Combatting brain and body ageing through exercise

Supervisory team:
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Project description:

It is popularly accepted that the way to a long life is through regular exercise, good sleeping habits and a healthy diet. Indeed, regular exercise is beneficial for the brain and body and can help us lose fat, improve cardiovascular function, repair the brain, stimulate the production of new brain cells, improve our problem solving abilities, and strengthen our body clock. A key to having good sleep and dietary habits is to make sure that we maintain regular bed-times and meal times. Daily regularity in sleeping and feeding arises because our body clock, which tells us when to awaken and when to eat, is matched to the 24h changes in daylight. Unfortunately, as we age, both our body clock and our synchronization to the external world can weaken, resulting in disruptions in sleepwake cycle, cardiovascular function, eating and impaired problem-solving abilities. In people leading sedentary lifestyles, such disruptions worsen and the ageing process is sped up, leading to premature death. This is called 'unhealthy ageing' and occurs in sedentary mice.

In this project, the student will study how providing mice with the opportunity to voluntarily exercise in a running wheel at different stages of life thwarts the ageing process. It is anticipated that the younger the animals are when they begin exercising, the more effectively the abnormal ageing process will be lessened. It is possible that even after spending half their life in a sedentary state that animals will show a significant improvement in their brain and body functions following the opportunity to exercise. Animals with weakened or completely dysfunctional body clocks are potentially prone to accelerated ageing and whether exercise is an effective intervention in these animals will be explored. It is also possible that regular exercise will stimulate the ageing brain to produce new cells and improve problem-solving capabilities. Through this research project, the student will investigate new ways of restoring brain and body rhythms to promote good health and longevity.