The role of the Ether-à-go-go K^+ channel in cellular proliferation in the mouse preimplantation embryo

S.L. Jones and M.L. Day, Department of Physiology and Institute for Biomedical Research, University of Sydney, NSW 2006, Australia.

The initiation of cell division is a complex process that is currently thought to depend on changes in membrane ion permeability, especially that resulting from K^+ channel activity (Amigorena *et al.*, 1990; Wonderlin and Strobl, 1996). Furthermore, K^+ channel expression and activity (Day *et al.*, 1993; Amigorena *et al.*, 1990) have also been found to be modulated during the cell cycle, which may suggest a novel, non-excitable K^+ channel function: the regulation of cell cycle progression. Ether-à-go-go (*eag*) is a voltage-activated K^+ channel, thought to be involved in cell proliferation (Brüggemann *et al.*, 1997; Pardo *et al.*, 1998).

This study aims to examine the cell cycle dependent expression of *eag* in MCF-7 and trophoblast stem cell lines and determine the extent to which *eag* alters the membrane potential in a cell cycle dependent manner. The expression and potential change will also be examined during development of the mouse preimplantation embryo.

The effects of loss of *eag* expression on membrane potential and cell division will also be examined by specific downregulation of the gene using RNA interference. A plasmid vector will be employed to synthesise siRNA homologous to *eag* mRNA within the cells resulting in degradation of the *eag* mRNA transcript.

These methods may allow a greater understanding of the cell cycle regulated expression of *eag* and the impact of this on changes in membrane potential and the proliferative response.

Amigorena, S., Choquet, D., Teillaud, J., Korn, H. & Fridman, W.H. (1990) *The Journal of Immunology,* **144:** 2038-2045.

Wonderlin, W.F. & Strobl, J.S. (1996) *Journal of Membrane Biology,* **154:** 91-107.

Day, M.L., Pickering, S.J., Johnson, M.H. & Cook, D.I. (1993) *Nature,* **365:** 560-562.

Brüggemann, A., Stühmer, W. & Pardo, L.A. (1997) *Proceedings of the National Academy of Sciences of the USA,* **94:** 537-542.

Pardo, L.A., Brüggemann, A., Camacho, J. & Stühmer, W. (1998) *The Journal of Cell Biology,* **143:** (3) 767-775.