

Interview with Dr. Richard Miller Biomarkers

KYLE JENSEN: Welcome to SAGE Crossroads, the premier online forum in issues of human aging. These podcasts feature lively discussion with the experts on the ethical, political, economic, scientific, and societal implications of aging related science. Thank you for listening.

I'm speaking now with Dr. Richard Miller. Dr. Miller is the associate director of research and a research professor at the Institute of Gerontology for the University of Michigan's Medical School.

Dr. Miller, what would the impact be if biomarkers of aging were discovered?

RICHARD MILLER: Well one of the major problems for aging research is that we can't tell how fast aging is going. The key question of aging research is, what controls the rate of aging? Since we don't have a really useful measure of how fast aging is going, the idea of discovering something that is a clear measure of aging like a biomarker or a set of biomarkers would give us a kind of yard stick. It's like asking if you want to develop medicines to cure hypertension, but you don't have a blood pressure cuff. You're kind of stuck.

KYLE JENSEN: What research is currently being done in this area?

RICHARD MILLER: Well not nearly enough. As you know, aging research is hopelessly under funded. It takes up only about six cents of every hundred bucks that NIH spends, but a few laboratories have tried to figure out what you can measure in experimental animals for instance or in people that are good predictors of life span. The first step to seeing if they are also good measures of the aging rate. The complicated factors here is that it's pretty easy to find a predictor of how long a person is going to live, things like, have they had a heart attack recently or have they been diagnosed with cancer or are they grossly over weight. These are predictors of death because they are closely associated with major diseases, but showing that they are measures of the rate of aging is a much trickier proposition. Very little real work has been done on that.

KYLE JENSEN: Have there been any real scientific stumbling blocks that have manifested themselves in this research?

RICHARD MILLER: Well one of them is a lack of interest or a lack of research effort devoted to the topic. There have been major complicated human data sets where people have been tested for lots of different things, and there is some end point measure, whether they die, whether they get cancer, or whether they develop a hearing problem and so forth, and the data sets exist, but they haven't really been evaluated by people who combine high class statistical skills and also a clear conceptual appreciation of the difference between a biomarker of aging and a risk factor for mortality. The other stumbling block is that data sets could be improved. If this were really the major goal of

the project, you would want to measure in each person or each rodent, if it's a rodent study, a batch of different kinds of changes. Changes in kidney function, liver function, cognitive function, skin composition, and gene expression. Highly enriched data sets of that sort would have to be prepared to provide the information needed for a high level evaluation of the biomarkers of the aging rate itself.

KYLE JENSEN: Are you confident that we will find the biomarkers of aging?

RICHARD MILLER: No. I think it would be very important to do so, and I believe that useful markers can be derived but whether it will take 1 year, 5 years, 10 years, or 50 years of work is hard to say because no one has really done it yet. It would be just a guess.

KYLE JENSEN: So, you don't have any predictions at this time?

RICHARD MILLER: No, I don't think it's possible to answer that question unless you know how many people are going to work on it and what sort of resources they will have available to them. The conceptual problems are pretty much easy to solve, but there has been such little good work done in the area, so a fraction of the work has been bad, so the thing has gotten a bad name. People hesitate to work in that area because it's got a reputation as a field which is conceptually un-sound. People need to begin to understand that work of this sort can be productive, and they need examples and models to follow.

KYLE JENSEN: The audience of SAGE Crossroads is made up of scientists, policy makers, and curious consumers. If there is one last statement that you could make to them about biomarkers of aging, what would it be?

RICHARD MILLER: I think basic aging research, more generally, has profound possibility of revolutionizing preventative medicine and development of biomarkers that can monitor the effects of genuine anti-aging drugs and it can, in a significant way, greatly speed up the process of learning about aging and how it relates to late life diseases. So I think that it deserves a high priority.

KYLE JENSEN: Thank you. On behalf of SAGE Crossroads, I'm Kyle Jensen.