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Cancer

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The endocrine system controls cell-cell communication and coordinates almost all our daily activities. Abnormalities in hormones, receptors and cell signalling pathways underpin many common diseases such as diabetes, high blood pressure and obesity. We are studying the actions of two important steroid hormones, cortisol (a glucocorticoid) and aldosterone (a mineralocorticoid) that are secreted by the adrenal gland and regulate important aspects of systemic physiology and homeostasis, in humans and other mammals. Cortisol has many homeostatic roles in a wide range of tissues both during embryogenesis, particularly the developing lung. Premature babies have underdeveloped lungs and require treatment with synthetic glucocorticoids. Glucocorticoids exert their effects by binding to the intracellular glucocorticoid and mineralocorticoid receptors, GR and MR respectively. Both are members of the nuclear receptor super-family of ligand dependent nuclear transcriptional regulators. Research projects below will utilize a range of molecular, biochemical and genetic techniques in both cell-based and animal systems to investigate these cell signalling pathways and their specific roles.

Research Projects

1. **Glucocorticoid-regulated pathways in the pre-term lung and the development of Selective Glucocorticoid Receptor (GR) Modulators (SGRMs)**
2. **Steroid metabolising enzymes: HSDs and cancer – a novel human enzyme called 11bHSD3**
3. **Analysis of genomic versus non-genomic effects of the MR in an in vivo dimerization mouse mutant**

Selected significant publications:

1. Antony N, McDougall A, Mantamadiotis T, **Cole T**, Bird A. 2016. Creb1 regulates late stage mammalian lung development via respiratory epithelial and mesenchymal-independent mechanisms. *Sci Rep* 6:25569.
2. Bird AD, Choo YL, Hooper SB, McDougall ARA **Cole TJ**. 2014. Mesenchymal Glucocorticoid Receptor Regulates Development of Multiple Cell Layers of the Mouse Lung. *Am. J. Resp. Cell Mol. Biol* 50, 419-428.
3. Wong S, Tan K, Carey KT, Fukushima A, Tiganis T and **Cole TJ**. 2010. Glucocorticoids stimulate Hepatic and Renal Catecholamine Inactivation by Direct Rapid Induction of the Dopamine Sulfotransferase Sult1d1. *Endocrinology* 151, 185-194.
4. **Cole TJ**, Solomon NM, Van Driel R, Monk JA, Bird AD, Richardson SJ, Dille R and Hooper SB. 2004. Altered Epithelial Cell Proportions in the Fetal Lung of Glucocorticoid Receptor Null Mice. *Am. J. Resp. Cell Mol. Biol.* 30, 613-619.
5. Purton JF, Boyd, R, ***Cole TJ** and *Godfrey DI. 2000. Intrathymic T cell development and selection proceeds normally in the absence of glucocorticoid receptor signalling. *Immunity* 13, 179-186. *joint senior authors.