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***STE Dean's Award of Excellence in Undergraduate Research***

**Identification of Toll-like Receptors in Spermatozoa**

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The ability of an organism to reproduce is one of the most fundamental concepts for the vitality of a species. Challenging the ability to reproduce are bacterial, viral, and yeast infections which can render the male reproductive organs impaired or infertile.

Protection of spermatozoa from microbes is a vital function of male reproductive organs such as the epididymis, an organ that is essential for sperm maturation, transport and storage. Toll-like receptors (TLRs) are a group of highly conserved transmembrane proteins that recognize invading microbes and activate innate immune responses. We hypothesize that TLRs are involved in antibacterial responses in male reproductive organs where they recognize and help destroy luminal and circulatory pathogens. Previously we have shown that TLRs are highly expressed in the testis and epididymis. The goal of this research was to determine if rat spermatozoa express TLRs. Reproductive organs were excised from adult, male retired-breeder Sprague-Dawley rats, and testicular and epididymal sperm were prepared for immunoblot and immunofluorescence analysis to detect TLRs. Results showed that TLRs 1-5, 7-9, and 11 are present on sperm. These results suggest that sperm can detect luminal pathogens via TLRs in addition to TLRs located on cell types of the testis and epididymis.