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Ageing Research Translation: a new era for UK Geroscience

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To the Editor:

These are exciting times for ageing research. Average life expectancy has risen dramatically in many countries over the last century and our understanding of ageing across the life course, from different disciplinary perspectives, is growing. However, improvements in healthy life expectancy (healthspan) have not kept pace with improvements in lifespan, and inequalities in healthspan, between countries and socioeconomic groups, are stark.[1] The UN Decade of Healthy Ageing (2021-2030) is shining a spotlight on this global issue. The UK Government has responded by setting two ambitious targets of: 1. ensuring that people enjoy at least five additional healthy, independent years of life by 2035, and 2. narrowing the healthspan gap between the richest and poorest.[2]

If advances in the biology and epidemiology of ageing are to positively impact healthspan and reduce inequalities, an effective translational pipeline is needed – from laboratory and population studies, through early and later phase clinical studies, and onward into clinical practice and policy. Some challenges must be overcome to realise this vision, a key one being insufficient collaboration between different research disciplines.[3] Insights in one area often do not inform progress in other areas. Promising interventions have yet to progress through the translational pathway, and some solutions are currently not deployable in the clinic.[4]

These challenges have long been recognised. A series of Government reports and research initiatives have highlighted the fragmentary nature of ageing research in the UK over the last 25 years;[5] in the USA, similar concerns led to the establishment of the National Institutes for Ageing (NIA) in 1974 which provides an excellent, if resource-intensive, exemplar for how to build translational ageing research expertise.[6] The UK House of Lords Science and Technology Committee[3] recently called for more research on ageing biology, more intervention studies, and faster translation from bench to bedside for ageing research – underpinned by better integration across disciplines and infrastructure.

How can such long-standing challenges be overcome to improve translational ageing research in the UK and other countries? We need to develop infrastructure and tools to conduct effective discovery science and interventional studies in the arena of human ageing. Much research on the biology of ageing uses animal models and has not been replicated in humans. Any new infrastructure must enable the study of human ageing across the life course, address multi-organ function in health and disease in a systematic way, with appropriate biomarkers and assays, and, critically, should facilitate evaluation of interventions to promote healthy ageing at different points in the life course.

Whilst bringing together experts in ageing biology, epidemiological studies and deep-phenotyped human cohorts with those with expertise in human intervention studies and clinical trials is necessary, it is not sufficient to provide the alchemy needed for subsequent translation. Critical to success is that researchers from different disciplines are willing to work together and develop the specific skills required for an interdisciplinary approach. This involves developing familiarity with different ways of conducting science and learning to speak a range of different discipline 'languages'. This is not an inconsiderable ask but there is some evidence that early career researchers are particularly receptive to this approach.[7] The potential rewards are great including increased investment from industry and other partners, particularly if combined with clearer regulatory pathways to market.

In the UK, a suite of eleven challenge-led ageing networks funded by UK Research and Innovation (UKRI)[8,9] has recently been launched. The overall focus for these networks is to build expertise and knowledge across disciplines, build new collaborations, and promote an integrated, rather than a reductionist approach to ageing research. This is essential to increase healthspan and quality of life in old age, address health inequalities and strengthen resilience.

The ART (Ageing Research Translation) of Healthy Ageing Network (www.artofheathlyageing.net), led by the authors, is one of the networks funded by UKRI that sits within this new interdisciplinary ecosystem.[9] The ART of Healthy Ageing Network has a specific focus on *translational ageing research*. Our vision is to bring together people from different disciplines with complementary expertise to build the necessary capacity, knowledge and resources for effective translation of advances in ageing biology and epidemiology into interventions for human testing. Our core team contains a strong mix of complementary expertise including ageing biology, life course epidemiology, computational science, experimental medicine, sports science and clinical trials, and has well-established links to a wide range of communities (including the British Geriatrics Society and the British Society for Research into Ageing, as well as social gerontology and physiology communities) that are essential for successful translational research. This breadth is necessary to execute successful ageing research, but also to embed ageing research in an appropriate societal context; research does not occur in an ethical, regulatory or policy vacuum.[10]

To deliver the vision of the ART of Healthy Ageing Network, we will link people, knowledge, resources and infrastructure across ageing biology, deep-phenotyped cohorts, epidemiology and clinical trials. Our eventual goal is to benefit the ageing research community by combining these components into a platform to support seamless progression from bench to bedside for interventions to support healthy ageing. Over the initial two years of the network, funded by a UKRI award of ~£200,000, we will map and curate the expertise and resources contained in different centres. Examples include but will not be limited to collections of human tissue for *in-vitro* studies, curated linked phenotypic data, expertise in specific biological assays, imaging and advanced epidemiology/data analysis, together with methodological expertise in designing and delivering clinical trials and other human studies. The wider ageing research community will be able to contribute their individual expertise and resources to the platform, and in return will be able to use the platform as a portal to access collaborators, knowledge and skills outwith their own discipline.

In doing so, we will create an environment where researchers from multiple disciplines work side-by-side to realise the benefits of ageing research for the public. The ART of Healthy Ageing Network will have a strong focus on supporting and training early career researchers in interdisciplinary environments. All our activities will be underpinned by a comprehensive communications strategy, involving a visible identity and clear messages, easily accessible web-based points of contact and resources, and active social media channels to raise the profile of the network and enable conversations between network members and a wide range of stakeholders. This broad stakeholder engagement, including the public, funders, policymakers and industry, is essential if the network is to understand and integrate a wide range of perspectives and needs, maximising benefit to all. By engaging broadly and training a new generation, we hope to surmount the challenges of sustainability and relapse into siloed working that have afflicted previous initiatives in this area.[5]

There is recognition at political and policy levels that action is needed to address the challenges to effective ageing research, and that a longer-term, more joined-up approach is needed if current initiatives are to succeed where previous ones have failed. Will the formation of the ART of Healthy Ageing Network and its sister ageing networks result in a new era for UK geroscience? We are optimistic that the research, funding and policy communities are now better aligned than they have been for a long time, and that there is a genuine desire for interdisciplinary working in translational ageing science. We look forward to playing our part in this important endeavour and driving forward interdisciplinary research that aims to deliver real-world benefits for our ageing population.

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