

Premature Cesarean versus Term Vaginal Birth Blunts Bile Acid-Induced FGF19 Signaling in Neonatal Pigs

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BACKGROUND

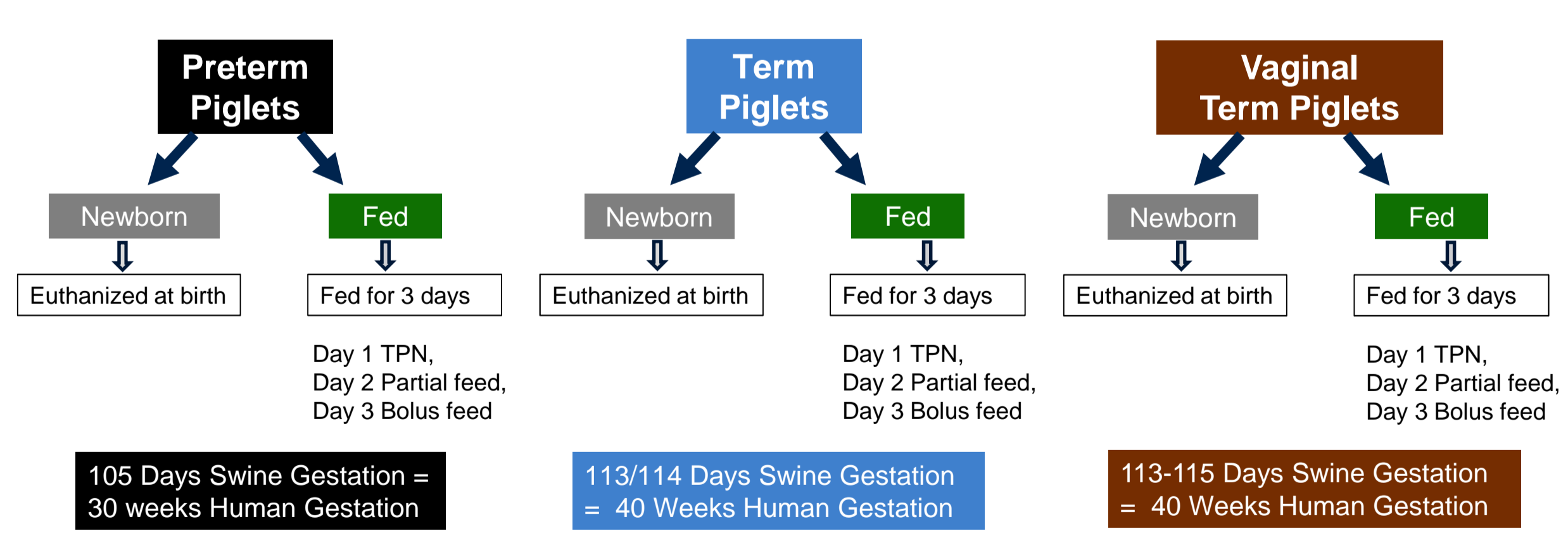
One approach to improving perinatal growth and development outcomes is the use of growth factors. Fibroblast growth factor-19 (FGF19) is a potent fetal growth factor¹⁻³, but transitions to become a regulator of hepatic bile acid synthesis, glucose metabolism, and lean tissue deposition in skeletal muscle, white adipose and hypothalamus⁴. Postnatally, FGF19 is synthesized in the distal ileum in response to bile acid stimulation.

Previous work in our lab has demonstrated that preterm piglet models have lower plasma FGF19, mediated by a smaller bile acid pool, and poor tissue responsiveness to bile acid stimulation.

Objective

To determine the effect of vaginal versus planned cesarean birth on growth, neonatal levels of parturition hormones, and genes and proteins in the Bile Acid – FGF19 axis

METHODS



Newborn Cohort	Effect of Gestational Age and Birth Modality on: - Plasma FGF-19 - Birthweight - Endocrine Hormones
Fed Cohort	Effect of Gestational Age, Birth Modality, and Enteral Feeding on: - Plasma FGF-19 - Growth Rate - Endocrine Hormones

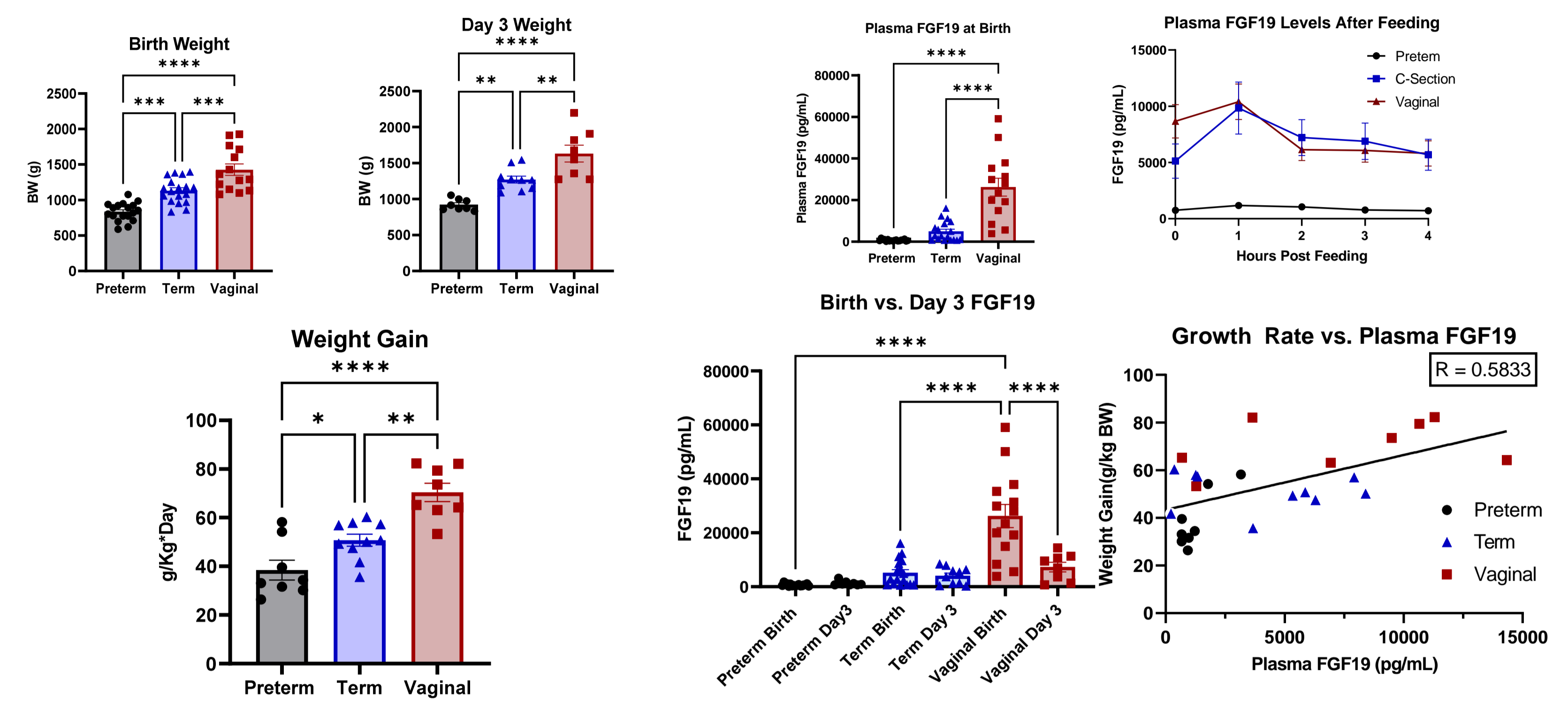


Fig 1: Birth weight and growth rate of piglets

Fig 2: Plasma FGF19 at birth and on day 3 of life

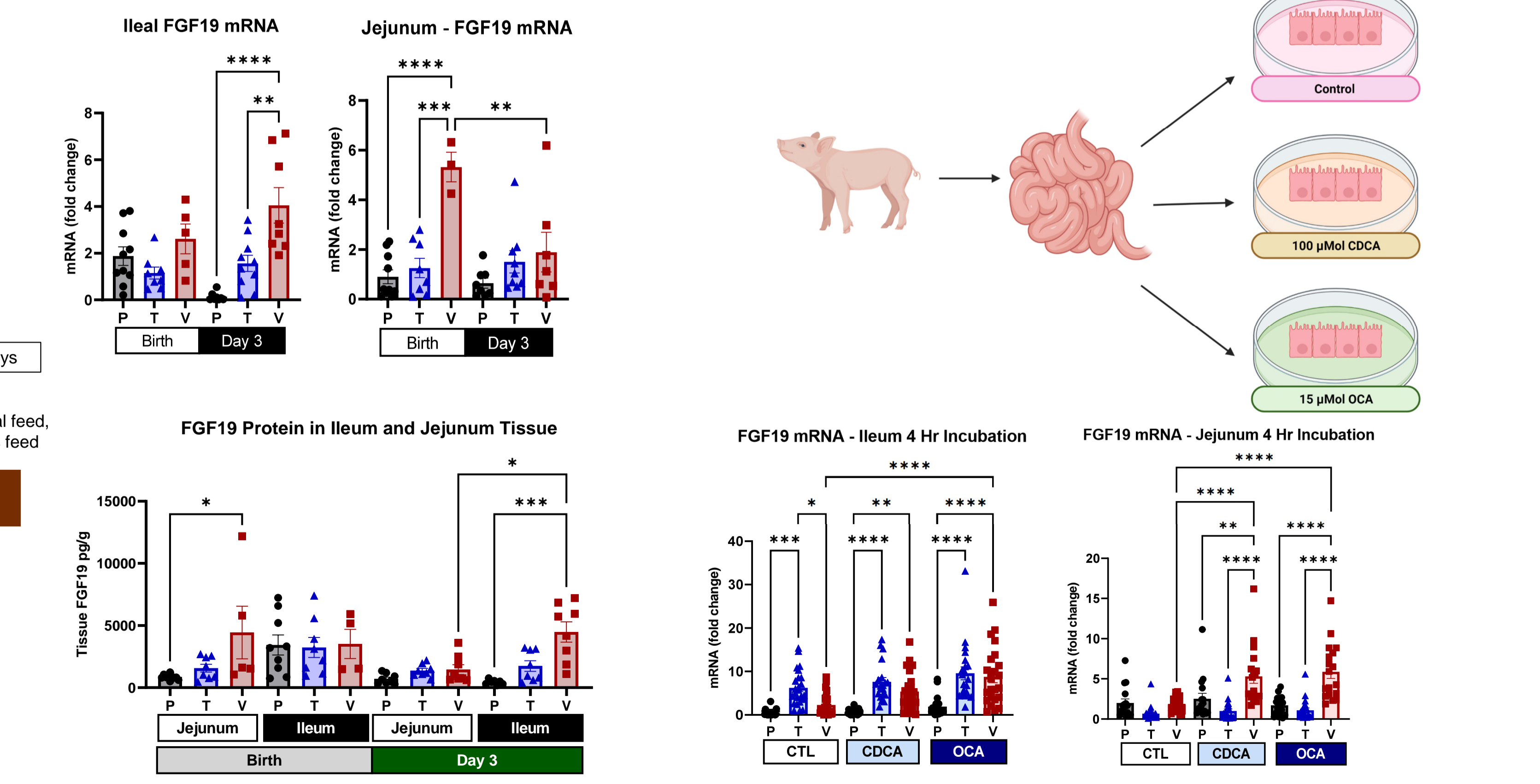


Fig 3: FGF19 gene and protein expression

Fig 4: Explant studies measured ileum and jejunum tissue FGF19 gene expression in response to bile acid stimulation

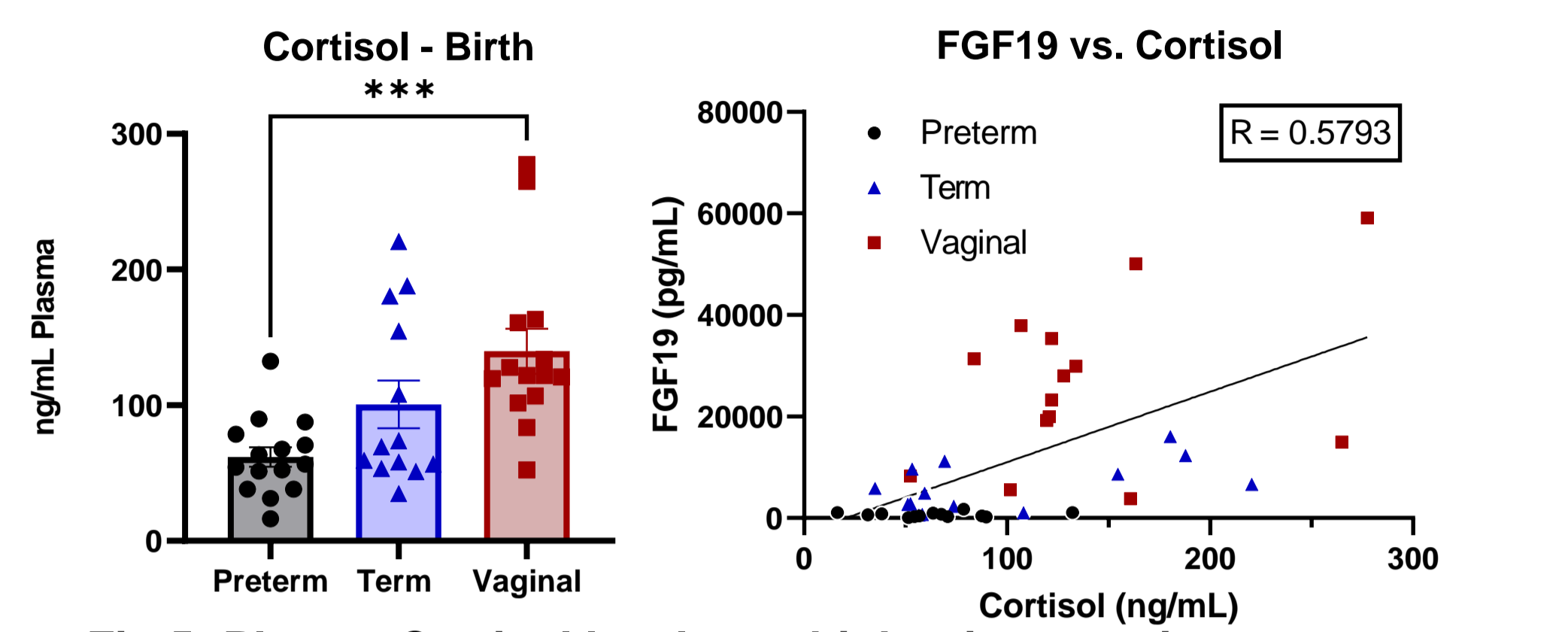


Fig 5: Plasma Cortisol levels are higher in term pigs and

RESULTS

- Vaginally born-piglets had larger birth weights, greater weight gains than cesarean-born term and preterm pigs
- Plasma FGF19 levels were 35x higher in vaginally-born pigs
- Plasma FGF19 positively correlates with growth rate
- FGF19 gene expression and protein level were higher, and the tissue more responsive to bile acid stimulation in the proximal jejunum in vaginally born pigs
- Plasma FGF19 positively correlates with plasma cortisol levels at birth

CONCLUSION

The lower circulating cortisol levels associated with premature, cesarean birth may limit the induction of intestinal FGF19 transcription and protein secretion that occurs with term vaginal birth.

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