The aim of this study was to evaluate "in vitro" phagocytic activity (intensity and phagocytosis percentage) and respiratory burst basal and induced by *S. aureus* and *E. coli*, of neonatal calves blood polymorphonuclear leukocytes (PMNs), measured by flow cytometry. Fifteen calves, divided into three groups according to the volume of colostrum ingested after birth:

- **G1** - 4 liters;
- **G2** - 2 liters and
- **G3** - 4 liters of milk only, were evaluated at following times:

  - **t0** (before milk/colostrum ingestion);
  - **t1** (until 48 hours post partum);
  - **t2** (48 - 96 h p.p.);
  - **t3** (96 - 144 h p.p.);
  - **t4** (144 - 192 h p.p.);
  - **t5** (192 - 240 h. p.p.).

Phagocytosis induced by *S. aureus* was higher after colostrum intake, being earlier for G1 (t1) than for G2 (t2). The phagocytosis percentage induced by *S. aureus* was higher after t0, for both groups that ingested colostrum. There was no difference between the times, nor the intensity, nor the percentage of phagocytosis for the animals of G3. Phagocytosis induced by *E. coli* and the phagocytosis percentage did not differ in either group, regardless of volume of colostrum intake. The basal respiratory burst did not differ among groups and among ages. The oxidative burst induced by DCFH + *S. aureus* took place shortly after colostrum intake, being higher between t1 and t3 for the animals of G1 and later (between t2 and t3) for the G2. With DCFH + *E. coli* the response was similar to that induced by DCFH + *S. aureus*, but lasted for less time. For G3 animals there were no differences in any of the age groups, regardless of the stimulus used to trigger the respiratory burst. Comparison of G1’s basal and induced metabolism was greater at all time points (t0 to t5) for *S. aureus*, and after colostrum intake for *E. coli* (t1 and t5); to G2 was higher for *S. aureus* between t0 and t3 and for *E. coli* between t2 and t4, and for G3 was higher for *S. aureus* between t0 and t5 and between t3 and t5 for *E. coli*.

**Conclusion:** *S. aureus* stimulated both phagocytosis and respiratory burst before and after colostrum intake. *E. coli* was not effective to stimulate phagocytosis in any group and was not a good inducer of respiratory burst for animals that received no colostrum. It was not clear the influence of age on the activity of PMNs. The provision of four liters of colostrum improves functional response of calves PMNs for the bacteria.

**Supported by:** FAPESP process n. 05/50548-6.

**Keywords:** Calf, Phagocytosis, Oxidative burst, *Staphylococcus aureus*, *Escherichia coli*