

Meeting Report

International Association of Biomedical Gerontology, 11th Congress (Aarhus, Denmark, August 13–16, 2005)

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THE INTERNATIONAL ASSOCIATION of Biomedical Gerontology (IABG) celebrates its 20th anniversary this year. It was founded by the originator of the free radical theory of aging, Denham Harman (USA), and its inaugural conference was held as a satellite meeting of the 13th International Congress of Gerontology in New York. IABG meetings have since been held every two years, and alternate ones have continued to be held as satellite meetings of the Congress, since that happens every four years. 2005 is the first year in which an odd-numbered IABG meeting has been held independently of the Congress; this course of action reflects the increasing success of the IABG meetings.

The IABG meetings are defined very well by the phrase included in their name—"biomedical gerontology." Biomedical gerontology is a profoundly distinct idea—unlike clinical gerontology, whose focus is on the use of existing technology to improve the health of the elderly, and also unlike biogerontology, which concentrates on understanding aging as opposed to doing anything about it. Rather, biomedical gerontology is about developing new techniques to combat aging more effectively than we can at present. (I consider myself a biomedical gerontologist, which is why the focus of *Rejuvenation Research* is on intervention¹ and also why I chose to organize the 10th IABG, in Cambridge in 2003.) This focus has to a large extent defined Harman's career—he has never been scared to proclaim that aging is something

we must strive to combat, even in the dark days of the 1960s and 1970s, when the political imperative to highlight "giving life to years, not just years to life" became so pronounced. At around that time, Harman formed the break-away American Aging Association (AGE), which to this day retains the intervention-friendly tone that Harman gave it. It is a source of great pleasure that Harman and his wife continue to attend the meetings of both AGE and the IABG. Harman, 89 this year, gave two talks in Aarhus, one reviewing the problem of aging and the need to combat it in order to extend lives, and one discussing Alzheimer's disease. The biomedical emphasis of the conference was most clearly shown by the relatively few talks focused on invertebrates: just one each on *Drosophila* and *C. elegans*, and two on *Podospora*. While such work is of course of great value, gerontology is such a big field these days that there is a definite place for more focused meetings, and the IABG conferences offer a fine example.

The meeting also featured two other gerontological veterans (though neither is quite of Harman's generation): Robin Holliday (Australia) and Tony Linnane (Australia). Holliday gave the first talk of the conference and showed why his understanding of aging—as exemplified most thoroughly in his 1995 book *Understanding Ageing*,² but also in several articles in the mainstream literature—is so relevant today. When so much of high-profile life extension research is focused on magic bullets to

trigger the body into some sort of magical, coordinated enhancement of self-repair, it was particularly welcome to hear Holliday lucidly explain that, at root, aging is a simple accumulation of various types of damage. It is no accident that I have in the past referred to Holliday's classification of these types of damage when presenting my own: they are very similar indeed. Holliday and I certainly part company when it comes to the feasibility of doing anything much about aging, but I felt more than ever after his talk that the contrast in our conclusions regarding what is possible in the foreseeable future is rather trivial compared to the contrast between me and the bulk of the biogerontology mainstream regarding our most promising course of action.

I was reminded even more strongly of this by the presentation of Randolph Howes (USA) that followed Harman's first talk. Howes purported to present an argument challenging the free radical theory of aging, but it rested entirely on the claim that free radicals have important roles in metabolism. That claim is indisputable, to be sure—but just as one can have too much of a good thing, one can also have too little of a bad thing. The fact that longer-lived homeotherms fumble fewer of their respiratory chain electrons is not in doubt, and it is extremely strong evidence that free radical-initiated damage is a major constituent of aging. It may well be that simply reducing the free radical production rates of rats to that of pigeons would do more harm than good, by destabilizing important signalling pathways, but that tells us merely that in turning short-lived species into longer-lived ones evolution has had to reduce free radical production and also make various adjustments to signaling pathways so that they still work in the context of reduced free radical flux. Harman's original insight is not remotely challenged by this, nor by the other important roles of free radicals that were touched on in the talks by Linnane (Australia) and Ghafourifar (USA).

With the exception of the talk by Horrobin (UK) during the first session, IABG11 did not feature discussions of the social context of life extension, nor its ethical ramifications. Horrobin's talk was a useful reminder that these

matters cannot be forgotten when we strive to postpone aging, and he was suitably uncompromising in his conclusion that we should indeed press ahead in this effort with all speed. There was also one other non-science talk: a historical overview by Kirk (Denmark) of the life and works of one of the most famous Danes ever, Hans Christian Andersen, whose 200th anniversary is being celebrated this year.

The bulk of the conference consisted of short and long talks interspersed, with no explicit grouping into thematic sessions (except for one session on DNA damage and repair in aging and various accelerated aging models). This is a novel approach, which worked rather well, perhaps because aging is so multifaceted but yet so indivisible, with each degenerative process interacting with others; thus, it is appropriate for the theme to be kept moving.

Two talks were purely theoretical in nature, highly intriguing, and somewhat related. Demetrius (USA) presented his reasons for predicting that humans will not derive a longevity benefit from calorie restriction, while Hipkiss (UK) proposed a novel mechanism whereby caloric restriction might work via a reduction not in oxidative phosphorylation but in its ostensibly more harmless precursor, glycolysis, on the basis that glycolysis generates glycation-inducing byproducts. He also drew attention to the possible beneficial effects of carnosine on this process.³

An appropriately strong theme of the meeting was the limited nature of our catabolic machinery and the contribution of those limitations to aging. Terman (Sweden) discussed the effects of this on the function of the lysosome, while three talks focused on the proteasome. Once a neglected area of biogerontology, this field is now powerfully represented at every aging meeting, reflecting the prevailing appreciation of how much harm the gradual accumulation of indigestible material can do.⁴

On the anabolic side, similarly, it was heartening to see three talks on the stimulation of cell proliferation for cell replacement, either by stem cells or by manipulating endogenous growth factors. No one can doubt the central role that stem cell therapies will play in any

eventual life-extension regimen, so it is critical that gerontologists be exposed to this field more than they have traditionally been.⁵

How far, then, are we from serious life extension in mammals and eventually in humans—and in particular, how far are we from life extension that merits the term “biomedical” by virtue of being applicable to those who are already on the slippery aging slope? IABG11’s organizers are well known to be skeptical of my views of how, how much, and how soon aging can be postponed, so I was grateful for the invitation to outline my position in the last session of the conference, which was gratifyingly well attended despite occurring on the morning after the excellent conference banquet. I was able to draw attention to the just-announced SENS Challenge⁶ and was suitably pleased to see no one volunteering to submit an attempt to win the \$20,000 on offer. If it is still unwon by the time of IABG12, in Greece in 2007, I suspect the skeptics will by then be fewer in number.

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