Public Abstract

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Title: PROTEASOMAL PROTEOLOYSIS DURING PORCINE FERTILIZATION

Protein recycling is an important process in order to maintain healthy cells. One such protein recycling pathway is the Ubiquitin Proteasome System (UPS) that consists of a small chaperone protein ubiquitin, a protein recycling enzyme/protease known as the 26S proteasome and three key enzymes (E1, E2, E3). The UPS has been implicated in multiple reproductive processes in animals including sperm and egg maturation, and fertilization. Based on this understanding the first objective of this thesis was to determine if the UPS was active during fertilization of swine eggs by boar sperm. The second objective was to determine if the UPS was actively recycling sperm and egg coat proteins during pig fertilization. Activity of the UPS was determined based on the protection of both egg and sperm proteins due to the presence of specific proteasomal inhibitors. It was concluded that the UPS is active during pig fertilization. Furthermore, it was shown that by the presence of proteasomal inhibitors, pig sperm and egg proteins could be protected from rcycling by the UPS. While attempting to determine which proteins were being protected from degradation, an E3 enzyme was identified in the pig testis and sperm cells. Based on location and potential function this protein, known as the ubiquitin ligase UBR7, it is possible that it may assist in sperm function during fertilization. Collectively, these results provide better understanding of the activity of the UPS during pig fertilization.