

Interdisciplinary Exploratory Symposium
Seasons of Life: Biological Rhythms Underlying Healthy Living

University of Glasgow, Main Bldg LT 255, 20th November 2013

Organisers:

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Idea and novelty

Annual changes in the environment shape the rhythm of life of most organisms on earth. However, wild organisms are increasingly coming under pressure because anthropogenic change is modifying the seasons for which they are adapted. Reports of mismatched timing of internal and external rhythms indicate detrimental consequences of this disconnect. Increasing scientific evidence for seasonal patterns in human physiology, health and well-being suggests that *Homo sapiens* is also principally a “seasonal animal”. Disconcertingly, human lifestyles under artificial conditions of eternal summer provide the most extreme example for a disconnect from natural seasons, making humans vulnerable to detrimental consequences for health and well-being. A closer look at the “seasons of life” could, therefore, inform efforts to mitigate the impact of global change, as well as inspire new perspectives for understanding medical and psychological problems in both animal and human populations. For this to occur we must develop interactive research efforts that promote transdisciplinary work under the unifying, annual time-frame. We propose development of an overarching research initiative to clarify the mechanisms that underlie seasonality, and the consequences of evolutionary adaptation to a seasonal world. This initiative follows from an informal workshop held near Glasgow in November 2012, in which researchers from eight European institutions identified the most relevant approaches for an advanced understanding of seasonality. Specifically, we propose that the mechanisms that underlie annual cycles are based on periodic generative and regenerative processes. To advance our overarching research initiative, we will convene a one-day symposium which will highlight seasonality of human health, and review evidence for phenology under pressure and the consequences of disrupted seasonal timing. The final symposium session will explore mechanistic advances that may help to understand the generation of long-term biological rhythms. The symposium will act as a springboard for working groups to draft applications for funding of network activities and multi-centre research on the day following the symposium.

Preliminary program

Session 1: *Health and well-being aspects of seasonality*

Chairs and discussion facilitators: Scott Nelson, Glasgow; Andrew Loudon, Manchester

Effects of season and light on physical and mental health

(Russell Foster, Oxford)

Epigenetic and intergenerational health effects of season of birth

(Giulio Disanto, Oxford)

Nutrition, disease and seasonality

(Stanley Ulijaszek, Oxford)

Session 2: *Changing phenology and temporal mismatches in wild vertebrates*

Chairs and discussion facilitators: Michaela Hau, Germany; Pat Monaghan, Glasgow

Temporal mismatches on different trophic levels under global change

(Marcel Visser, NL)

Shifting seasons, climate change & ecosystem consequences

(Stephen Thackeray, Lancaster)

Seasonal energetics of mammals in a warming world

(Walter Arnold, Austria)

Session 3: *In search of mechanisms that create long-term cycles*

Chairs and discussion facilitators: Gerald Lincoln, Edinburgh; Colin Selman, Glasgow

Molecular switches: genetic response cascades to photoperiod

(Takashi Yoshimura, Japan)

Generation and regeneration: stem cell niche and possible links to seasonality

(Stuart Forbes, Edinburgh)

Reversible aging of stem cells (TBA)

Pattern generation: insights from modelling of population cycles

(Daniel Haydon, Glasgow)