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Research interests:

- Biochemical characterization and physiological role(s) of proteins from the male reproductive tract.
- Mechanism of sperm protection by egg yolk and milk.

Summary of interests:

Biochemical characterization and physiological role(s) of proteins from the male reproductive tract:

In mammals, sperm emerging from the male reproductive tract are incapable of fertilizing egg; however, they acquire this ability during their journey in the female reproductive tract. This prerequisite conditioning is called capacitation and it is one of the key events that regulate fertility. A part of this process involves loss or modification of surface components acquired by sperm during epididymal maturation and their contact with seminal plasma. We have isolated and characterized a family of proteins from bovine seminal plasma called Binder of Sperm (BSP proteins), which are added to sperm during ejaculation. Our studies have demonstrated that these proteins are essential for capacitation and are ubiquitous in mammals. Sequences homologous to BSP proteins have been identified in human and mouse genomes. Two homologous cDNA sequences in mouse and one in human have been cloned and their specific expression (mRNA) in epididymis has been shown. To study the functions, mouse and human BSP homologous proteins have been expressed in bacteria and purified. Further studies on these novel proteins may aid in the understanding of mechanisms involved in fertilization and identification of factors important for human fertility.

Mechanism of sperm protection by egg yolk and milk:

Over the past 60 years, egg-yolk and milk have been routinely used in both liquid semen extenders and those used to cryopreserve sperm. However, the mechanism by which egg yolk and milk protect sperm during liquid storage or from freezing damage is unknown. Thus our laboratory is studying the mechanisms involved in sperm protection by milk and egg yolk. We discovered that a group of phospholipid-binding proteins (PL-BP), which are detrimental to sperm, are added to sperm at ejaculation. Interestingly, these detrimental factors bind caseins/whey proteins and low-density lipoproteins found in milk and egg yolk respectively. This interaction appears to reduce lipid loss from the sperm membrane, thereby preventing membrane damage during storage and preserving the sperm functions (motility, viability and membrane integrity). In future studies we would like to further characterize the interaction between PL-BPs and milk components and develop novel sperm storage medium for commercial application.

Publications choisies:

Lefebvre, J. Boileau, G and Manjunath, P. (2009) Recombinant expression and affinity purification of a novel epididymal human sperm-binding protein BSPH1. *Mol. Human Reprod.* 15: 105-114.

Manjunath, P., Lefebvre, J., Jois, P.S., Fan, J. and Wright, M. W. (2009) New nomenclature for mammalian BSP genes. *Biol. Reprod.* 80: 394-397.

**If you are interested, please send your complete C.V to: Dr Puttaswamy Manjunath puttaswamy.manjunath@umontreal.ca ;
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Web Pages : <http://recherche.maisonneuve-rosemont.org/fr-ca/la-recherche/nos-chercheurs/manjunath-puttaswamy.html>
http://www.biochimie.umontreal.ca/bottin411/Enseignants/manjunath_p.html

http://www.rqr.umontreal.ca/index.php?option=com_content&view=article&id=172&Itemid=198