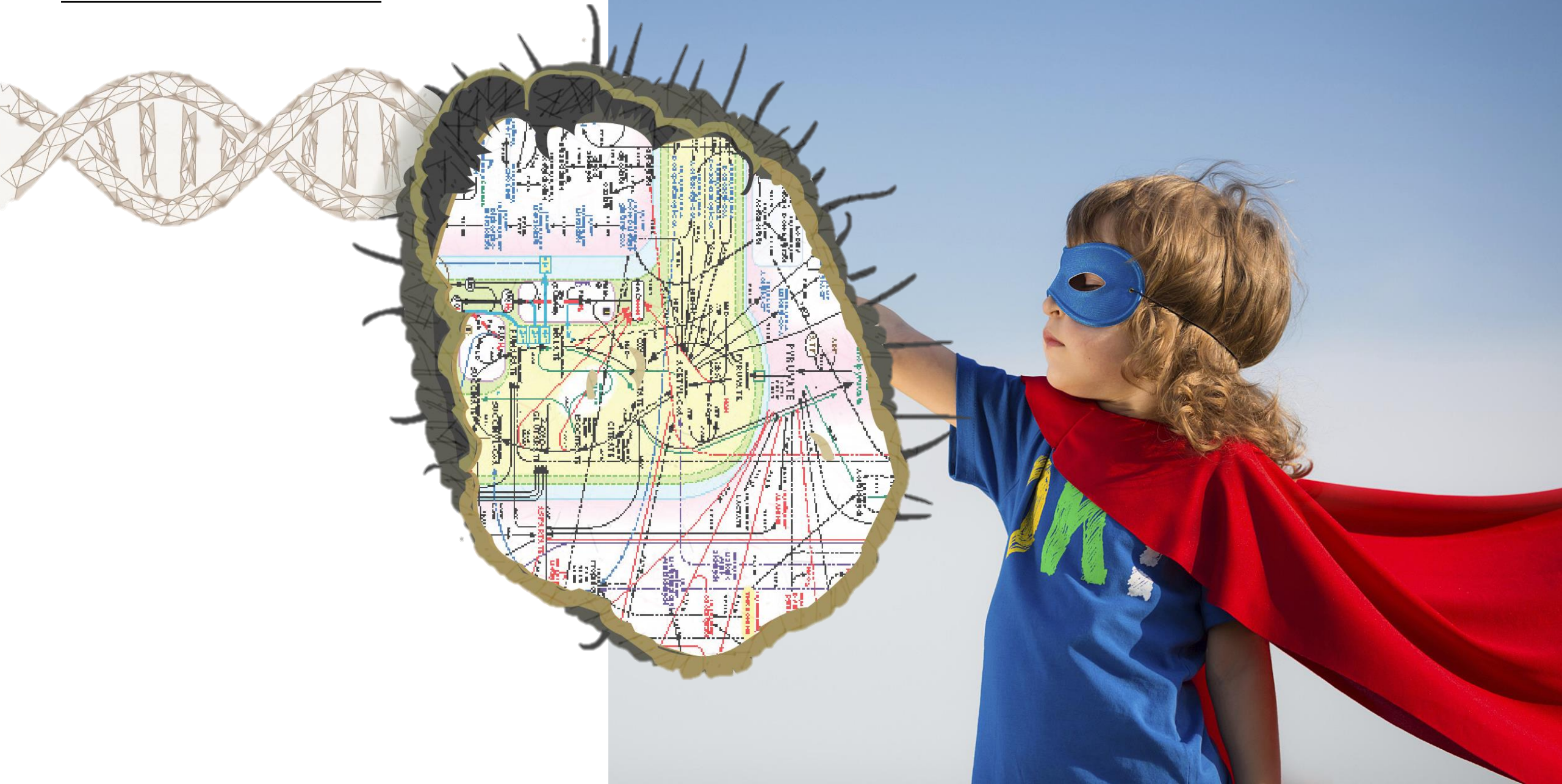


**AQUACULTURE BIOTECHNOLOGY
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- Applied research that assists and advances New Zealand's growing aquaculture industry.
- Dynamic environment where students participate in collaborative research.
- Development and application of innovative tools and approaches to solve complex 'real world' problems.

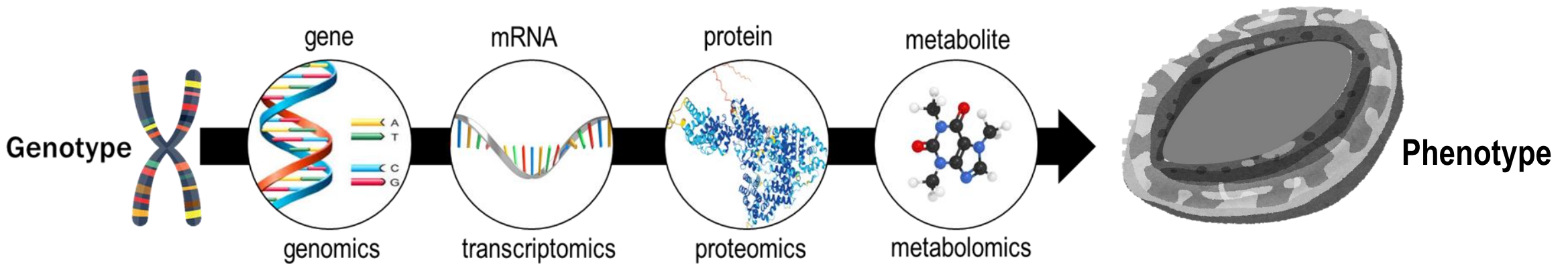
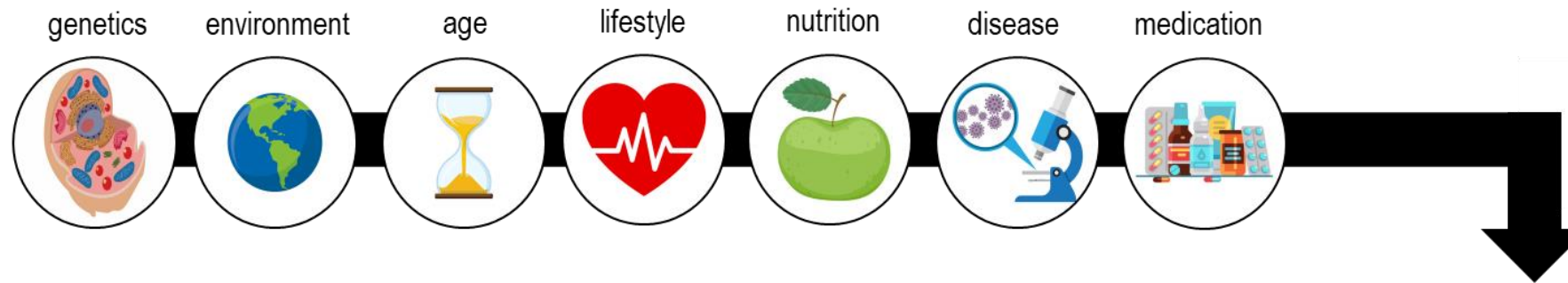


“Super-pāua”



Metabolomics as investigation tool to profile metabolites

↳ Non-biased identification and quantification of metabolites in a biological system
Small molecule – intermediate / end product of cellular metabolism



"Metabolites, after all, are the ultimate molecular arbiters of biological function..." - Jeffrey Perkel (2012) The Scientist

"If I were doing a PhD, I'd be doing it in Metabolomics" - James Watson (2013)

NZ Pāua

Abalone: Single-shelled marine molluscs, unusual, flattened shell, contains a large muscular foot.

Commercially pāua is harvested by free diving.
Small abalone farming market is operational in NZ.

New Zealand's pāua: shells, pearls and meat ~ exported and sold locally as fresh and canned products.

Live exports account for \pm 45% of total exports.
Freight can be shipped up to 36h depending on destination.



Rationale and aim



WHY

Understand mechanisms that drives abalone physiology during transport stress and recovery.

Support industry and policy makers
~ improve live abalone transport and recovery methods
~ higher survival rates and improved product quality



AIM

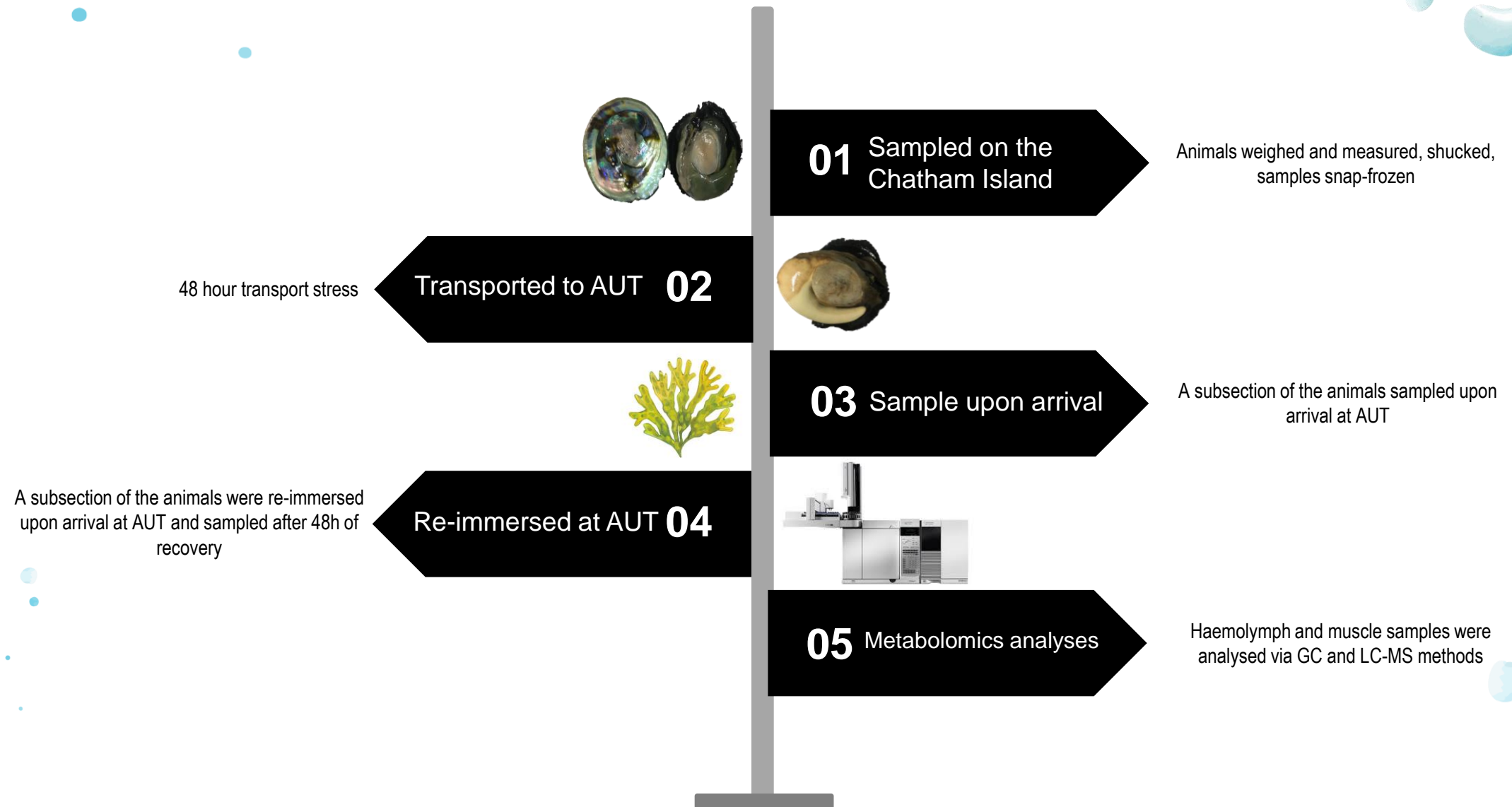
Determine how transport stress affects the metabolome of *H. iris*

Experimental design & analyses



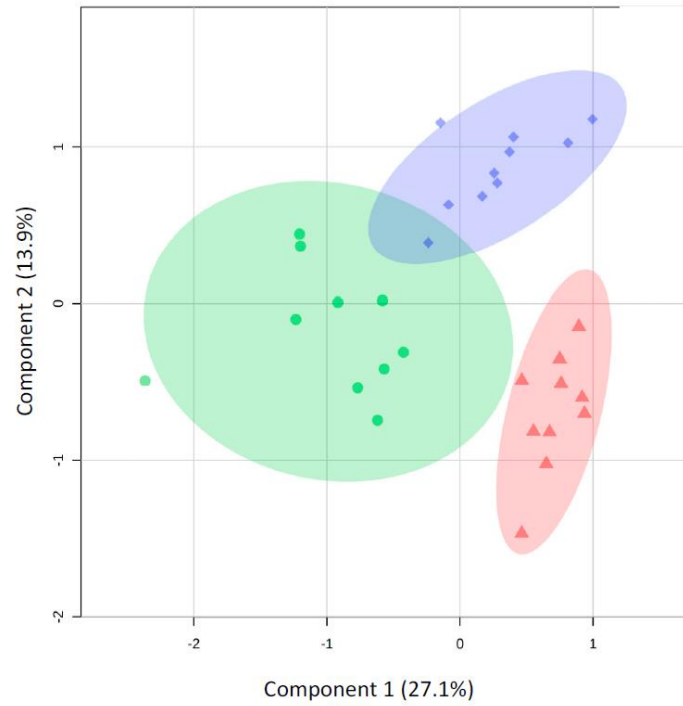
The Chatham Islands consists of two main islands, Chatham Island and Pitt Island located approximately 800 kilometres east of New Zealand.

Experimental design & analyses

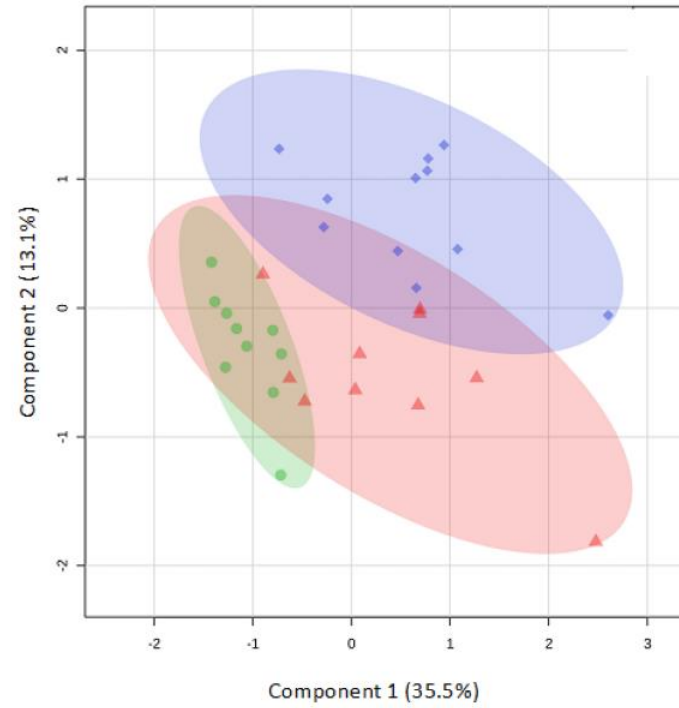


Results

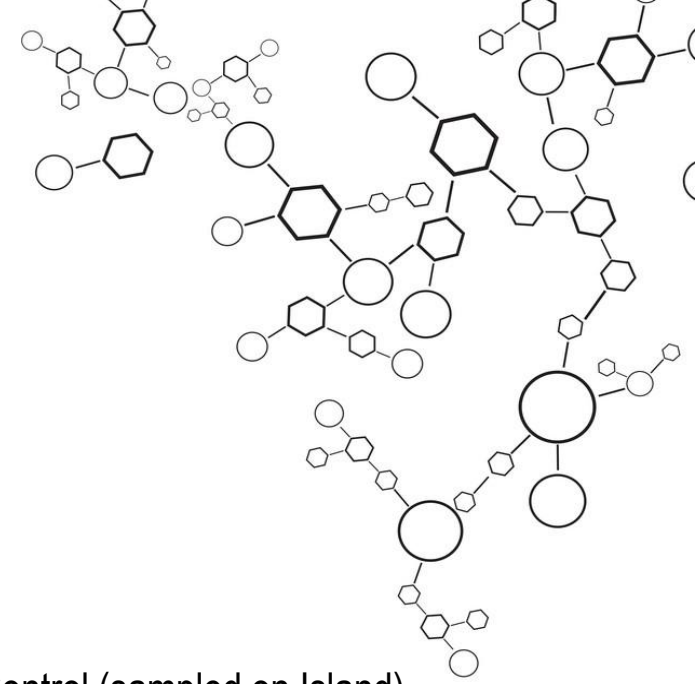
A - Haemolymph



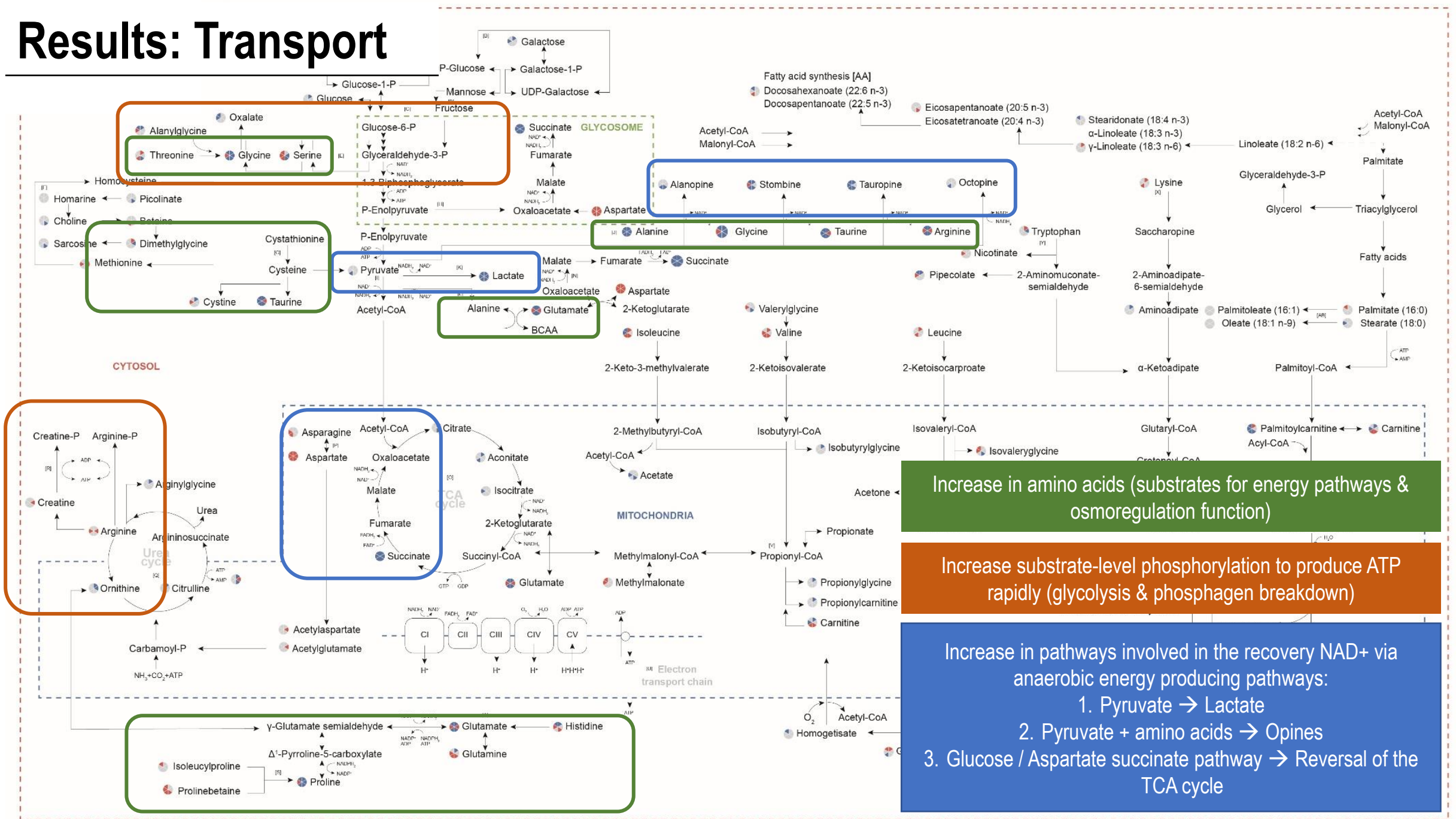
B - Muscle



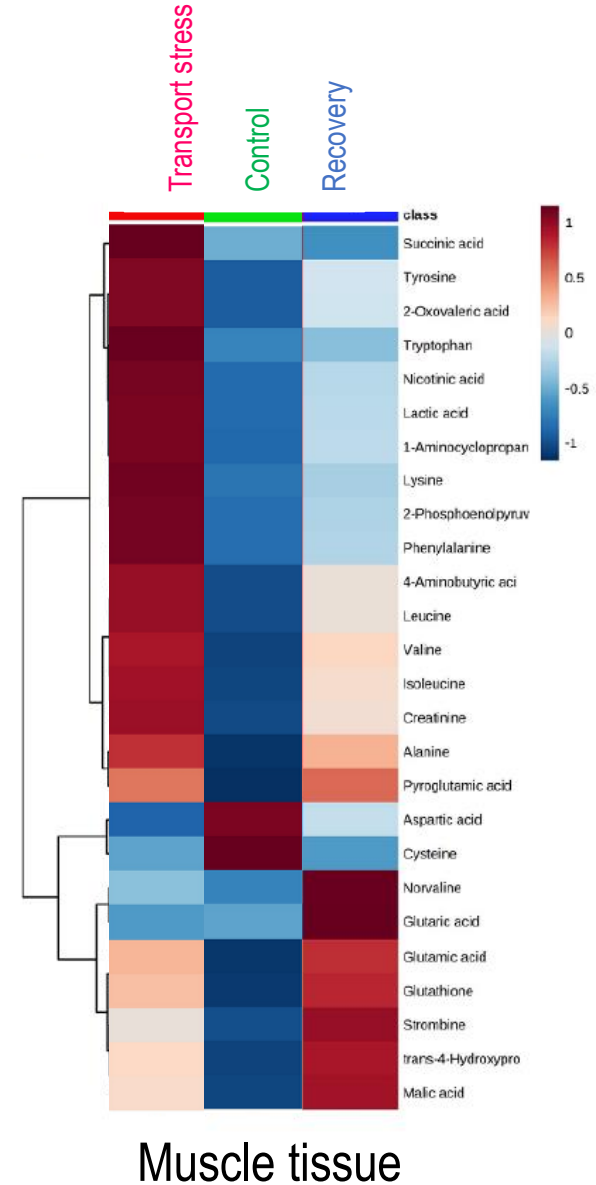
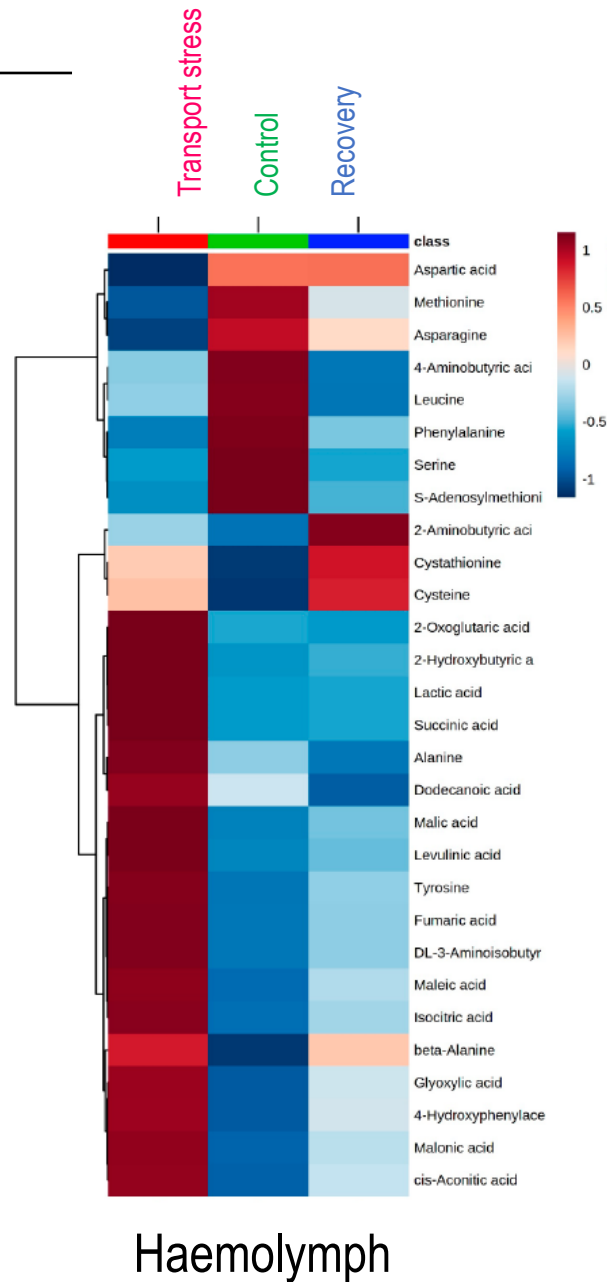
- Control (sampled on Island)
- ▲ Transport stress
- ◆ Recovery



Results: Transport



Results: Recovery



After 48h:
 Haemolymph metabolites similar to controls
 Muscle metabolites ~ metabolites equilibrium
 ~increased stress markers

Conclusions

- Metabolites can be reversed when stress conditions return to normal, causing a decrease in metabolite signals as recovery takes place (happens faster in the haemolymph than in the muscle).
- Important to keep the animals in seawater for as long as possible before transport and placed back in water as soon as arrival at destination for recovery
- Findings provide important information that may guide industry decisions to update and refine the methods and systems for live transport of abalone and other shellfish.



Article

The Effects of Live Transport on Metabolism and Stress Responses of Abalone (*Haliotis iris*)

Andrea C. Alfaro ^{1,*}, Thao V. Nguyen ^{1,2,†}, Leonie Venter ¹, Jessica A. Ericson ³, Shaneel Sharma ¹, Norman L. C. Ragg ³ and Craig Mundy ⁴



Thank you



"God must have made the Chathams last. He had a wheel barrow full of everything left over and used them up here."
- These thoughts from a Chatham island farmer, reflect the extraordinary diverse geology of a relatively small island group.

AUT



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leonie.venter@aut.ac.nz