Gene expression of P-glycoprotein drug efflux pump in bovine mastitis

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Abstract (300 word limit)

P-glycoprotein (P-gp) is one of ATP binding cassette transporters [1]. It act as a reverse efflux pump with wide range of tissue expression levels[2]. It has physiological role by helping in detoxification of toxic agents by outward efflux of toxins from inside the cells [3]. Overexpression of this pump has been associated with resistance of drug actions by lowering the intracellular concentration of chemotherapeutics. Therefore, P-gp has a vital role in chemotherapeutic failure in some diseases as cancers and microbial infections [4, 5]. In this study, we investigated the gene expression of P-gp in normal and mastitic tissues. Bovine udder samples were checked directly after slaughter of cows by California mastitis test for finding mastitic udder samples. Positive samples were then confirmed by histopathological examination to reveal the signs of mastitis. Total RNA was extracted from tissues followed by cDNA synthesis. Real time PCR (RTPCR) was performed by forward and reverse primers targeting the gene encoding bovine P-gp (accession no. AY789648). The obtained data were compared to a house keeping gene glyceraldehyde 3-phosphate dehydrogenase (GADPH). Results indicated that P-gp is overexpressed in bovine mastitis (compared to normal tissues). The overexpression of P-gp might be associated with increased number of toxins and mediators released during tissue damage. Therefore, it protects the cells from the damaging effect of toxins. On the other hand, over expression of P-gp in mastitis is expected to modulate the antimicrobial therapy by prevention of intracellular accumulation of chemotherapeutics and continuous efflux to the extracellular fluids.

Image

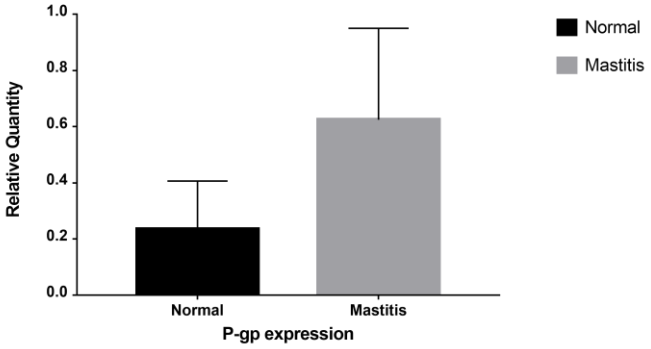


Fig. 1. Gene expression of P-glycoprotein in normal and mastitic tissues of bovine udder.

Recent Publications (minimum 5)

1. Kim Y, Chen J. Molecular structure of human P-glycoprotein in the ATP-bound, outward-facing conformation. *Science* 2018;359:915-919.
2. Fromm MF. Importance of P-glycoprotein at blood-tissue barriers. *Trends Pharmacol Sci* 2004;25:423-429.
3. Szollosi D, Rose-Sperling D, Hellmich UA, Stockner T. Comparison of mechanistic transport cycle models of ABC exporters. *Biochim Biophys Acta* 2018;1860:818-832.
4. Pokharel D, Roseblade A, Oenarto V, Lu JF, Bebawy M. Proteins regulating the intercellular transfer and function of P-glycoprotein in multidrug-resistant cancer. *Ecancermedicalscience* 2017;11:768.
5. Kapp E, Malan SF, Joubert J, Sampson SL. Small Molecule Efflux Pump Inhibitors in Mycobacterium tuberculosis: A Rational Drug Design Perspective. *Mini Rev Med Chem* 2018;18:72-86.



Biography (150 word limit)

Mohammed AlQuhaidan, Veterinarian I work in the Ministry of Environment, Water and Agriculture in the General Department of Quarantine, I am a Master student in the Department of Biomedical and Pharmaceutical Sciences of the College of Veterinary Medicine at King Faisal University, I have gained experience in one of the dairy companies I am grateful to King Abdulaziz City for Science and Technology for their support of the research NO.1-17-04-004-0002

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Notes/Comments: