

TOM KIRKWOOD**Professor at the Newcastle University Institute for Ageing and Copenhagen University Centre for Healthy Ageing**

Tom Kirkwood works at the Newcastle University Institute for Ageing and Copenhagen University Centre for Healthy Ageing. His research is on the factors underlying the complexity of ageing at the mechanistic level and its effects on individuals. He has pioneered systems-biology approaches to addressing the inter-relationships between the different molecular mechanisms, cellular responses and signaling pathways that collectively make up the ageing

process. He also leads a major population-based investigation (the Newcastle 85+ Study) which has examined in unprecedented detail the spectrum of health and associated biological and functional measures in a cohort of very old people. His books include the award-winning *'Time of Our Lives: The Science of Human Ageing'*, *'Chance, Development and Ageing'* (with Caleb Finch), *'The End of Age'* based on his BBC Reith Lectures in 2001, and *'An Age of Wonders: the Story of the Newcastle 85+ Study'* (with Gordon Morris).

Dynamics of ageing: A silent transformation caused by “noise”

Lifespans are increasing but why is this happening and where might it lead? Until recent decades, few scientists studied ageing; the common view was simply that the body is programmed to die. Progress in preventing deaths in early and middle age was expected to result in a world with more old people but with a ceiling on life expectancy. But the ceiling has been broken and the surprising continuation of the increase is driven by something new. Death rates at advanced ages are falling and ageing itself appears more malleable than we used to think. To identify what governs this malleability we need to discover much more about the intrinsic biological processes that drive the ageing process. Evolutionary logic shows that there is almost certainly no fixed program for ageing. Ageing occurs because every process on which life depends is also vulnerable to mistakes and damage. Ageing is the silent transformation of order into disorder.