Comparison of immune cells of colostrum from gilts and sows

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Introduction

The early and sufficient intake of good quality colostrum is essential for piglet's health and growth. After farrowing, the newborn piglet goes from a sterile intrauterine environment to an antigen-rich external environment, which requires an adequate immune response to survive (1,2). In swine, maternal immunity is transferred to offspring only after birth via colostrum ingestion. In addition, porcine mammary secretions contain leukocytes, which are absorbed by the neonate and produce a measurable immune activity and numerous soluble factors with antimicrobial and/or immunomodulating activity (2). This study aimed to compare the immune cells presented in colostrum from gilts and sows.

Materials and Methods

Eighty dams (40 gilts and 40 sows) had the farrow induced by an analog of prostaglandin F2a (Alfabédyl®) on day 113 of gestation and colostrum was manually collected after the birth of the first piglet. Teats were scrubbed with alcohol and iodine and gloves were worn to minimize contamination. Colostrum was diluted in PBS containing 5% fetal calf serum, centrifuged and the fat upper layer was discarded. The cells' viability was evaluated by the trypan blue exclusion test. For flow cytometry, colostrum samples were incubated with the following antibodies: isotypes controls; mouse anti-pig CD3, CD4, CD8, granulocytes, macrophages, CD27, CD45RA, CD79a, CD5, CD14, CD16, IgM, CD45RA/B220, and CD335. Flow cytometry was performed with Accuri® flow cytometer (Becton Dickinson) and 50.000 events were analyzed. The data were pre analyzed by the K-S test. The transversal analyses were performed using the Kruskal-Wallis test, with the Student-Newman-Keuls posttest.

The dams' colostrum was composed of 30% of lymphocytes, 40% of macrophages, and neutrophils are the predominant granulocyte in mammary secretions (Table 1). It was observed a numerically but not a statistically significant increase in granulocyte, NK cells ($CD3^-CD8^{low}CD335^+$) and B-lymphocytes subsets in sows compared with gilts. Sows showed $CD4^+$ T cell subsets and monocyte/macrophage ($macrophages^+CD14^+CD16^+$) significantly higher than gilts ($p \leq 0.05$). The phenotypic classi fication of $CD4^+$ T cell subsets that increased are naive $CD4^+$ T cells as $CD4^+CD27^+CD45RA^+$, central memory $CD4^+$T cells as $CD4^+CD27^+CD45RA^-$, effector memory $CD4^+$T cells as $CD4^+CD27^-CD45RA^-$, and central memory $CD8^+$T cells as $CD8^+CD27^+CD45RA$.

Table 1. Comparison of immune cells of colostrum from gilts and sows.

Immune Cells	Gilts	Sows
$Granulocytes^+$	7.062±1.589	11.06±2.408
$Macrophages^+$	40.74±1.050	40.51±2.180
$CD79A^+$	16.47±3.064	13.83±2,216
IGM^+	18.93±1.085	25.63±4.022
$CD45R/B220^+$	1.856±0.547	2.846±0.470
$CD5^+$	32.36±1.820	32.53±1.884
$CD3^+CD4^+$	9.354±2.277	11.81±2.117
$CD4^+CD27^+CD45RA^-$	8.380±1.215[a]	18.31±3.110
$CD4^+CD27^+CD4RA^+$	2.955±0.761[a]	6.258±1.274
$CD4^+CD27^-CD45RA^-$	21.53±2.360	29.16±3.331
$CD3^+CD8^+$	7.205±1.536	7.880±1.266
$CD8^+CD27^+CD45RA^-$	10.09±1.706[a]	18.33±2.348
$CD8^+CD27^+CD45RA^+$	3.848±1.077	7.426±2.050
$CD3^-CD8^{low}CD335^+$	13.20±1.098	16.31±1.735
$Macrophages^+CD16^+$	27.60±1.286	25.90±1.945
$Macrophages^+CD14^+CD16^+$	10.88±1.695[a]	16.76±1.888

[a]Superscripts indicate statistically significant differences within main effect ($p \leq 0.05$)

Conclusions and Discussion

Dams' colostrum contains lymphocytes (T and B cells), phagocytes (neutrophils and macrophages), and epithelial cells. The estimated number and types of [illegible]dely between dams and are affected by parity order. This study provides new data about population of cells existing in porcine colostrum, mainly regarding to subsets of T-lymphocytes and the difference about these subsets in gilts and sows' colostrum.

References

1. Bandrick M C et al. 2014. Developmental and Comparative Immunology 43:114-120.
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