Adrenal development
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Understanding the development of any organ is important to appreciate how it functions during the sequential phases of life: childhood, adolescence, adulthood and old age. In addition, the human adrenal gland also functions in the womb both during early development when sexual organs are being formed and late in gestation when the fetal lungs are preparing for post-natal life.

- This talk will introduce the normal structure and function of the adult adrenal cortex as a reference point (also relevant to Derek Sandeman’s talk on adrenal tumours).
- Formation of the adrenal gland takes place within the first two months of intra-uterine development, when its secretion of steroid hormones impacts on the disorder, congenital adrenal hyperplasia (no doubt covered in Ieuan Hughes’ talk on genital development).
- During the middle part of gestation, the adrenal cortex remains very active. However, the purpose of this function has remained elusive despite many years of investigation.
- Later in gestation, the adrenal cortex recommences cortisol secretion. Cortisol induces the secretion of surfactant by the fetal lung. This substance reduces surface tension, a key feature that allows the transition from fluid-filled lungs before birth to inflated lungs that permit gas exchange post-natally. Synthetic glucocorticoids (the family to which cortisol belongs) are administered in cases of premature labour in the hope of avoiding respiratory distress syndrome.
- After birth, the adrenal cortex remodels itself and secretes cortisol and the mineralocorticoid, aldosterone.
- The final phase of adrenal development is called ‘adrenarche’, which usually precedes the onset of puberty by a couple of years. It heralds the formation of the innermost part of the adrenal cortex, the zona reticularis, which secretes hormones that are converted into potent sex steroids (oestrogens and androgens). Clinically, the effects of these hormones can create some confusion with premature puberty. They can also be relevant to the investigation and diagnosis of some adrenal tumours.
- The talk will end by summarising the topics covered and attempt to draw them together in a meaningful conclusion.

Learning objectives:
1. To understand the structure of the adrenal cortex, its hormone secretions and their regulation, in order to understand clinical investigation.
2. To appreciate the development of the adrenal cortex and how it impacts on
   a. normal adult adrenocortical function
   b. congenital adrenal hyperplasia
   c. lung maturation
   d. adrenarche