

PSC1: A PROTEIN WITH MULTIPLE ROLES IN RNA METABOLISM

Thesis submitted to the University of Adelaide for the degree of
Doctor of Philosophy

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March 2014



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AUSTRALIA

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THESIS SUMMARY

Peri-implantation stem cell 1 (Psc1) is a developmentally regulated protein that is down regulated as cells of the blastocyst inner cell mass differentiate into primitive ectoderm *in vivo*, and as embryonic stem (ES) cells differentiate *in vitro*. The function of Psc1 is unknown, however the Psc1 protein sequence contains multiple domains that suggest a role in RNA metabolism. These include an RNA recognition motif (RRM) that has been shown to bind RNA *in vitro*, and a motif known as an RS domain that contains multiple alternating serine and arginine dipeptide repeats, and is found in many proteins involved in RNA processing. Psc1 localises with RNA metabolism proteins and to sites in the nucleus known as nuclear or splicing speckles, as well as to unidentified speckles in the cytoplasm. The work in this thesis has shown that multiple alternative forms of Psc1 exist at both the RNA and protein level, and that regulation of these alternative forms of Psc1 occurs during ES cell differentiation. Further evidence for a role in RNA metabolism and the identification of Psc1 function has been advanced through the identification of Psc1 protein binding partners Sart1 and Pabpn1. These results have led to a model where Psc1 functions at multiple stages during the maturation of specific RNA transcripts, potentially during splicing and spliceosome formation through an interaction with Sart1, and during mRNA nuclear export through an interaction with Pabpn1.

STATEMENT

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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ACKNOWLEDGEMENTS

I would like to thank Professor Peter Rathjen for the opportunity to undertake a PhD in the Rathjen lab, for input into my research, and support for the submission of my thesis after such a length of time.

Thank you to all the members of the Rathjen Lab who helped and taught me during my time at the bench, especially the two Steves, Nathan, Katherine, Michael and Joy.

Special thanks to my co-supervisor Rebecca, for guidance and advice during my time in the lab, but especially for never giving up on me completing my thesis, reading my drafts and supplying encouragement when I needed it most.

Special thanks to Joy Rathjen for helping me get my thesis from draft to complete. I can't understate my appreciation for your time, knowledge and expertise.

To my husband John, thank you for everything, this thesis would never have been completed without you. And to my children Liliana and Oscar, thank you for providing the motivation to finish.