

Dormancy of cells and organisms – strategies for survival and preservation – Sleeping Beauty (NEST - 012674-2; Sept 2005 – Sept 2008)

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Project Summary

Preserving one's body and reviving it in future generations is a dream of mankind. In fact, there are important practical uses for the preservation of cells, tissues, organs and organisms or for maintaining the gene pool. Many organisms have learned in evolution to enter dormant stages, often associated with desiccation, in which they survive for long periods and then reactivate within minutes or hours. So far, we have failed to learn how cells, tissues or entire organisms can be made dormant or be effectively revived, at ambient temperatures. Attempting to learn that lesson is the vision of "SLEEPING BEAUTY".

The objective is by learning from nature to develop novel concepts for cell preservation based on mechanisms with which model organisms tolerate desiccation and/or remain metabolically inactive for long periods. The project will employ front-line high-throughput approaches on five selected model organisms (cyanobacterium, yeast, rotifer, Arctic springtail and killifish embryos), representing diverse strategies and taxonomic phyla that show long-term survival in a desiccated or non-desiccated form. The end-point will be knowledge on the molecular details of strategies employed by such model organisms and if those strategies can be used to develop preservation approaches at ambient temperatures for different cells and organism. Moreover, knowledge obtained in this project may also prove useful to combat harmful or pathogenic organisms that employ such survival strategies as part of their life cycle. Emphasis will be on understanding processes that control establishment and maintenance of dormant stages as well as exit from dormant stages.