

**Evaluation of the Science of Ageing (SAGE) and  
Experimental Research on Ageing (ERA) initiatives**

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This document presents the conclusions of a review panel of experts in this field.  
The views expressed are entirely those of the members of the panel.

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## **EXECUTIVE SUMMARY AND KEY CONCLUSIONS**

This document records the findings of the review panel set up to provide an independent evaluation of the BBSRC's Science of Ageing (SAGE) and Experimental Research on Ageing (ERA) initiatives. The evaluation was undertaken as part of BBSRC's on-going programme of research evaluations of its research initiatives, responsive mode portfolio and funding schemes.

The panel's terms of reference were to:

- Assess the extent to which the original objectives of the SAGE and ERA initiatives were met; and the extent to which they contributed to the Government's EQUAL initiative, to extend the active period of people's lives
- Identify any strengths, weaknesses and gaps in the research funded within the initiatives
- Review the quality of science of individual grants and identify any grants that were particularly successful, as informed by final reports
- Assess the level of outputs and outcomes from individual grants, as informed by questionnaire responses from principal investigators and from final reports
- Consider the added value of funding this area of research as initiatives, rather than via responsive mode grants
- Advise on future action, including the most appropriate modes and level of future funding in this area.

### **Key conclusions:**

- The panel concluded that SAGE and ERA made a major contribution to the consolidation of ageing research in the UK, underpinning much of the research in basic biology of ageing carried out in the UK since. They agreed that the original objectives of SAGE and ERA had been met, but were uncertain of the extent to which these findings had so far contributed to EQUAL's objective.
- Much of the research funded in SAGE and ERA was of high quality and many of the findings are still relevant today. No major gaps were identified in the science funded but the panel believed that more translational research should now be funded, particularly if the objectives of EQUAL are to be met. It is important that the scientists supported to carry out fundamental studies through SAGE and ERA are encouraged to take forward their findings to translational studies.
- The final report grades for SAGE and ERA were comparable with the final report grades of responsive mode grants assessed at around the same time. The panel identified several SAGE and ERA grants that were particularly successful, and which had provided the foundations for a wide range of research still being carried out in the UK and overseas.
- The level of outputs and outcomes resulting from the initiatives was good: a creditable number of refereed papers were published, a large number of staff were trained, and most PIs carried out activities to engage the public with their science. Several SAGE and ERA PIs have joined working groups, committees and assessment panels related to ageing research and have become key members of the research community.
- The panel concluded that there was definite added value for researchers who participated in SAGE and ERA. This resulted from having a specialist panel to assess grant applications, the development of a strong research community, and the

opportunity for networking at the annual workshops. A number of important collaborations were established between research groups, many of which have resulted in joint publications, joint funding and sharing of resources. SAGE provided much-needed funding for research into ageing at a time when the research community was heavily dependent on charities for funding, and the resulting increase in critical mass was then transferred to ERA.

- The panel agreed that it is essential to maintain the impetus gained from the research carried out in SAGE and ERA and that the UK funders should ensure that a coordinated approach to future funding is sustained. It is also important that the funders offer more practical support for researchers in the ageing field by providing career development opportunities and by facilitating knowledge transfer and other activities.

## CHAPTER 1: INTRODUCTION: EVALUATION AND METHODOLOGY

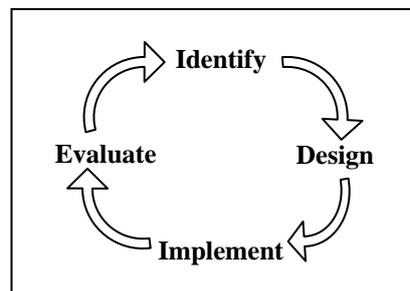
### Evaluation

1. The Biotechnology and Biological Sciences Research Council is one of seven Research Councils sponsored through the UK Government's Department for Innovation, Universities and Skills (DIUS). Its principal aim is to foster a world-class biological science community in the UK. BBSRC's mission is to fund internationally competitive research, to provide training in the biosciences, to encourage opportunities for knowledge transfer and innovation leading to tangible economic or social impact, and to engage the public and other stakeholders in dialogue on issues of scientific interest.
2. With the Government's focus on evidence-based decision making, evaluation is of growing importance to BBSRC. It informs funding decisions, it helps BBSRC to account (to Government and other stakeholders) for the funds it allocates, and it helps to improve BBSRC policy and practice.
3. **Funding decisions:** Evaluation contributes to funding decisions at a number of levels, both externally and internally:
  - Justifying funding: DIUS requires research councils to bid for their future funding. In these bids, councils have to submit evidence of the outputs and impacts from research funded through previous SR allocations. Evaluation provides both quantitative and qualitative evidence of achievements and impacts as part of this evidence;
  - Internal funding decisions: evaluation enables identification of achievements, progress against objectives, and reasons for lack of progress. This facilitates the development of a strategic overview, setting the framework for future funding decisions.
4. **Accountability:** as a publicly funded body, BBSRC needs to account to Government and to the general public. BBSRC also needs to be accountable to the research community it supports, and to explain its role to other relevant organisations including industry and other funding bodies. Evaluation provides evidence of achievements and progress, enabling BBSRC to demonstrate its effectiveness to stakeholders.
5. **BBSRC policy and practice:** The evidence and strategic insight discussed above is also valuable for BBSRC's policy and practice:
  - Development of policies and programmes: the results of evaluation inform policy decisions and the design of new schemes, programmes and processes;
  - Maintaining performance: evaluation enables managers to (i) share with others the lessons they have learnt and the good practice that they have developed; and (ii) identify weaknesses and improve processes.
6. Formal evaluation is conducted at a number of levels in BBSRC:

Project	<ul style="list-style-type: none"><li>• Evaluation of final reports from grants</li></ul>
Scheme	<ul style="list-style-type: none"><li>• Evaluation of research committee responsive mode portfolios</li><li>• Evaluation of research initiatives (time-limited research funding in strategically significant areas), generally two to three years after the grants have ended</li></ul>

Institution	<ul style="list-style-type: none"> <li>Institute Assessment Exercise, conducted every four to five years at the BBSRC-sponsored research institutes</li> </ul>
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7. BBSRC recognises that evaluation does not end with a report. Results are fed back, via Strategy Board, into policy-making, programme design and operation, as depicted by the bold arrow in the programme cycle. Evaluation thus becomes part of the evidence, experience and expert judgement used to make policy decisions and manage programmes.



## EVALUATION METHODOLOGY

8. This evaluation focused on two initiatives: Science of Ageing (SAGE) and Experimental Research on Ageing (ERA). Twenty nine grants with a total value of £5M were awarded via SAGE in 1997, and 19 grants with a total value of £4.15M were awarded via ERA in 2001. For details of the initiatives and the grants awarded see Appendices 2 and 3 on pages 17-22.
9. The evaluation comprised two main elements:
- surveys of principal investigators and other key funders
  - review of evidence by an expert panel.

### Surveys

10. Information was collected from a range of sources:
- Grantholders:** a questionnaire was sent to all SAGE and ERA Principal Investigators (PI), asking for information on a range of topics such as outputs and outcomes, networking and collaboration, further funding, and whether or not the project met its original aims. The results of the PI surveys were analysed and are presented in Appendix 4 on pages 23-60.
  - Other relevant UK funding bodies:** a questionnaire was sent to other funding bodies with an interest in ageing research, asking for their views on the relationship of BBSRC's funding in this field to their own remit.
  - BBSRC data:** relevant data were collated, including the final reports submitted by PIs, and information from BBSRC's grants databases. Review panel members were each asked to review a small sample of grants in advance of the panel meeting.

### Review of evidence

11. The role of the review panel was to provide an independent scientific evaluation of the data presented. It comprised experts familiar with the research in this area and included one member from overseas and four members of the original SAGE/ERA panels.

## CHAPTER 2: RESEARCH OUTPUTS AND ACHIEVEMENTS

### Research quality

12. All principal investigators (PIs) funded by BBSRC are required to submit a final report within three months of the completion of their grant. The reports are assessed and graded by BBSRC Committee members (or other appropriate assessors) on a scale of A to D, taking account of the quality of the research undertaken and the extent to which it met the initial objectives of the project<sup>1</sup>.
13. An analysis of the final report scores awarded to grants in SAGE and ERA shows that 86% of SAGE grants and 63% of ERA grants were graded either A or B, with the remainder graded C. No grants received a D grade.
14. When compared with the final report grades for responsive mode grants completed in 2001-02 (i.e. assessed around the same time as most of the SAGE grants), the SAGE and ERA grades were as follows:

% in each grade	A	B	C	D
Responsive mode	32	46	20	2
SAGE	24	62	14	
ERA	19	44	38	

15. The evaluation panel broadly agreed with the views of the original assessors. Some grants had produced excellent results, but a small number had been less successful - they had not met their original objectives and had resulted in few outputs.
16. The panel concluded that in most cases the research funded in SAGE and ERA was high quality and internationally competitive with a number of outstanding examples (see pages 8-9). The initiatives had made a major contribution to the consolidation of ageing research in the UK, had underpinned ageing-related research in basic biology carried out since, and had improved knowledge considerably in key areas relevant to ageing.
17. Where grants had not met their original objectives, a number of reasons had usually been given. In some cases, the technical difficulty of setting up experiments had been under-estimated, so that studies that were detailed in the applications were not possible or were protracted. Other problems included recruiting and retaining staff and, specifically in relation to the use of rodents, the time taken to 'grow' the animals in the first place.

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<sup>1</sup> A: Very high class work that has produced results of considerable scientific importance in a cost effective way and met all or almost all of the agreed or related key objectives  
B: Work that has added significantly to knowledge in the field and met the majority of its agreed or related key objectives  
C: Work that has fallen short of the contribution to knowledge or cost effectiveness expected from the original proposal even though it may have met some or all of its agreed or related key objectives  
D: Work that has not added significantly to knowledge in the field and/or has failed to address the agreed or related objectives.

## Research highlights

18. A number of grants were identified as having produced outstanding research outputs. These are described below:

### **SAGE:**

#### *The control of immunosenescence in CD8+ T lymphocytes*

This was international quality research which fully addressed the hypothesis and objectives. New technology was developed: 2 colour fluorescence for virus specific T cell/telomere length tracking (2 colour flowfish), which has subsequently been taken up by others. There was a high level of dissemination of results and good publications. Further funding was achieved from ERA and BBSRC responsive mode. This grant was a good example of seed corn funding driving capacity build, and encouraged the PI to move into the ageing field, resulting in the PI becoming a key member of the UK ageing community.

#### *Dissecting the mechanisms of human cell senescence*

A raft of important discoveries came from this collaborative project including the important observation that restoration of telomerase activity in the cells of Werner's Syndrome patients prevented cellular senescence, that telomere-independent senescence occurs in a variety of tissues, and a demonstration that Hutchinson-Guilford progeric cells undergo senescence through the telomere-dependant pathway. In addition, a p53-dependance for Werner's cell senescence was uncovered. The project generated three BBSRC projects and other additional funding, a total of 12 refereed publications (including a paper in *Nature Genetics*) and considerable efforts were made by the investigators to publicise their discoveries.

#### *Biological determinants of ageing, and*

#### *Cost of reproduction, caloric restriction, oxidative damage and ageing in Drosophila*

This collaborative project produced lasting discoveries of international importance. Critically, they demonstrated that IGF-like signaling determined lifespan in *Drosophila melanogaster* (a complementary study from a USA laboratory was published at the same time). Together these studies gave considerable evidence for the notion that ageing mechanisms were 'conserved' between divergent species. This discovery has had an enormous impact on the field of the biology of ageing. In addition, the project addressed the role of IGF signaling in DR extension of lifespan. The study provided evidence of cross-talk between these mechanisms but these results have yet to be confirmed by other studies. 16 publications resulted from these projects and the researchers have made efforts to disseminate their discoveries to both the wider scientific community and the general public.

#### *The effect of age on neutrophil function and apoptosis: role of superoxide anion and PKC isoenzymes*

This research was international quality with good, clear insights generated. The study showed that the loss of neutrophil function in the elderly leads to reduced ability to fight infections. Poor phagocytosis was shown to be linked to reduced CD16 expression. Further work shows that trauma (hip-fracture) very seriously compromises burst. This is not just GC suppression as it continues for more than 8 weeks. This work established the PI in the ageing field: a good series of publications was published, and further funding was obtained from BBSRC in ageing/infection.

#### *Mitochondrial respiration kinetics and superoxide generation in calorie restricted rats exhibiting retarded ageing*

This was an important study which produced a series of papers. The discoveries made are well known in the biology of ageing field and are under investigation in other laboratories and in other model systems. This research showed that mitochondria from CR rats produced less oxygen radicals but exhibited no change in respiration, suggesting that CR results in a proton leak and a reduction in the mitochondrial membrane potential (uncoupling). In

addition, a study of mitochondrial membrane lipid content revealed a loss of double bonds in the fatty acid acyl chains in the CR animals. This may protect against peroxidation damage by ROS. This study demonstrated how a combination of traditional biochemistry, bioenergetics and metabolic control theory can provide new insights into the effects of CR. The PI is also an important communicator of ageing research to the media in the UK.

*Diet-related death of neurons in the ageing gut: causes and effects*

This was a collaborative project which investigated age- and diet-related neuronal losses in the enteric nervous system. The work was of international standard and moved forward knowledge in the area. Excellent hypotheses were generated and answered and considerable novel findings were made which prompted further study. Some novel technology was developed, and one good paper was published in *Gut*.

*Longitudinal and cross-sectional studies of normal ageing in mice: cognitive, neurochemical and neural analyses*

Loss of mental abilities is the most feared aspect of growing older and this research is of huge potential importance for society. Using C57Bl mice to model cognitive decline with age, the results show that this process is complex in this model and differ from human and other model data. The detailed work shows how complex this type of work is - showing that cognitive practice through life protected against some deleterious effects of age. One paper was published in *Science*.

**ERA:**

*The basis for decreased responsiveness to immune challenge in the elderly in vivo*

This project studied immune decline in later life, which causes an estimated 40,000 deaths in older people each year. This project, in humans, is challenging compared to animal experiments, but has resulted in novel data, theories of how ageing immunity is compromised, and led to 9 papers in high quality journals such as *Nature Reviews Immunology*, *Journal of Experimental Medicine* and *Journal of Immunology*. The PI has consequently secured substantial further funding and has pulled together European immunologists to create a critical mass.

*Modification of IL-7 and the reversal of thymic involution in aged mice*

This research was of international standard and showed steady progress from original work. The construction of novel, patented, targeted IL-7 vector, showed improved efficacy over infused IL-7. A significant advance for the area of T cell immunosenescence and potential vaccine improvements for the elderly. One major publication, which resulted in many requests for conference talks. The PI has achieved follow-up funding in ageing research and is now a central member of the UK ageing community.

*Ageing in the parasitic nematode Strongyloides ratti*

This model exists in a short-lived (free living) and long-lived (parasitic) form, so much can be learnt about the ageing process using genetically identical individuals. Both forms age, but at different rates – if the mechanisms can be identified then this would be of great value to human healthy ageing. A healthy gut was identified as a contributor to longevity. The project was refocused away from exploring the free radical theory of ageing to identifying gene expression differences between the 2 forms, and comparison with *C. elegans*, which revealed exciting results. Two papers were published from the grant.

## **Research outputs and outcomes**

19. Questionnaires were sent to all SAGE and ERA PIs seeking details of outputs and outcomes from the grants, and views on the success of the initiatives. The main findings are set out below, with more detailed analysis of the responses in Appendix 4 on pages 23-60. The panel agreed that there was a good number of outputs and outcomes arising from the SAGE and ERA initiatives and noted the following:

### Publications

20. A total of 184 refereed papers had been reported by PIs as being published from the initiatives (126 from SAGE and 58 from ERA), which compared well with other initiatives and responsive mode grants. Moreover, it should be noted that the figures are likely to be an underestimate as publications data were compiled from final report forms for all PIs plus additional information for only those PIs who returned the questionnaire. Also, some of the ERA grants have only just finished, so there is no updated information for them since the final report, which is returned too early for most papers to have been published.
21. The panel commented that, while only a small proportion of these papers were in the more widely circulated, multidisciplinary journals such as *Science* or *Nature*, this may have been because when SAGE and ERA projects were running the science of ageing was an emerging area of scientific interest. In retrospect, some of the publications in the specialist literature may well have been of relevance to a broader range of researchers and of sufficient interest to merit wider circulation. There were few specialist journals in the ageing field at the time although, since then, some of the lesser known journals have become more established in the field and new ones formed, for example *Ageing Cell*, which was originally created by SAGE/ERA grantholders.

### Contribution to the 3Rs (replacement, reduction or refinement of animals in experiments)

22. The panel noted that a small number of PIs reported that their work had contributed to the 3Rs. As contribution to the 3Rs had not been identified as a specific requirement or objective of either initiative, these findings were considered to be a useful additional outcome from the research.

### Science & Society

23. The panel was pleased to see that most PIs had carried out activities to engage the public with their science. Activities included events during National Science Week, participation in ageing events at the British Association Festival, and a wide range of media activities, including television and radio interviews. Also, BBSRC organised further activities such as the Dissemination Meeting and Public Consultation in 2006, as well as publicising the initiatives through press releases and articles in publications.

### New technologies and resources

24. Several PIs had developed new technologies or established resources during their grant. Some grants had been awarded to set up cohorts (of both humans and rodents) and the panel was of the opinion that these were extremely valuable resources and that adequate funding should be provided to protect and maintain them.

### Staff and training

25. The panel agreed that SAGE and ERA had contributed significantly to capacity building in ageing research in the UK. Several PIs had moved into ageing research from other disciplines and were now well established in the field; for others already in the field, funding from SAGE and ERA had helped to strengthen their position and to remain in the community.
26. The initiatives had supported the wider research aims of most PIs and, for some, had had a major impact on their careers. For one, this was their first grant as a PI; another PI was on the verge of leaving science altogether when SAGE was launched and is now a leading member of the community researching ageing.
27. The panel was pleased to note that a good number of research assistants and technicians received training through their roles in SAGE and ERA, further strengthening the capacity to carry out this type of research in the UK. A small number of studentships, funded by a range of organisations, had arisen directly from the research in the initiatives.

#### Other outputs

28. Several PIs had joined working groups, committees and assessment panels related to ageing research and had become prominent members of the community in ageing research as a result of participating in the SAGE and ERA initiatives. Many had been invited to join the executive committees of learned societies and were involved in the organisation of scientific conferences.

#### Networking and collaboration

29. The panel considered this to be one of the major outcomes from the initiatives. A large number of important new contacts and collaborations were established between PIs, many of which are still in place. A high proportion of these collaborations have resulted in joint publications, joint funding applications and sharing of resources. Most new contacts were made at the annual workshops.
30. As a result of the strength of some of these collaborations, further international partners had been added to UK ageing networks. Also, the joint initiative with the US National Institutes of Health would not have been established without the contribution of SAGE and ERA.

#### Workshops

31. The workshops provided excellent opportunities for PIs to meet other researchers in ageing and created a real feeling of community among the researchers. In particular the workshops were helpful for those scientists who were new to the ageing field, as it gave them the chance to discuss technical issues with PIs who were more established in the field.

#### Further funding

32. The panel was pleased to note that a high proportion of the SAGE and ERA grantholders were successful in receiving follow-up funding for their ageing research (SAGE: 86%; ERA: 79%). This funding was from a variety of sources, including research councils, EU, Wellcome Trust, Research into Ageing and other healthcare charities, and industry. Two of the research assistants employed in SAGE and ERA have gone on to obtain their first grants as PIs via the Strategic Promotion of Ageing Research Capacity (SPARC) initiative. Details of further funding are given in the Questionnaire analysis in Appendix 4 on pages 23-60.

33. Although several SAGE and ERA PIs had received further funding, the prevailing view of PIs was that it was difficult to get funding to continue working in this field. The panel felt that more effort should be made by funders to provide continuity of funding for PIs and to help their career prospects.

#### **Aims & objectives and added value of SAGE and ERA**

34. The panel agreed with the majority of PIs that the SAGE and ERA initiatives had contributed considerably towards an increased understanding of ageing. The research carried out provided a much improved picture of basic ageing mechanisms and led to significant advances in knowledge. However, the panel accepted that it would be some time before this knowledge was translated into identifiable improved quality of life for the ageing population.
35. In relation to added value, the panel concluded that this was an obvious feature of both initiatives. Added value came from the workshops and the high number of contacts and collaborations resulting from them. As well as the workshops, the opportunity to apply for dedicated funding in this area was a distinct advantage, because funding for ageing research had been very difficult to get previously. Establishing a specialist panel to assess applications was also a benefit because, at the time, there was little or no expertise in ageing research on BBSRC research committees. PIs had more confidence that their proposals would be assessed appropriately by a specialist panel. Moreover, at the time that SAGE was launched, this was the only way that researchers at BBSRC-sponsored institutes were able to apply for grant funding.

### CHAPTER 3: INTERACTIONS WITH OTHER UK FUNDERS

36. Several other UK funding bodies support research in ageing which potentially overlaps with that funded by BBSRC through SAGE and ERA. These funders were asked to comment on potential gaps or overlaps in funding, and to suggest ways that funding organisations could work together to serve the ageing research community better. Responses were received from: Department of Health, Engineering & Physical Sciences Research Council, Economic & Social Research Council, Medical Research Council, Wellcome Trust, British Heart Foundation, The Stroke Association, Alzheimer's Research Trust, and Research into Ageing at Help the Aged. The responses are summarised on page 14.
37. Overall, there appeared to be little overlap between the areas of research funded by the research councils. The interface is regularly monitored and funding arrangements are in place to ensure that applications received which are outside the remit of BBSRC are re-directed to the most appropriate research council. The research councils work well together and have formed X-CAR, the cross-council committee on ageing research. The New Dynamics of Ageing (NDA), Strategic Promotion of Ageing Research Capacity (SPARC), and Centres in Lifelong Health and Wellbeing are all cross-council initiatives.
38. Some areas of overlap and/or gaps were highlighted by the other funders but the general view was that the remits are complementary (see page 14).
39. The panel acknowledged that some translational work had been carried out in SAGE and ERA, but recommended that further work in this area should be encouraged through links with MRC and ESRC. In particular the panel felt that taking forward findings from basic research that relate to quality of life issues would be appropriate, and such translational work would also be likely to address the interests of the wider public. Some panel members felt that the lack of translational work might be due to the separation of basic biology and research on diseases of ageing. The panel agreed that efforts should be made to ensure that the biological, medical and social research communities are brought closer together.
40. Although no major gaps were identified in scientific areas being funded by the UK funders, the panel suggested that several areas would benefit from further effort, such as: bone biology, other musculo-skeletal biology, physiological/muscle weakness, lung function, organ biology, evolutionary biology, cognitive ability, hearing and demographics. Also, the panel commented that epigenetics research is likely to play a major role in the future of ageing research.
41. The panel recognised that on-going initiatives such as NDA and SPARC provide a focus point for researchers and were of the opinion that the research community would benefit from additional practical support by funders. The panel acknowledged the role of the UK Age Research Forum (UKARF) in coordinating ageing research funding and felt there was scope to build on this with a view to sustaining the broader research community. The need was to provide support to the researchers throughout their careers and facilitate knowledge transfer and other activities, including the organisation of national scientific conferences.

## Summary of responses to survey of UK funders

Funder	Areas of overlap or gaps	Summary of comments
Department of Health	<ul style="list-style-type: none"> <li>• Potential overlap in research into natural sciences</li> <li>• Possible gap in interrelation between biophysical and non-biophysical determinants of healthy ageing</li> </ul>	<ul style="list-style-type: none"> <li>• DoH remit is more policy driven and more likely to combine natural and social science.</li> </ul>
Engineering & Physical Sciences Research Council	<ul style="list-style-type: none"> <li>• Potential overlap on biomechanics, neuroimaging and nutrition.</li> </ul>	<ul style="list-style-type: none"> <li>• EPSRC and BBSRC already have strong links via the NDA, and Lifelong Health and Wellbeing initiatives.</li> <li>• EPSRC research can be usefully informed by BBSRC research on the biology of healthy ageing; there is scope for BBSRC researchers to contribute to studies in other disciplines.</li> <li>• The research councils should work together more flexibly to identify areas of collaboration to provide a balance of opportunities for research into ageing.</li> </ul>
Economic & Social Research Council	<ul style="list-style-type: none"> <li>• Remits are complementary rather than overlapping, but there is some potential overlap in psychology and brain sciences.</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-council collaborations are already strong, although some current collaborations could be extended further to other councils.</li> <li>• Collaborations with other funders not as well developed but this could be addressed via the UK Age Research Forum (UKARF).</li> </ul>
Medical Research Council	<ul style="list-style-type: none"> <li>• Some overlap around funding of basic non-clinical research.</li> <li>• Formal arrangements are in place to allow joint funding and to ensure that applications do not fall between funding remits.</li> </ul>	<ul style="list-style-type: none"> <li>• Already working with other research councils through X-CAR and the NDA and Lifelong Health and Wellbeing initiatives, and with other main funding organisations through UKARF.</li> <li>• Considers the collaborations to be a strength as they allow partnership working across the research councils.</li> <li>• Sees a role for the newly revamped UKARF in coordinating funding.</li> </ul>
Wellcome Trust	<ul style="list-style-type: none"> <li>• Several areas of overlap such as apoptosis, senescence, cancer, stem cells, and genomics.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not run initiatives in ageing but funds research in biomedical areas related to ageing.</li> <li>• Committed to partnerships with other funders, e.g. via UKARF.</li> </ul>
British Heart Foundation	<ul style="list-style-type: none"> <li>• Possible overlap in research into atherosclerosis and its consequences.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not ring-fence funding specifically for ageing research, as much of its research is focused on diseases that occur in old age.</li> </ul>
The Stroke Association	<ul style="list-style-type: none"> <li>• No obvious overlaps.</li> </ul>	<ul style="list-style-type: none"> <li>• Would welcome a unified research strategy across funders to encompass different age-related conditions as well as normal ageing, to reduce duplication and encourage multi-disciplinary working.</li> </ul>
Alzheimer's Research Trust	<ul style="list-style-type: none"> <li>• Minor overlaps but ART focuses on abnormal ageing due to neurodegenerative disease rather than on normal ageing.</li> <li>• Potential gap is the role of diet and exercise in 'healthy' ageing.</li> </ul>	<ul style="list-style-type: none"> <li>• ART is currently funding a project utilising the Aberdeen Birth cohorts set up under SAGE, to assess cognitive decline over time.</li> <li>• SAGE/ERA findings are relevant and transferable to research on neurodegenerative diseases.</li> <li>• Would welcome increased scientific communication and networking.</li> </ul>
Help the Aged/ Research into Ageing	<ul style="list-style-type: none"> <li>• Overlaps with all areas of SAGE/ERA remit, but RiA also funds age related diseases (excluding cancer) and social/policy research.</li> <li>• Obvious gaps are ageing systems, such as vasculature, and ageing organs such as bladder and bowel.</li> </ul>	<ul style="list-style-type: none"> <li>• Already collaborating in joint calls with BBSRC.</li> <li>• Need to ensure that the ageing research community is sustainable, and to keep the most able researchers in the field by providing adequate funding.</li> </ul>