



Strategic Promotion of Ageing Research Capacity

Can the Fruit Fly Help Us Understand How We Age?

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*Meeting the challenges of
an ageing society*

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The Background

Studying ageing in humans is difficult because it is a slow and gradual process that continues throughout life. Fortunately, because ageing is so common in nature we are able to study much simpler animals to understand this process. One of the most useful organisms for scientists is the *fruit fly*. For more than a century, these have been used to study genetics, the growth and development of cells, and human diseases. Fruit flies have very short life-spans which can be controlled and varied in the laboratory by genetic and environmental means. They are one of the easiest to use, and most informative systems available for studying ageing.

There are many processes that are thought to be involved in ageing. Some of these processes are common to humans and fruit flies, so information about the effect of these processes on people can be obtained by studying fruit flies.

Glycation is a process that leads to the accumulation of *Advanced Glycation End-products (AGEs)*. These are formed when *sugars* found in the body react with *proteins* in the body's tissues. AGEs are the result of complex reactions, they accumulate with age, are very stable and cannot normally be removed without destroying the protein.

Proteins that have been affected by AGEs may lose their shape and flexibility. This is thought to prevent them from working properly, and may be the cause of some of the problems associated with ageing.

These affected proteins have been detected in the tissues of healthy people as they get older and have been found at elevated levels in patients with diabetes.

The Issues

The ageing process is almost universal across life on Earth. Ageing is a series of complex, but subtle changes that happen from molecules through cells and tissues to whole bodies. Understanding the ageing process helps to develop new ways of enabling people to remain healthy and independent for longer. It is not yet known whether AGEs cause frailty or whether they are just a symptom of living a long time.

The Aims

The aim of this study was to understand the ageing process in humans by determining whether AGEs are involved in the ageing of fruit flies. This will help to establish the true role of AGEs in human ageing.

This is the first detailed study of AGEs using fruit flies.

The Study

Populations of fruit flies were established to investigate the effect of gender, food availability and temperature on the formation of AGEs. Each population was sampled weekly and subjected to chemical analysis.

Results and Implications

The results suggest that AGEs do indeed accumulate as fruit flies age. This process varies slightly under different environmental conditions and markedly between male and female flies. Further work is being conducted on an extensive data set to measure the size and nature of these differences more accurately.

The most obvious implication of this study is that the fruit fly can be used to study AGEs. Thus, the fruit fly may therefore be very valuable for the study and development of treatments associated for problems associated with heart disease and diabetes.

The Research Team



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The Study

The study has financial support from SPARC of £58,820. It will run for 18 months and be completed in October 2008. Additional support has been provided by the University of Brighton.

More information about the study can be found on the SPARC website www.sparc.ac.uk and obtained directly from Dr Ostler.

Bibliography and Key References

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SPARC

SPARC is a unique initiative supported by EPSRC and BBSRC to encourage the greater involvement of researchers in the many issues faced by an ageing population and encountered by older people in their daily lives. SPARC is directed, managed and informed by the broader community of researchers, practitioners, policy makers and older people for the ultimate benefit of older people, their carers and those who provide services to older people.

SPARC pursues three main activities:

Workshops to bring together all stakeholders interested in improving the quality of life and independence of older people.

Advocacy of the challenges faced by older people and an ageing population and of the contribution of research to improving quality of life. SPARC is inclusive and warmly welcomes the involvement of everyone with a relevant interest.

Small Awards to newcomers to ageing research, across all areas of design, engineering and biology and at the interfaces relevant to an ageing population and older people. In 2005 and 2006 SPARC received 185 applications for support in response to two invitations for competitive proposals of which 34 were supported.

Executive Summaries

SPARC is supporting its award holders through funding, mentoring, a prestigious dissemination platform, professional editorial assistance, international activities and provision of contacts. Each of the projects has been small, yet the enthusiasm for discovery, and impatience to contribute to better quality of life for older people, has more than compensated for the very limited funding which was provided.

This executive summary is one of a series highlighting the main findings from a SPARC project. It is designed to stand-alone, although taken with summaries of other projects it contributes to a formidable combination of new knowledge and commitment by newcomers to ageing research, with a view to improve the lives of older people. This is a tangible contribution towards ensuring that older people receive full benefit from the best that research, science and technology can offer.