THE SECOND LAW OF THERMODYNAMICS AND THE ETIOLOGY OF BIOLOGICAL AGING

(This Conference is dedicated to the Memory of Dr. Robin Holliday)

The premise of this conference is that the fundamental causes of aging occur at the molecular level which has been rarely the subject of a conference.

A major concept in bio-gerontology is that the Second Law of Thermodynamics plays a significant role in the accumulation of miss-folded, dysfunctional molecules that leads to age changes at higher levels of organization. Put simply, the law posits that energy tends to dissipate unless restrained. The restraints are mostly chemical bonds, a state that is the *sine qua non* for life.

There are only two ways in which age changes can occur. They can arise either from a purposeful program driven by genes or by random stochastic or accidental events. There appears to be little, if any, evidence that a deteriorative, catabolic process like aging is driven by a genetic program. However, there is incontrovertible evidence that the genome drives the anabolic processes that govern the determinants of longevity. Confusing these two opposing phenomena is extensive in this field.

Energy loss that leads to the accumulation of dysfunctional molecules also occurs in maintenance systems that include repair, synthesis and turnover. The slow, escalating increase in dysfunctional molecules occurs throughout early life and ultimately exceeds maintenance capacity at about the time of reproductive maturity. This condition then increases vulnerability to age-associated pathology or disease. Studies on age-associated diseases and on longevity determinants, both of which masquerade as studies on aging, will not be emphasized.

CONFERENCE PROGRAM

Wednesday, November 5, 2014

8:00 AM - 5:45 PM; Independence Ballroom E (M) (Washington Marriott Marquis)

This conference is Held in Honor of the Memory of Dr. Robin Holliday

This conference will be held on the day of the evening start of the Annual Meeting of the Gerontological Society of America. A discounted hotel reservation rate may be had at the GSA website (www.geron.org).

Sponsored by the Glenn Foundation for Medical Research, M. Collins President

Co-organized by L. Hayflick, UCSF and W. Bortz, Stanford, University

Wednesday, November 5, 2014

8 AM to 8:25 AM

WELCOME, INTRODUCTION, CONFERENCE PURPOSE, ANNOUNCEMENTS
L. Hayflick, W. Bortz, and M. Collins

SESSION 1, AGING: ETIOLOGY, THERMODYNAMICS, TIME, AND ENTROPY
CHAIRPERSON: Walter Bortz

8:30 AM to 8:55 AM

"THE ETIOLOGY OF BIOLOGICAL AGING"
Leonard Hayflick
University of California, San Francisco

9:00 AM to 9:25 AM
“TIME-DEPENDENT PROTEIN MISFOLDING AS A PRINCIPAL DETERMINANT OF AGING IN THE NERVOUS SYSTEM”
Dennis J. Selkoe, Harvard Medical School and Brigham and Women’s Hospital Boston

9:30 AM to 9:55 AM

THERMODYNAMIC REVERSIBILITY AND AGING IN LIVING SYSTEMS
Krastan B. Blagoev
National Science Foundation and Massachusetts General Hospital
Harvard Medical School

10:00 AM to 10:25 AM OPEN DISCUSSION

10:30 AM to 10:55 AM COFFEE BREAK

SESSION 2, PROTEIN MISS-FOLDING, CELL SURVIVAL AND DEATH

CHAIRPERSON TO BE NAMED Dennis Selkoe?

11:00 AM to 11:25 AM

“IS AGING THE CONSEQUENCE OF PROGRESSIVE AND WIDESPREAD ACCUMULATION OF MISS-FOLDED PROTEINS?”
Claudio Soto, PhD.
University of Texas Medical School, Houston.

11:30 AM to 11:55 AM

“PROTEIN MISS-FOLDING, ROS PRODUCTION AND CELL SURVIVAL/DEATH MECHANISMS”
Niels Gregersen
Aarhus University Hospital, Skejby
Aarhus, Denmark

12:00 PM to 12:25 PM OPEN DISCUSSION

12:30 PM to 1:25 PM NO HOST LUNCH

SESSION 3, AGING: PHYSICS, LIFESPAN, RATE OF LIVING AND INTRINSIC SOURCE OF DEATH

CHAIRPERSON TO BE NAMED Niels Gregersen?

1:30 PM to 1:55 PM

“The New Physics of Aging”
Walter M. Bortz II,
Stanford University School Medicine
Stanford, CA

2:00 PM to 2:25 PM

“The Scaling of Lifespan and the “Rate of Living” in C. elegans”
Walter Fontana
Harvard Medical School
Boston, MA

2:30 PM to 2:55 PM

“Does Life Contain the Seeds of Its Own Destruction?”
3:00 PM to 3:25 PM OPEN DISCUSSION

3:30 PM to 3:55 PM COFFEE BREAK

SESSION 4, AGING: EVOLUTION, ENTROPY AND ETIOLOGY

CHAIRPERSON TO BE NAMED Tom Kirkwood?

4:00 PM to 4:25 PM

"N.E.T. AND THE BLACK QUEEN: ON THE EVOLUTIONARY PERSISTENCE OF AGING"
Dorion Solomon Sagan
General Partner, Sciencewriters,
Amherst, MA

4:30 PM to 4:55 PM

"EVOLUTIONARY ENTROPY AND THE ETIOLOGY OF AGING"
Lloyd Demetrius
Harvard University
Cambridge, MA
5:00 PM to 5:25 PM OPEN DISCUSSION

5:30 PM to 5:45 PM

SUMMARY and CONCLUDING REMARKS
M. Collins, W. Bortz and L. Hayflick