

## ANHB3316 LECTURE 4 (05/08/2015)

- Using animal models to study human pregnancy
- Leptin produced by fat – feedback of to the body about food consumption
- Obesity – it doesn't work properly (leptin resistant)
- Altered transport of leptin through blood-brain barrier, altered leptin receptors, altered leptin binding activity
- During the first half of pregnancy you need to increase the intake of good resources – increased leptin production in these stages
- Overexpression of thioredoxin-1 reduces oxidative stress in the placenta of transgenic mice and promotes fetal growth via glucose metabolism

### Rat Pregnancy

- Progesterone – build up, plateau, decline over cycle
- Prolactin – spike pulses, flat line, sharp increase over cycle
- Oestrogen (estradiol) – steady increase over cycle
- Progesterone important for implantation (via endometrium) and represses immune response by the mother during pregnancy (so mother doesn't reject fetus), decreases contractility of uterine muscles, inhibition of lactation – why they drop at late pregnancy
- Mating occurs at early oestrus – blocks cycle
- Corpora lutea do not regress – progesterone levels rise (produced by corpus luteum)
- Prolactin provides luteotrophic support – maintain corpus luteum
- Implantation occurs at day 5-6 after mating
- Embryogenesis complete by day 13
- Progesterone peaks around day 16
- Gradual rise in oestradiol levels
- Pre-partum decline in progesterone
- Parturition at day 23
- Post-partum ovulation – promote frequent reproduction (oestrogen levels are really high at parturition so switched negative feedback to positive feedback)
- Initial increase in prolactin generated by the mating stimulus (irritation to cervix) which maintain progesterone levels to prevent the next cycle from happening (as a rat's cycle is only 4-5 days long)

### Rat Vs. Human Pregnancy

- Human – steady increase of oestrogen and progesterone
- Rat pregnancy – progesterone entirely from corpus luteum (humans only maintain corpus luteum progesterone until placenta takes over after 8ish weeks)
- Cytotrophoblast – important for hormone production within the placenta
- Syncytiotrophoblast – maternal-fetal exchange
- Blastocyst invades into endometrium and forms chorionic villi (finger-like projections)

- Rat placenta divided into two layers – labyrinth zone (maternal-fetal exchange) and junctional zone (major site of hormone synthesis – also called basal zone)
- Particular enzyme in labyrinth zone to prevent stress hormones into fetus – enzyme declines dramatically at end of pregnancy for parturition
- Glucocorticosteroids needed for lung development and parturition
- Labyrinth zone rapidly grows late in pregnancy (day 16-22)
- Junctional zone grows mostly before day 16-22
- Labyrinth zone – lots of blood supply