

Focus	Development of a long-term stable preservation technology for <i>Drosophila</i> strains
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Period	FY2007 - 2009
Overview	<p>Demand for <i>Drosophila</i> as a model organism for genetic resources in life science research will inevitably grow, hence the number of <i>Drosophila</i> strains maintained for use by the <i>Drosophila</i> community is certain to expand. Because maintenance of <i>Drosophila</i> strains relies on laboratory rearing generation to generation, there is a significant need to develop techniques for low-cost, long-term, stable maintenance techniques to handle future increases in the number of strains. The aim of this project is to develop microscopic insemination techniques (intracytoplasmic sperm injection, ICSI) and adapt them for maintenance of <i>Drosophila</i> genetic resources.</p> <p>Why ICSI?</p> <p>No cryopreservation and resuscitation techniques, including early embryo cryopreservation, have been successful.</p> <p>In vitro fertilization is not possible because mature eggs have an eggshell.</p> <p>The very long sperm makes it difficult to inject into the female spermatheca.</p> <p>Requirements for success with microscopic insemination</p> <p>The sperm are approximately 2mm in length, which is very long, hence it is impossible to isolate the entire sperm and use it in microscopic insemination. It is necessary to develop a method to separate and collect only the head portions of sperm and to inject the head portions into eggs microscopically.</p> <p>A problem with ICSI is that it inhibits egg activation. The aim is to establish a method to collect large quantities of activated, unfertilized eggs utilizing male sterile mutants, which produce sperm that is capable of entering eggs but fails in fertilization.</p> <p>The project will also investigate the development of sperm cryopreservation, and will amass comprehensive data on sperm via protein profiling during the sperm maturation process utilizing proteomics analysis.</p>
Progress	<p>References</p> <ul style="list-style-type: none"> • Takemori N, Yamamoto MT 2009 Proteome mapping of the <i>Drosophila melanogaster</i> male reproductive system. <i>Proteomics</i> 9:2484-2493. DOI: 10.1002/pmic.200800795. • Yamamoto MT, Takemori N 2010 Proteome profiling reveals tissue-specific protein expression in the male reproductive system of <i>Drosophila melanogaster</i>. <i>Fly</i> 4:36-39. DOI: 10.4161/fly.4.1.10838.