Casein and whey fractions of sow and gilt colostrum stimulate cell proliferation of a human gastrointestinal cell line *in vitro*.

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**Background:**
It has been previously observed, that on average, piglets born to multiparous sows exhibit enhanced growth performance compared to progeny from gilts (Carney et al., 2009). We have evaluated the potential for bioactive components in colostrum playing a role in this performance difference through enhancing gastrointestinal development. This evaluation consisted of investigating the proliferative effect of colostrum derived casein and whey fractions from gilts and sows on a gastrointestinal cell line (*T84* – human colon epithelial cells) *in vitro*.

**Methods:**

- Colostrum samples were collected from gilts (parity 1) and sows (parity 2-6) during farrowing.
- Skimmed samples of colostrum were separated into casein and whey fractions, equivalent to 4μg of protein (BCA assay).
- Fractions were incubated with the T84 intestinal cell line in growth media (+ 10% fetal calf serum - FCS) with 20,000 cells/well in a 96 well plate for 48hr at 37°C, 5% CO₂ before the addition of the fluorescent dye and plate reading (CyQuant – Invitrogen- ≥ 6 replicates).
- Human EGF (100ng/μl) was used as a positive control and untreated cells and a non specific protein digest (Polypep) were used as negative controls.

**Results:**

- One way ANOVA identified a significant difference between the proliferative effect of the whey fractions from sow and gilt colostrum samples.
- Further REML analysis identified that there was a significant difference between the proliferative effect of sow and gilt whey fractions in serum free media (SFM) only.
- There was no significant difference between the proliferative effect of sow and gilt casein fractions regardless of media supplementation.
- A significant difference was observed between the proliferative effect of media supplementation with both the EGF and the no-treatment controls.

**Discussion:**

While the observation that colostrum fractions may promote gastrointestinal epithelial cell proliferation is not novel, the observation that both casein and whey fractions promote proliferation above that of negative and non-specific controls suggest that there may be more than one molecule in porcine colostrum that may facilitate this bioactivity. Further, the difference observed with media supplementation (+10% FCS) with the addition of EGF, similarly suggests more complex synergistic pathways facilitating cellular proliferation in gastrointestinal epithelial cells.

Importantly, the observed increase in mean proliferative effect on gastrointestinal epithelial cells of sow colostrum whey fractions above the mean proliferative effect of gilt colostrum whey fraction may be one source of the productive advantage observed for sow progeny.

**Reference:**

**Acknowledgements:**
This work was supported by the Pork Co-operative Research Centre

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