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## PTX3 is up-regulated in epithelial mammary cells during *S. aureus* intra-mammary infection in goat

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### ABSTRACT

Pentraxins are a superfamily of conserved molecules with immune functions such as complement activation and opsonization. PTX3 is the prototypic long pentraxin and is produced by different cell populations after pro-inflammatory stimuli. Different studies have demonstrated the up-regulation of PTX3 during ruminant mastitis, but its role is still unknown.

The aim of this study was to elucidate the role of PTX3 in the immune response to *S. aureus* intra-mammary infection (IMI). Given that no data are available on PTX3 expression in goat tissues, we first studied its pattern of expression in goat normal tissues, and then we investigated the role of PTX3 during mammary infection.

Six healthy goats were infused with PBS in the right udder and with *S. aureus* in the left udder. Mammary biopsies from udders were collected 30h post infection, formalin fixed and routinely processed for microscopic evaluation or immediately stored in RNAlater.

Tissue samples were collected at the slaughterhouse from healthy goats and were stored in RNAlater.

Blood and milk were collected from healthy and infected goats; cells from blood and milk were isolated and processed for RNA extraction or for cytopins.

Total RNA from different organs, blood or milk cells, milk fat globules and mammary tissues was extracted and used as template in qPCR for PTX3.

PTX3 expression was investigated by immunohistochemistry on formalin fixed paraffin embedded mammary tissue samples and on cytopins of isolated goat blood and milk cells.

PTX3 mRNA was expressed with very high levels in bone marrow, mammary gland, aorta, pancreas, skin and lung. Given the high expression in the mammary gland, we investigated which cell population expressed PTX3. PTX3 was mainly expressed in the apical cytoplasmic portion of mammary gland epithelial cells, and in macrophages. During *S. aureus* infection PTX3 was up-regulated by epithelial cells. Macrophages and mammary secretum didn't show PTX3 modulation, but PMNs recruited during infection were variably intensely positive.

PTX3 mRNA expression was low in healthy organs and tissues of goats as has been reported indeed the molecules commonly induced after pro-inflammatory stimulation. As expected, PTX3 was constitutively expressed in bone marrow, rich in PMNs and monocytes, in aorta covered by endothelium and in the skin.

PTX3 was up-regulated in epithelial mammary cells and in milk cells after *S. aureus* infection, demonstrating that it represents a first line of immune defense in goat udder. No modulation was observed in macrophages, in the secretum and in the ductal epithelial cells.

Further experiments are needed to elucidate the role of PTX3 in the pathogenesis of *S. aureus* infection.

### References

Daigo *et al.* 2014. Immunology Letters 161(1):38-43; Brenaut *et al.* 2014. Veterinary Research 45:16; Cremonesi *et al.* 2012. BMC Genomics 13:540