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Follistatin, muscle accumulation, puberty and fertility in Merino ewe lambs

Cesar Rosales

Mark Ferguson, Claire Macleay, Jan Briegel, Mark Hedger, Graeme Martin, Andrew Thompson



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Agriculture



Government of Western Australia
Department of Agriculture and Food



SHEEP CRC

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Internal factors

Genotype

Liveweight

Body
Condition

Age



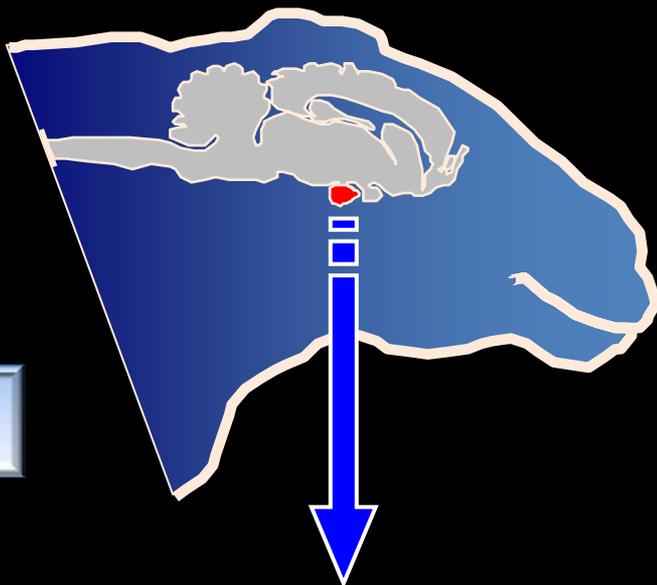
External factors

Rainfall
Environmental
temperature

Latitude
Photoperiod

Nutrition

Socio-sexual
interactions



Liveweight (50 – 70%)

Physiological sexual maturity has been reached

Gonadotrophins

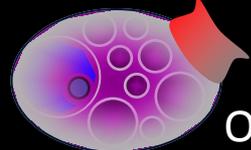
LH – Luteinizing Hormone

FSH – Follicle-Stimulating Hormone

Ovulation

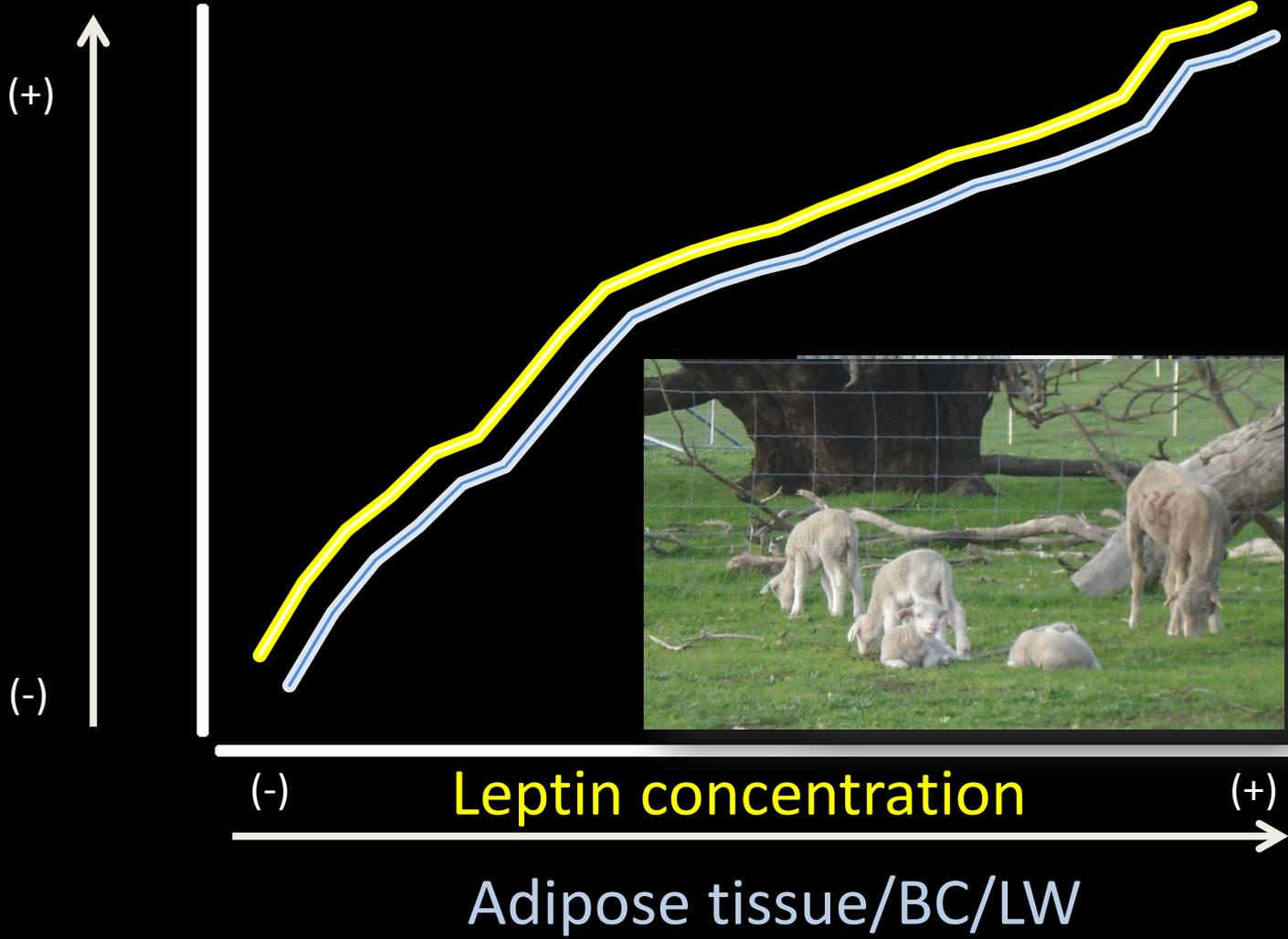


Egg

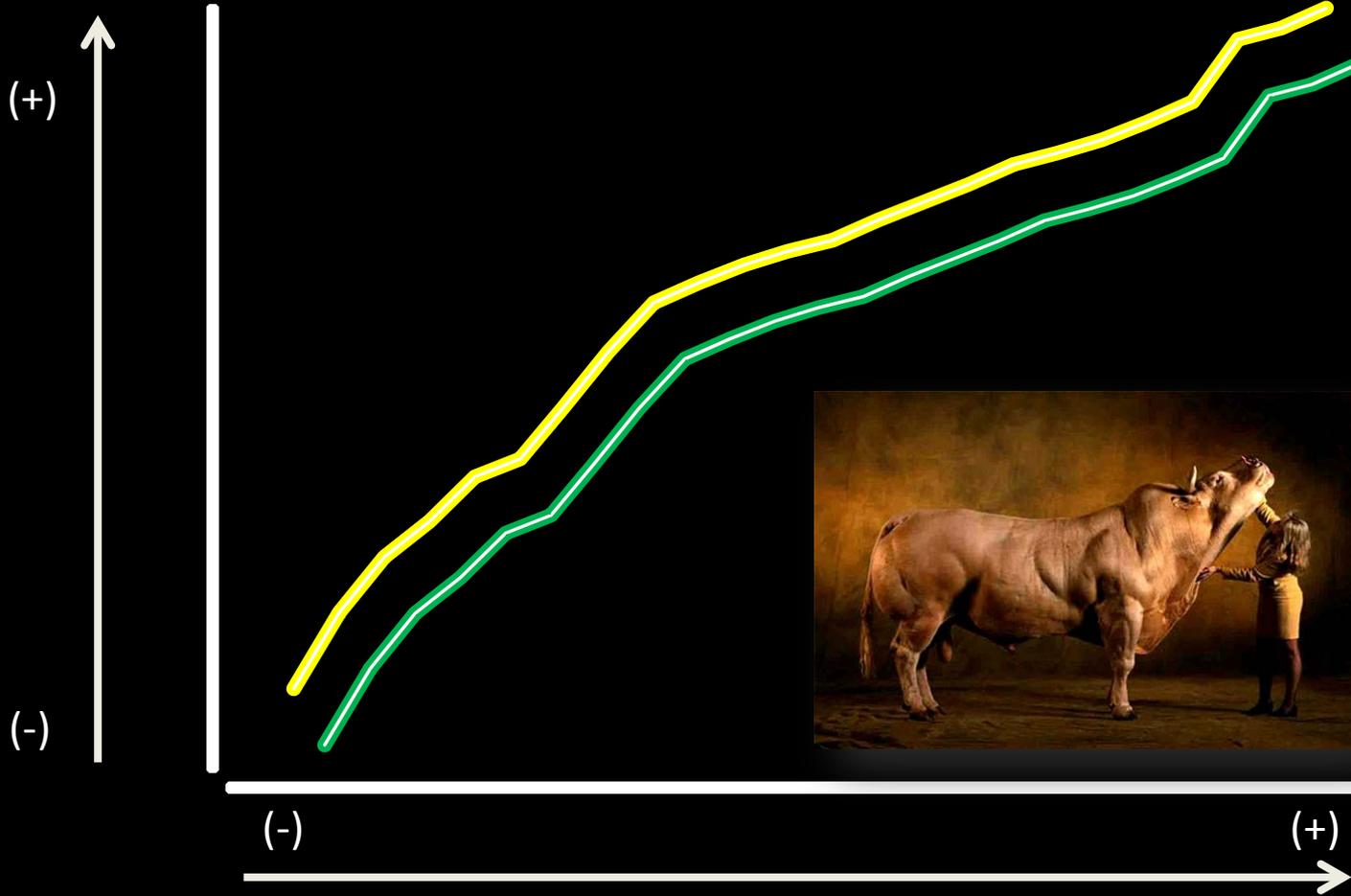


Ovary

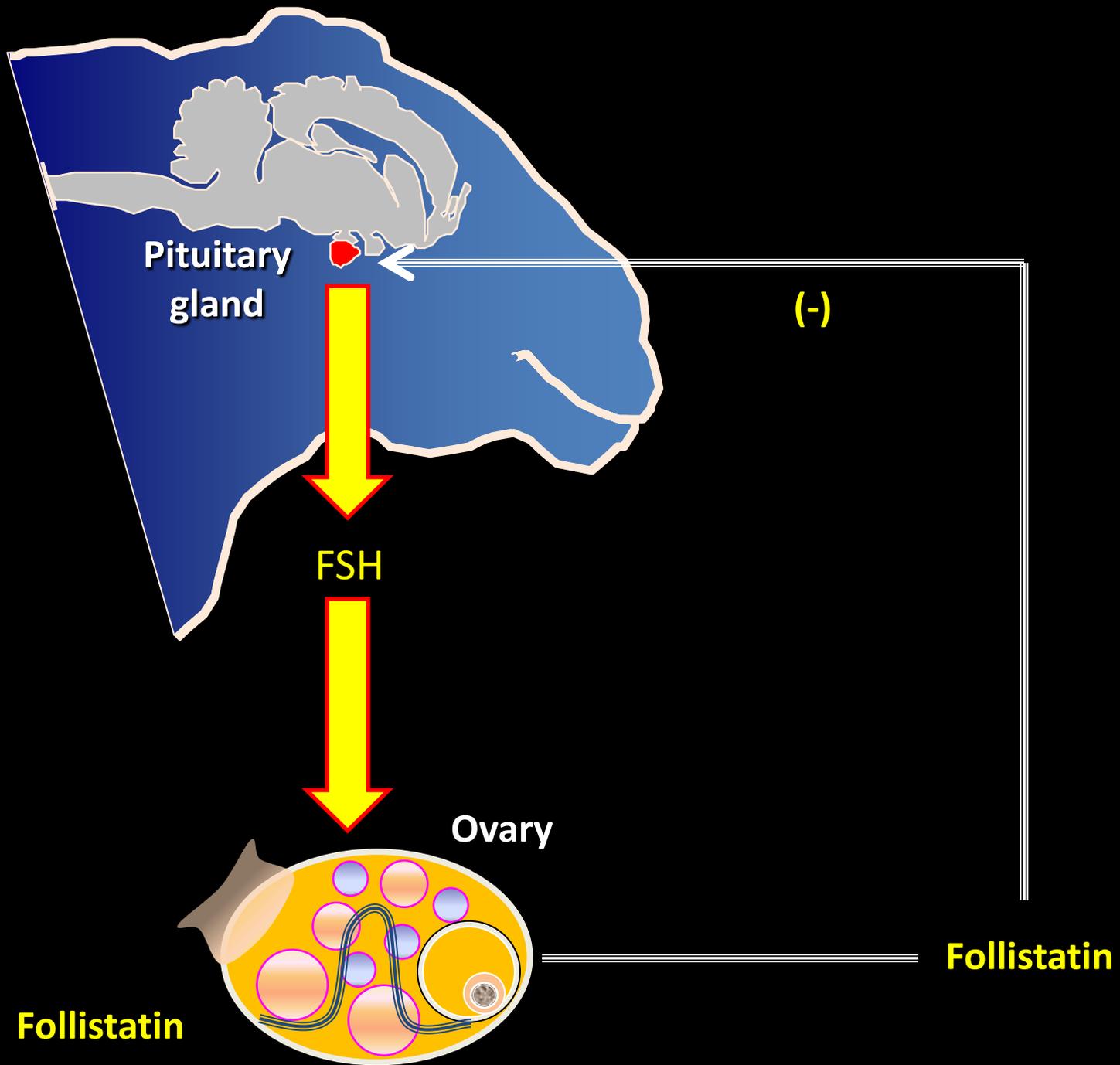
Puberty/Fertility
Leptin concentration



Follistatin
Fecundity

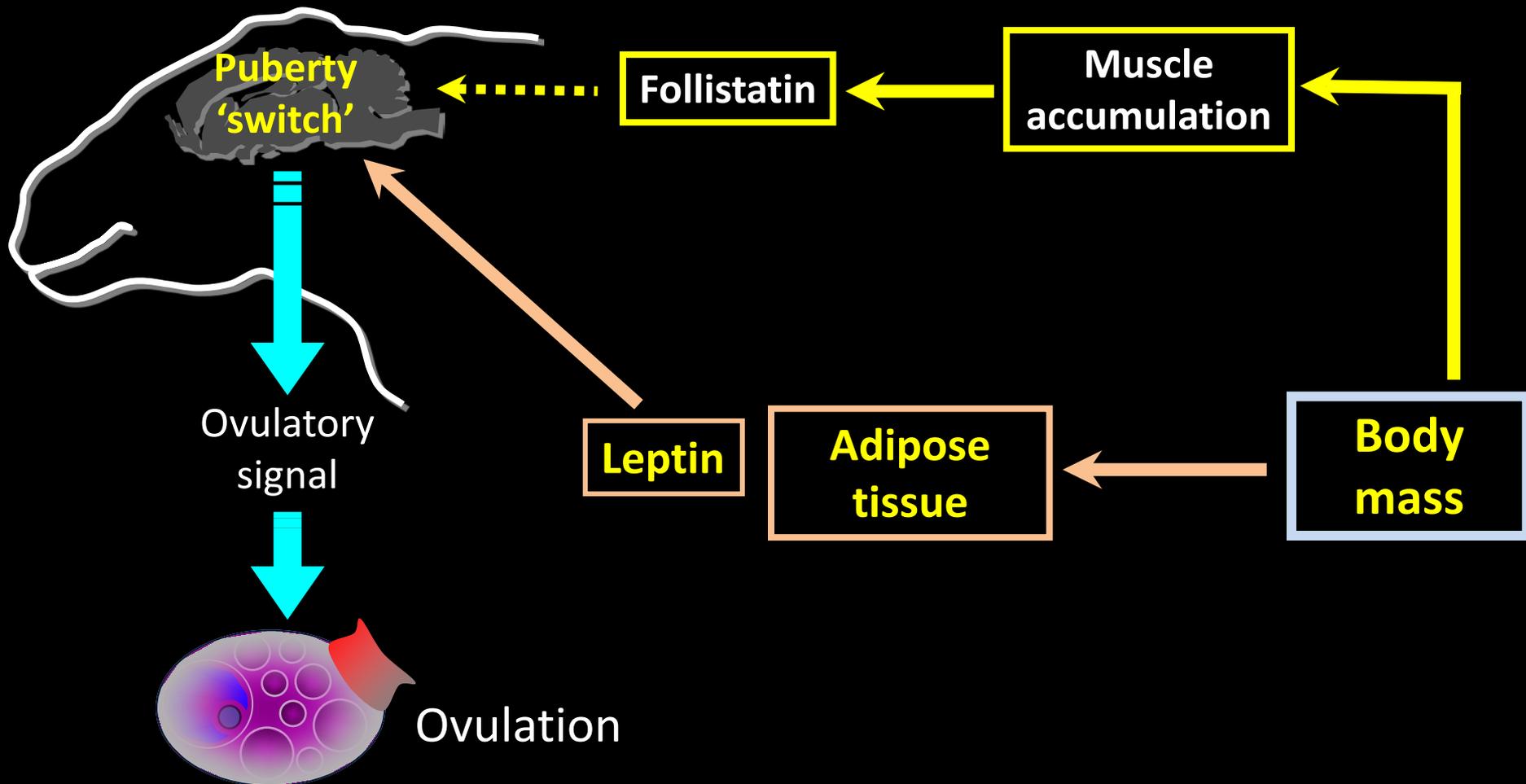


Muscle accumulation

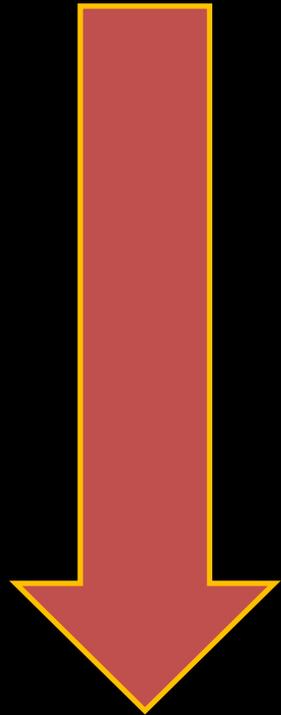


Hypothesis

Circulating concentration of Follistatin is positive correlated to puberty and fertility in Merino ewe lambs



- **Flock:** 136 Pure Merino ewe lambs (Aug - Sep 2009).
 - Sire: Wide range in genetic values (ASBV) for muscle
- Fat and muscle scan (**Average 5 mo**).
 - Phenotypic and Genotypic
 - Muscle



2010

Experiment

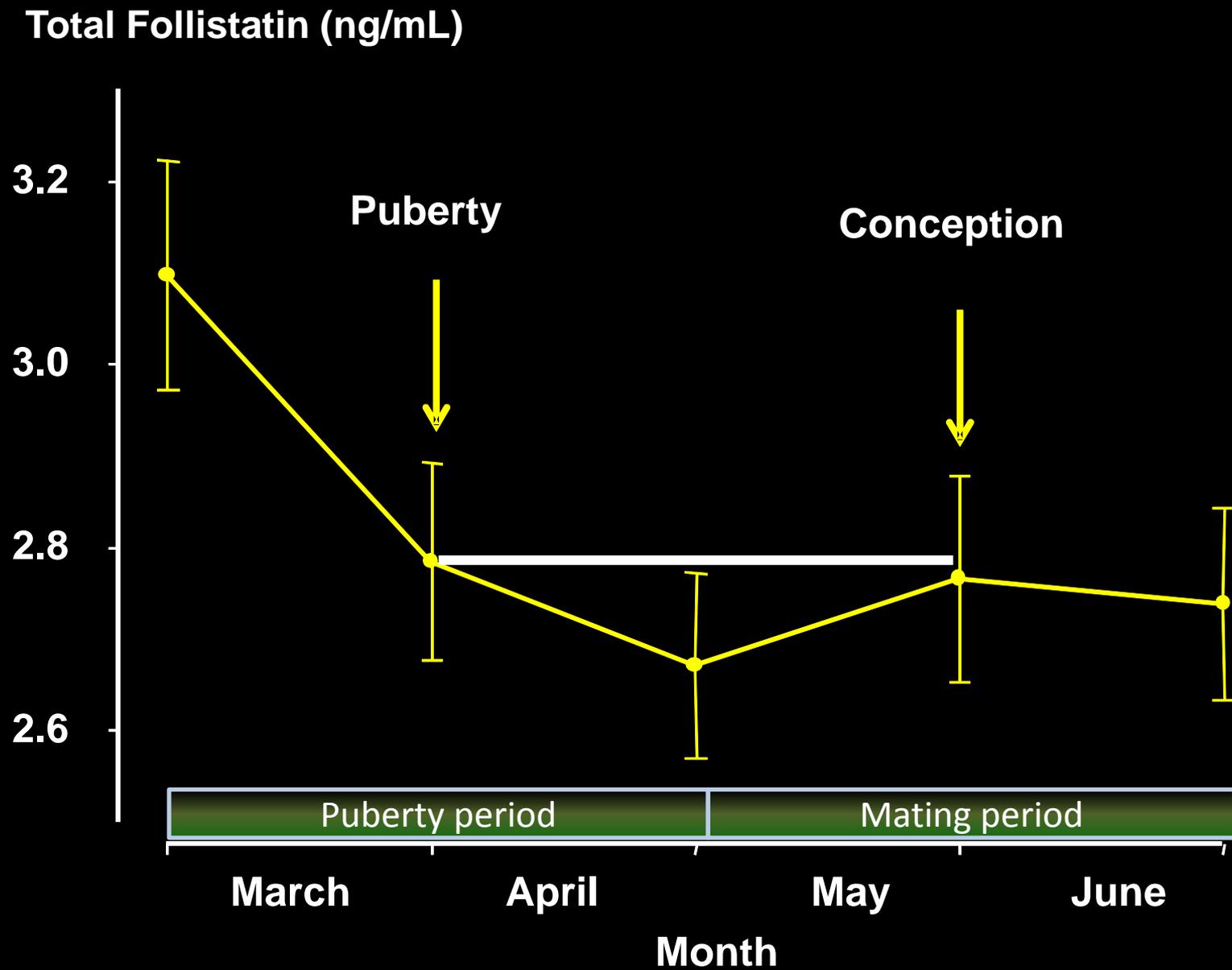


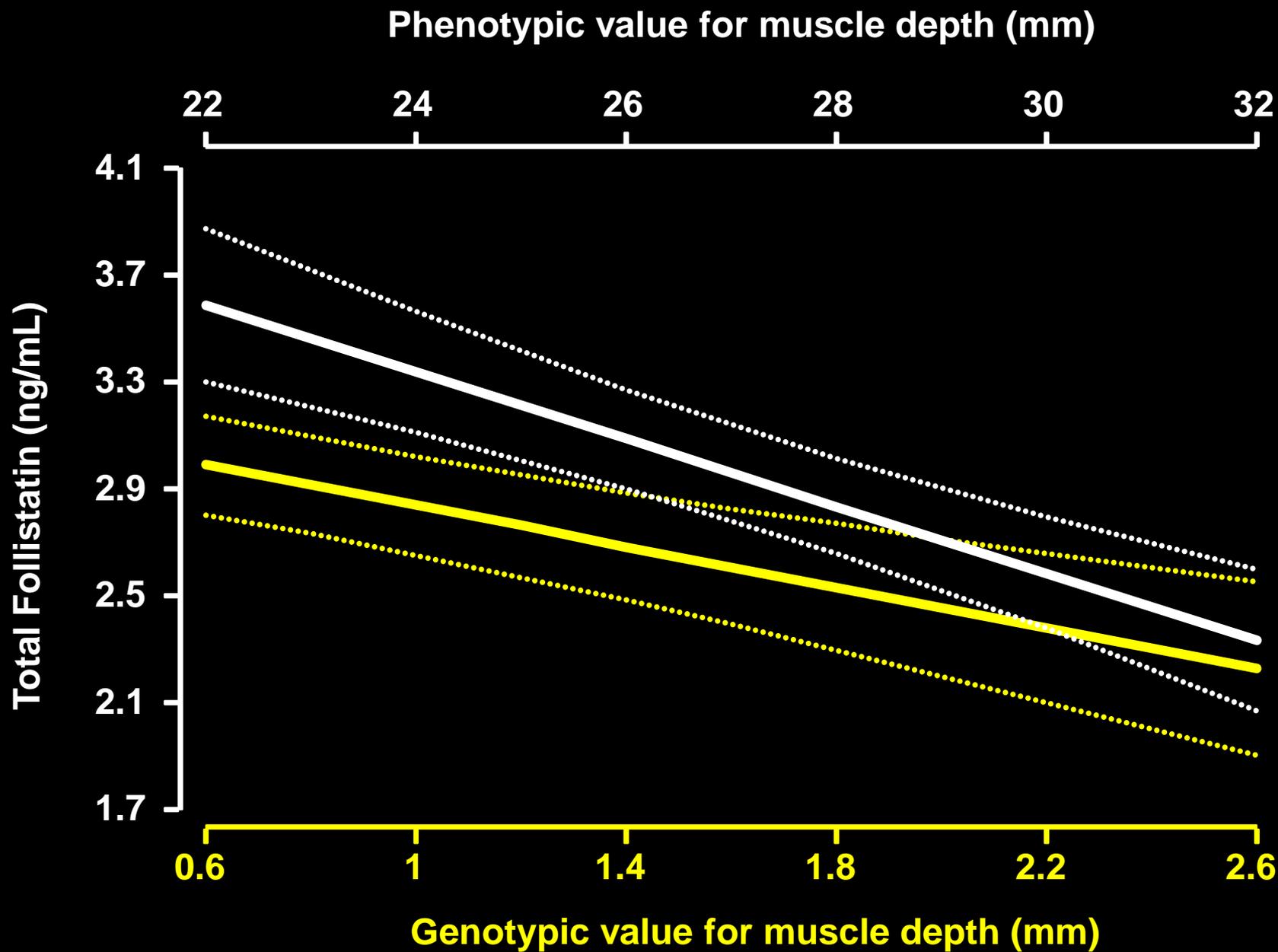
- Puberty period (**Ram effect; 6 mo and 37 kg**)
 - ❖ Assessed the onset of puberty; 4 testosterone-treated castrate males with harness
 - ❖ Three times per week marks were recorded
- Mating period (**Average 8 mo and 41 kg**)
 - ❖ Experience entire rams
- Blood samples (5)
 - ❖ Follistatin
- Pregnancy scan
 - ❖ Assessed the conception rate



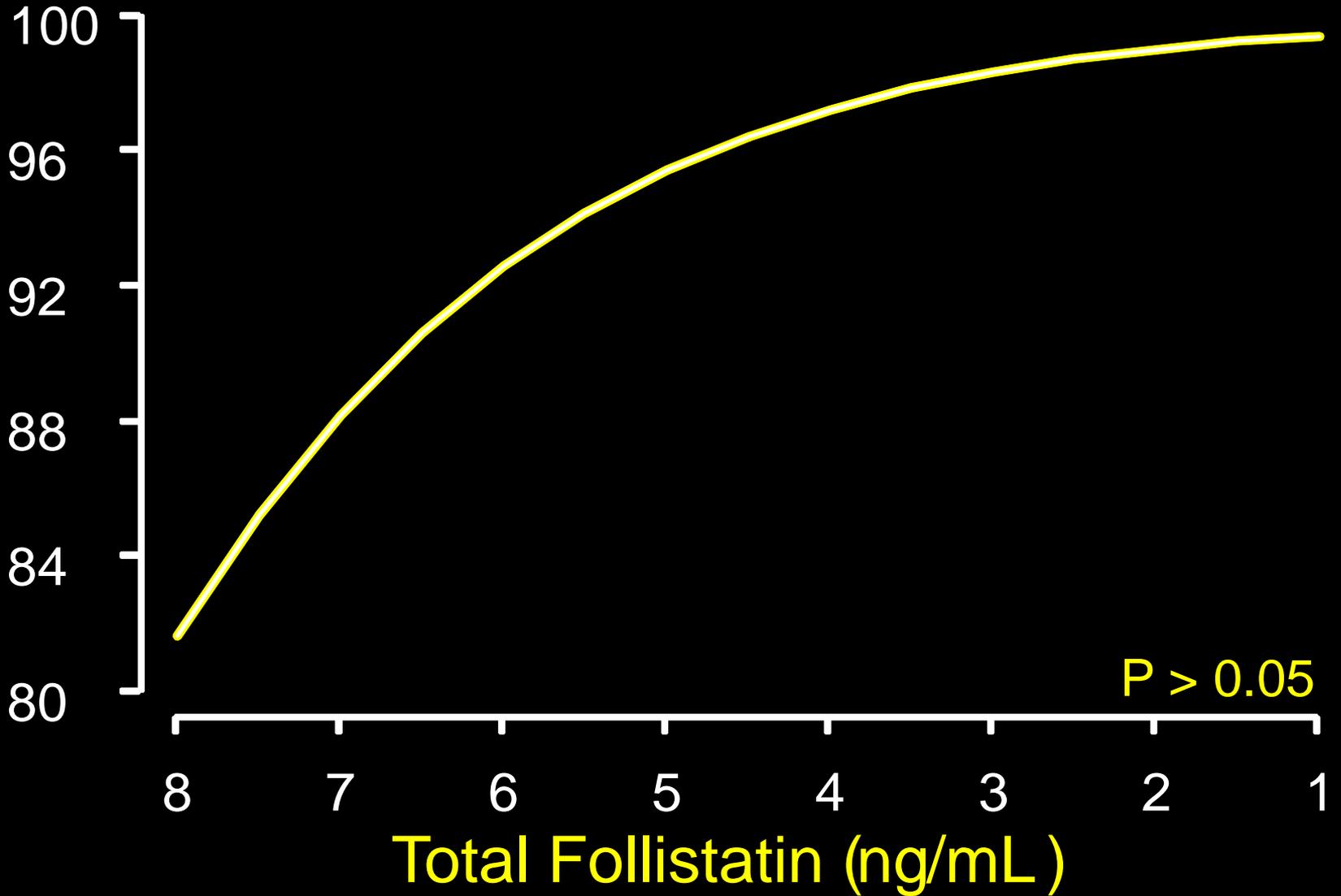
- Total Follistatin concentration was measured by RIA
- **Generalized Linear Mixed Model** with a binomial distribution and logit link functions for **Puberty and Fertility**
- **Class variables & Fixed Effects:** Birth type, Ewe sire, Dam source, Dam age
- **Covariates:** Phenotypic and Genotypic value for muscle

Results

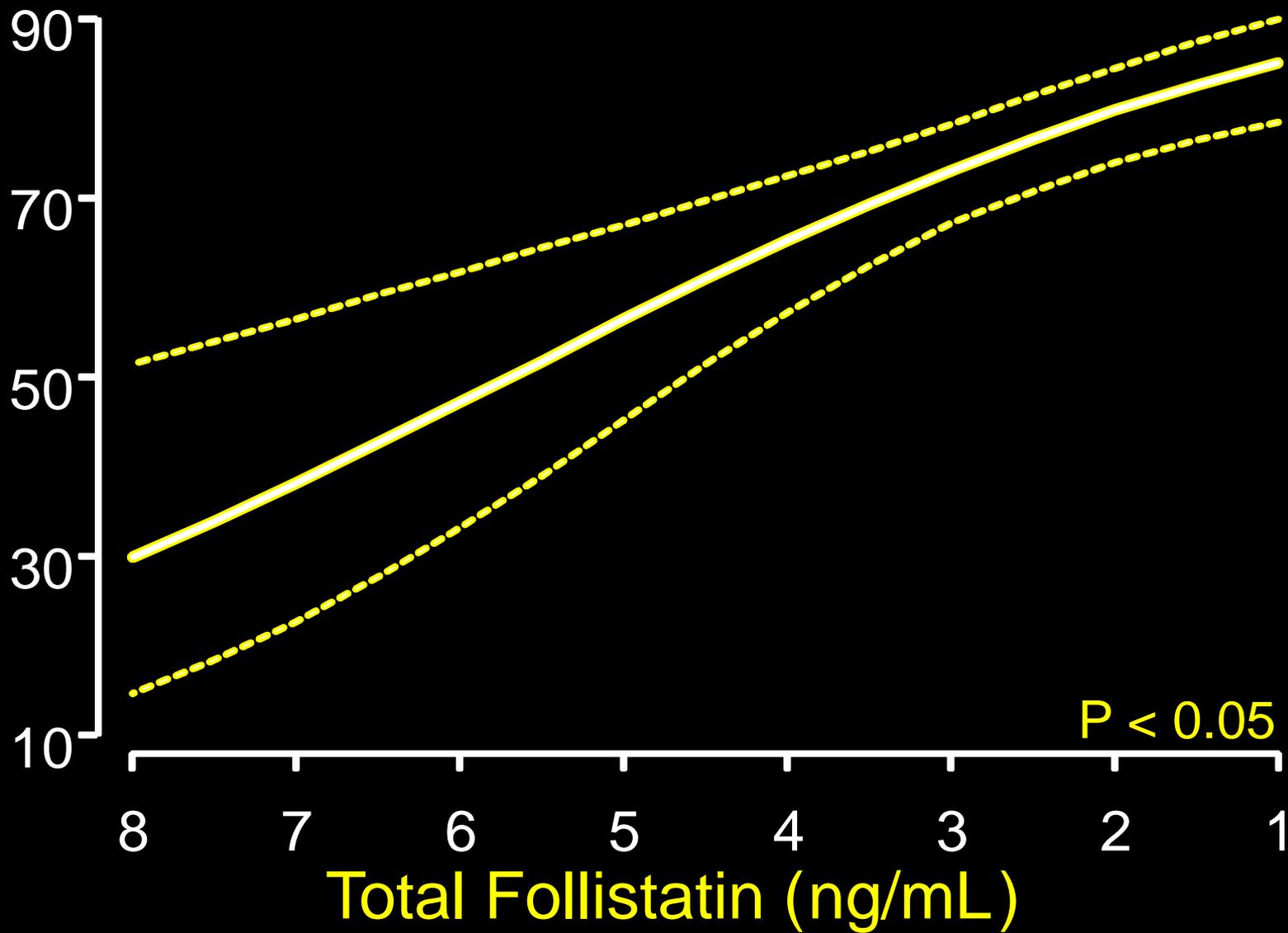




Puberty (%)



Fertility (%)



- Follistatin secretion is positive correlated to muscle accumulation
- Follistatin concentration is not correlated to the onset puberty
- Follistatin concentration is negative correlated to fertility