

1. Institution

Prof of Developmental Biology, School of Biological Sciences and Developmental Origins of Health and Disease (DOHaD), University of Southampton, Bassett Crescent East, Southampton, SO16 7PX, UK
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2. Principal investigator and contact person

Tom Fleming (tpf@soton.ac.uk) or the contacts below

3. Key Personnel

Judith Eckert	jje@soton.ac.uk	embryo devel, signalling, molec biol, imaging, human
Tom Papenbrock	tp2@soton.ac.uk	transgenics, molec genetics
Adam Watkins	ajw7@soton.ac.uk	nutrition, culture, cardiovascular
Charlotte Williams	clw2@soton.ac.uk	cytokines, behaviour
Karen Lillycrop	kal@soton.ac.uk	epigenetics, transcription factors
Bhav Sheth	bs1@soton.ac.uk	epithelial differentiation, siRNAs
Neil Smyth	N.Smyth@soton.ac.uk	transgenics, ECM, stem cells
Mark Hanson	m.hanson@soton.ac.uk	DOHaD Director

4. Research profile

The laboratories focus firstly on environmental influences on mouse embryo and egg developmental potential using in vivo maternal nutrition and infection and in vitro culture models. Outcomes and mechanisms studied cover growth, metabolism, physiology, behaviour, immune response, gene expression, epigenetics and cell biology during embryonic, fetal or postnatal life. We also study basic mechanisms of early embryo development centred around blastocyst morphogenesis and trophectoderm epithelial differentiation including signalling and transcription factor contribution. Human embryo development studies lead by J. Eckert relate also to basic mechanisms and environmental consequences in vitro and in relation to maternal factors.

5. Key technologies and tools

Embryo culture, embryo gene expression (real time RT-PCR) and protein localisation and imaging (confocal microscopy), gene microinjection, transgenics, stem cells, cardiovascular phenotype (eg, vasculature myography; blood pressure), behaviour studies, licence for human embryo research.

6. Selected publications (max. 5)

Watkins, AJ, Platt, D, Papenbrock, T, Wilkins, A, Eckert, JJ, Kwong, WY, Osmond, C, Hanson MA, Fleming, TP. (2007) Mouse embryo culture induces changes in postnatal phenotype including raised systolic blood pressure. *Proc Natl Acad Sci, USA*, 104:5449-54.

Eckert JJ, Houghton FD, Hawkhead JA, Balen AH, Leese HJ, Picton HM, Cameron IT, Fleming TP. (2007) Human embryos developing in vitro are susceptible to impaired epithelial junction biogenesis correlating with abnormal metabolic activity. *Hum Reprod*. 22:2214-24.

Watkins AJ, Ursell E, Panton R, Papenbrock T, Hollis L, Cunningham C, Wilkins A, Perry VH, Sheth B, Kwong WY, Eckert JJ, Wild AE, Hanson MA, Osmond C, Fleming TP. (2008) Adaptive responses by mouse early embryos to maternal diet protect fetal growth but predispose to adult onset disease. *Biol Reprod*. 78:299-306.

Watkins AJ, Wilkins A, Cunningham C, Perry VH, Seet MJ, Osmond C, Eckert JJ, Torrens C, Cagampang FRA, Cleal J, Gray WP, Hanson MA, Fleming TP. (2008) Low protein diet fed exclusively during mouse oocyte maturation leads to behavioural and cardiovascular abnormalities in offspring. *J Physiol*. In press.

Kwong, WY, Miller, DJ, Ursell E, Wild AE, Wilkins, AP, Osmond, C, Anthony, FW, Fleming TP. (2006) Imprinted gene expression in the rat embryo-fetal axis is altered in response to periconceptual maternal low protein diet. *Reproduction* 132:265-77.