



The War on Anti-Aging Medicine

*Robert H. Binstock, Case Western
S. Jay Olshansky, University of Illinois
Morton Kondracke, Moderator
September 17, 2003*

KONDRACKE: The shorthand subject of today's discussion is the war over anti-aging research. We will get beyond that issue, but that's the headline of the discussion.

The discussants are Dr. Robert Binstock, who is professor of aging, health and society at Case Western Reserve University, and S. Jay Olshansky, who is a professor in the School of Public Health at the University of Illinois at Chicago, and a research associate at the Center on Aging at the University of Chicago and at the London School of Hygiene & Tropical Medicine.

So the opening question, which I would like each of you to respond to, is what is the war over anti-aging medicine about? Who are the combatants? and what are the stakes? Jay Olshansky, you can begin.

OLSHANSKY: All right. Let me give you a little bit of background, actually.

A couple of years ago at the American Association for the Advancement of Science (AAAS) meetings, we were having a session on how long humans can live. At that session there were a number of scientists who were talking about duration of life and how much further we could extend it.

Many of us were lamenting, though, about the prospect of some individuals suggesting that we already have the ability to slow down, stop, or reverse the aging process. We were suggesting that that is not currently possible. Although that is what we know is not currently possible, it may be at some time in the future, but we know it's not now.

That was the beginning of something that my colleagues and I turned into what was called the position statement on human aging that we published in *Scientific American* last summer. It was also followed by a short piece in the June issue of *Scientific American* called "No Truth to the Fountain of Youth."

We were basically making the argument that there are a number of individuals out there who are currently selling products with the specific claim that it is now possible to slow, stop, or reverse human aging. We wanted to state in language that was as unambiguous as we could possibly make it, that not only is that not true, but there are some potential dangers associated with some of the products that are being sold.

At the same time, we wanted to emphasize that there is an ongoing and fascinating field of research in gerontology that is devoted to the study of aging, with the goal, in part, for some of the researchers, of understanding the process of aging and finding a way to intervene so that at some time in the future we might be able to slow down the process.

So we wanted to clearly distinguish between the substances that were being sold today with claims that it is currently possible to slow, stop, or reverse aging, with the real science of aging, suggesting that at some time in the future it might be possible, but it is not currently possible.

And the position statement on human aging lays out in very clear language what we know, what we don't know, what we think is true, what we think is not true, and we had quite a response to it.

KONDRACKE: I take it that one of the stakes involved here is that you are afraid that the reputation of gerontology will somehow be affected or clouded by anti-aging quackery. Is that true?

OLSHANSKY: Well, there are two things. First of all, we wanted to get across a public health message. It is a public health concern that individuals are using products that have not yet been tested for efficacy—whether they do what these individuals say that they do—nor have they been tested for potential harm.

So first it was a public health message.

But as you said, we were also concerned with the possibility that the research scientists who were doing work in this area might be associated with this anti-aging industry. And of course, the anti-aging industry, as many have documented, has been with us for thousands of years. It appears to crop up right about the time there are major developments in our ability to influence diseases. Anti-aging medicine, for example, was extraordinarily popular at the beginning of the twentieth century, as we made inroads against infectious and parasitic diseases.

It is no surprise that it's cropped up in today's world during a time in which we are aging very rapidly as a population, as we see major advances that are occurring in the biomedical sciences in the form of stem cell technology and so forth, that seem to be very promising.

So it's consistent. It's exactly what we would expect to occur at this particular time.

KONDRACKE: Dr. Binstock? What do you have to say about this?

BINSTOCK: Well, I got into this subject matter a couple of summers ago when Jay and his colleagues published this "No Truth to the Fountain of Youth" article, and I asked myself, why are they doing this?

After all, anti-aging interventions have been around for millennia, and there have been plenty of fraudulent, risky, and harmful products out there.

And when I did, it seemed to me that there were, indeed, these two strains. One of them was the public health message. But the other one was very much boundary work, which you alluded to with your question.

On the public health front, this is an important thing to address. The size of this industry is estimated by one report I've seen to be about \$42 billion, if the market is broadly defined to include exercise and nutritional, as well as cosmetics and hormone injections

and dietary supplements. That estimate also predicts that it will reach about \$67 billion in a few years.

And there is no question that some of the practices are risky, harmful, and fraudulent. For example, one of the things they push very much is hormone replacement therapy. Well, you probably have seen a number of the studies recently pointing out not only the physical, but mental risks of that therapy.

So I saw this as a worthwhile undertaking. But I was also cognizant of the fact that research into biology of aging has a long history of being regarded as being a marginal, charlatanic undertaking itself. And here were over fifty international biogerontologists coming out and making this statement: “No Truth to the Fountain of Youth.”

So I went back and interpreted and documented the history of how aging research was regarded very poorly by the NIH, and by all sorts in the federal government, even as people in the field tried to establish their own National Institute on Aging in the early 1970s.

The statements from NIH officials, from the Office of Management and Budget, and from assistant secretaries and so on were just as damning as you could be: “These people are not competent. They don’t have any good ideas. No good will come from it. It’s a pipe dream,” and so on.

Now some of this opposition, of course, especially from the NIH, was that they didn’t want another institute sharing the pot of NIH appropriations. But in fact, this was very much the view.

Nonetheless, the biogerontologists, in particular, persisted with their lobbying to the point where they managed to get a bill passed in 1972 to create their own trough for their research funds, which was why they said that everyone was prejudiced against them.

And President Nixon vetoed it, then, on the advice of NIH and OMB. But then they persisted and got it in 1974, and of course, President Nixon was wrapped up with other things, such as Watergate and his impeachment.

So the bill was left to pass, and that began a legitimation of this field, which has been extraordinary since the institute began operating in 1976. It’s grown from what was then about \$50 million to a billion dollars today.

So it was very important for the biogerontologists not to be tarred with the brush of this anti-aging medicine movement. Indeed, when I wrote this up, I got quotes from some of the leaders, some of Jay’s colleagues, who said, “Indeed, this was an important purpose.”

I went and examined then, how is this war going, this attack on the American Academy of Anti-Aging Medicine (A4M), in particular? It claims twelve thousand members. It board certifies people as anti-aging practitioners, even though it doesn’t have any

approval from the American Medical Association. Its net assets have grown from \$500,000 in 1997 to over \$5 million today in terms of their IRS report. So it's a thriving, growing thing and the question then becomes, what's the best strategy for trying to combat them? They are risky and harmful and fraudulent practices. Well, Jay has undertaken one strategy with his colleagues.

KONDRACKE: A frontal attack, you would say?

BINSTOCK: To the fountain of youth, right?

KONDRACKE: Right.

BINSTOCK: He has also issued a couple of annual silver fleece awards emulating Senator Proxmire's golden fleece awards, which he gave out years ago.

And as I assess the war on anti-aging medicine, as they began trading shots, one of the things that struck me was that this strategy may not be the best, to attack this movement, because a Brer Rabbit type of situation has emerged. They are getting inextricably involved with a tar baby.

For example, recently the *O'Reilly Factor* show wanted to deal with this subject, and the head of the anti-aging medicine movement, as misleading as he is in my judgment, was given the same platform as Jay. A month after the "No Truth to the Fountain of Youth," came out in *Scientific American*, the *AARP Bulletin* ran a story on its front page about "No Truth to the Fountain of Youth," and in it they have Ron Klutz, the president of A4M, on an equal platform with Jay. There was a nice big picture, a sidebar, and indeed, the very fact that the reporter felt it was important and imperative to go interview Klutz and get his view, told me that this group is getting legitimated a great deal, at least, in the eyes of the popular press.

So I won't go on at length about this, but I think there are maybe better strategies for the biogerontologists to pursue.

KONDRACKE: Such as?

BINSTOCK: Well, first of all, I think that to avoid conflating what biogerontologists are working on, which is the fundamental causes of aging and how they might be used constructively as we understand them, they would be better off emphasizing that what they are up to is trying to achieve active and healthy long life and hit on that rather than saying "These other guys are bad to accentuate the positive."

Now, the question of what to do about the risky and harmful and fraudulent aspects of anti-aging medicine is very tricky, because stronger government regulation doesn't seem to be in the cards. One of the things that has really led to the growth of this industry was the passage of legislation in 1994 that protected dietary supplements from any sort of government regulation.

The FDA and the FTC can't regulate the practice of medicine. To the extent that that's done, it's done by the states. The states have shown no sign of getting into this issue so far. And the power of the dietary supplement industry in being able to get that legislation in, and keep it in force for ten years, suggests it is going to be pretty hard to overturn.

So my feeling is that the ball is really in the court of the professional organizations that care most, or purport most to care, about the well being of older persons—namely, the Gerontological Society of America, and the American Geriatrics Society—that as organizations they should address anti-aging medicine, perhaps, through specific task forces that could work jointly and singly, and I can think of at least three things that they should do.

One thing they should do is try to embrace many anti-aging practitioners by having symposia and workshops at their annual meetings, and reaching out to them and helping to sort out the good and the bad and the ineffective for them, because I don't believe that everybody out there practicing in this area is doing bad things consciously.

KONDRACKE: Uh-huh.

BINSTOCK: Or being quacks consciously.

A second thing they can do is identify those areas of anti-aging interventions which are problematic, and designate their experts to do reviews of them in health care journals, such as was done this year on human growth hormone in the *New England Journal of Medicine*, reviewing its harms, its assets and what the status is now. And in a sense, be police on this by getting these reviews done in a proactive way.

KONDRACKE: So this role would not be taken by the biogerontologists themselves, the academic biogerontologists, but organizations that represent them?

BINSTOCK: Well, in this case I would say the professional organizations that include the biogerontologists and the geriatricians and so on.

But my third step is that they should reach out to the others. For example, these professional organizations could develop white papers and arrange for press conferences at the National Press Club, orchestrating in the AARP, Consumers Union, the American Medical Association, the American Public Health Association, so that the word about the harms and the risks and the fraudulency could get out through the popular media much better than its has to date.

KONDRACKE: Let's go back to Jay to give him a chance to respond to your proposal here.

OLSHANSKY: OK. Well, actually, you know, we were talking about this earlier this afternoon, and it's interesting. I agree with Bob. He raises a really important issue that I think we were unaware of when we were writing this position statement. And that is,

once it got out, and once it became publicized, there were stories in newspapers and magazines that were giving equal time to the very people we were saying really are not scientists in the field and don't deserve to be given equal time. And that is a problem. I agree with that. It was an unintended consequence of what we had done.

KONDRACKE: So you are not going to go on the *O'Reilly Factor* any more with Ronald Klatz, the head of the American Academy of Anti-Aging Medicine?

OLSHANSKY: Actually, it's hard for me—you know, if given an opportunity to debate, to turn it down. I am not afraid to confront the opposing point of view, and I certainly am not afraid to oppose the other point of view.

So I will always accept an opportunity to debate under these conditions. Someone has to do it. Someone has to stand up and state specifically what we know and what we don't know in light of what they are arguing.

So I agree on the one hand. Now, the other thing that Bob was recommending was the creation of these white papers and interventions by government agencies, and so forth, to make it clear what we know and what we don't know about aging. In a way, that is exactly what we were doing with our position statement, except we were focusing in on the scientists themselves who are doing the research.

If there is going to be some sort of breakthrough in the field of regenerative medicine or anti-aging research, it is going to come from many of the scientists who had already signed on to our position statement.

So my view is that I don't think it is going to work. I think what would happen is if we write these white papers, we would get the exact same effect that we got with our position statement, and that is that these alternative points of view about anti-aging medicine are going to come to light, more people are going to become aware of them, and I think the anti-aging industry will continue to grow.

My approach would be a bit more draconian, I guess. That is the approach that I think is currently being taken with regard to the downloading of music and Napster; that would be to sue, to go after these individuals, these groups, where specific claims are being made about the anti-aging properties of these products. They have to demonstrate efficacy. They have to demonstrate that there is no danger. If it cannot be demonstrated, then this kind of information needs to be made available to the public. I think fear will work very effectively for this anti-aging industry in protecting the general public from many of these products.

KONDRACKE: Now, we have two definite cases where products for which great claims were being made: ephedra and fen-phen. But therapies such as hormone replacement have had major attacks made on them scientifically.

Now, one would think that stimulating science on these various products, one by one, or the most dangerous at a time, would somehow be a way to warn the public that there are problems here.

OLSHANSKY: Absolutely. You are recommending what I think would be the best approach, and that is to evaluate these products one at a time. Fen-phen and ephedra are classic examples of products that were sold to the public, some of which were sold by clinicians, suggesting that, “This is a reasonable product to be using. There is no danger associated with it.” The fact is that it had yet to be evaluated using clinical trials in humans.

These substances that are being sold, the antioxidants, the growth hormone, the DHEA, all of these need to be evaluated in detail using clinical trials in humans before they are used, before they are administered.

My personal opinion is that clinicians, physicians who are administering growth hormone, a biologically active compound to their patients, before this product is adequately evaluated using standard scientific methods is inappropriate.

KONDRACKE: Now, the law, as stated by Dr. Binstock, is that none of these therapies, including growth hormones, can be regulated by law at the present time in any way. Is that correct?

What should be done? What is the ideal circumstance? Should the FDA be given responsibility over all of this? There is an Office for Alternative Medicine at NIH. Should it be given more money to evaluate these supplements? How would you design this if you could start from scratch? What would you tell Congress to do?

OLSHANSKY: Well, I think there is no question that some of the initial research that is being done, that has been funded by NIH, on this very issue should be expanded. There was a study that came out last year by Blackman. It was published in a major journal on growth hormone. This was one of the first and best clinical trials that was done on growth hormone in humans.

But it is an initial study. They used a larger dose of growth hormone. These kinds of studies need to be repeated using lower doses. They need to expand the study population to evaluate them. But you have to realize that hormone replacement therapy in women has been evaluated for decades, and the science keeps waffling back and forth. You know, “Should we use it? Should we not use it?”

Growth hormone has not really even yet been studied. So it’s a classic example of one of those circumstances where individuals associated with A4M are suggesting that, “We can’t wait for the science. If we wait for the science, we’ll all be dead. So we should be taking these products now and hope that the science will eventually catch up with us.”

That’s the line of reasoning that’s being used.

BINSTOCK: See, where I vary on this is not in objecting to that in principle, but the question is, who's going to see that it gets done in a blanket enough way to be effective?

That's why I urge that professional societies, particularly those concerned with older people and aging baby boomers and their welfare, should take it on as their responsibility to see to it that their members start working on this, to get them interested in these sorts of clinical trials and so on.

I mean "should" is one thing, but then who is going to implement the "should"?

KONDRACKE: Right.

BINSTOCK: With respect to the lawsuits, just one comment. It's not clear to me how that's going to work. Maybe it can. Your only route is tort suits and proving the damage might be very, very difficult.

KONDRACKE: Well, if you are a baseball player or a football player and you take ephedra and you die, can't your surviving relatives sue the manufacturers?

BINSTOCK: Sure. But I am not sure yet we have cases of people dying from these substances.

KONDRACKE: Oh, yes, we do. Well, claim on ephedra that a football player died, I believe, or a baseball player. I can't remember which one it was; I think it was this summer.

BINSTOCK: Oh, that's right.

KONDRACKE: Right. OK. Ronald Klatz, who is the president of the American Academy of Anti-Aging Medicine, is not with us today so I want to just take some of the claims that are being made by his organization, which is the advocacy group that we are talking about and ask you about them.

They say the official definition of anti-aging medicine is that it is a medical specialty founded on the application of advanced scientific and medical technologies for the early detection, prevention, treatment, and reversal of age-related diseases.

Now, scientific. To what extent are their activities scientific? That is, peer reviewed, scholarly, etc.?

OLSHANSKY: Well, clearly that particular comment, and many of the other related comments that come from A4M, represent classic examples of preventive medicine – identifying diseases, trying to prevent them, postpone them, delay them, treat them.

I think what the American Academy of Anti-Aging Medicine has done, and in fact what the anti-aging industry has done, and the mistake that they have made, is that they associate aging with disease. This is a fundamental problem.

They believe that if you increase muscle mass, reduce the rate of bone loss, improve skin elasticity, and reduce your risk of heart disease, cancer, and stroke, that you are altering aging.

The fact of the matter is that you are treating the manifestations of aging. Even if we could somehow come up with some hypothetical magical cure for heart disease or cancer or stroke, those three diseases would be replaced by three other major causes of death, and aging itself would remain uninfluenced.

So they are basically narrowly defining aging as what they do in clinical science to treat disease. What we are suggesting is that that is a fundamental misunderstanding of efforts, to go after the biology of aging itself.

KONDRACKE: Well, no, but aren't they saying that if you take vitamin E, that you are not going to cure heart disease, but what you are going to do is forestall it, right? They say that the most effective thing you can do to postpone aging is to take multivitamins every day.

OLSHANSKY: Well, I think much of what they are suggesting is—I hate to put words in their mouth—but that some of the nutritional supplements that are being offered indeed will reduce the risk of some diseases. I think there have been trials that have demonstrated that some diseases are amenable to modification with the introduction of nutritional supplements.

And that's certainly expected. There are plenty of things that you can do to influence attributes associated with aging and the risk of disease.

For example, many of the benefits that have been associated with the use of growth hormone, such as increased muscle mass, improved mental acuity, improved skin elasticity, all of these can be accomplished with exercise. Does that mean that exercise is slowing or reversing the aging process? No. It means that the manifestations of the aging process are inherently modifiable because the aging process itself is not programmed. In the absence of a program, it means that interventions work. That's precisely why many of the things that we do at older ages to treat the manifestations of aging enable us to live longer, and in some cases healthier, lives.

But that's not the same as going after the aging process itself. I think that is a fundamental misunderstanding of the anti-aging industry.

BINSTOCK: I think to a layman the distinction that Jay is making is perfectly valid. But I think to a layman it is not terribly important.

As I said to Jay in a recent conversation, whether you are dealing with aging itself as a process or not, is not terribly important to a consumer like me. So when I do exercise, weightlifting and other things, to try to compensate for the condition that normally accompanies aging, which is loss of muscle mass, that could perfectly well be called an anti-aging effort on my part. If my doctor prescribes it, it is a perfectly good thing to do. To me, the fact that it doesn't have anything to do with the fundamental biochemical mechanisms of aging is rather irrelevant.

So I think the key thing is to not focus on the industry as a whole and say it's making bad claims across the board and doing bad things across the board; it's important to sort out the good, the bad and the fraudulent. And there is plenty of good. I think there are a lot of practitioners out there who are advising exercise, nutritional stuff, dietary supplements as well as good diets, and they ought to be embraced and that tilting at them is not a good thing to do.

KONDRACKE: One of their other claims is that, indeed, since its creation in 1974, the U.S. National Institute on Aging has spent more than \$9.4 billion, but has yet to turn any medical intervention into a meaningful application to combat the degenerative diseases of aging. So they are basically saying that scientific gerontology has produced nothing in all this time.

OLSHANSKY: Well, think about that statement for a second. I mean, it contradicts the opening remark which says that there are plenty of things that we can do, and that they do to intervene in the aging process, most of which was discovered by the very scientists they are saying haven't produced anything. So it is a contradictory statement and makes no sense to me whatsoever.

KONDRACKE: Does A4M lobby for or against increases in the National Institute on Aging budget?

BINSTOCK: I don't think they do either. But they attack the NIA very specifically as trying to maintain an establishment and to shut them out. They don't apply for any research funds that I am aware of.

They describe gerontology as a death cult. So basically, what they are saying is, "Anybody who picks on us is just trying to maintain power." In fact, that's what they described you as doing, to stay on top of the multibillion gerontological industry, and that's why you were attacking them, and so on. So they are good symbol manipulators.

KONDRACKE: Do they do any science? That is to say, do they have double blind studies? Do they publish peer-reviewed research? Do they test anything?

BINSTOCK: None that I know of.

OLSHANSKY: The leaders of the organization haven't published any scientific articles in a peer review journal. They have published plenty of popular books that all basically say the same thing—that it is possible to slow, stop, or reverse aging.

They will say that many of the people who attend their meetings, or who are affiliated with the organization, have published scientific articles. But the society itself doesn't publish anything that is in peer review.

KONDRACKE: They claim as sponsors, such organizations as Genentech, Novartis, SmithKline Beecham, and Tufts University. That sounds like legitimization. Is that valid or invalid?

OLSHANSKY: Well, I don't know if that's valid or invalid. I also don't know about any of those affiliations, whether those are real or not.

I think what you often see at their meetings is they will invite in well-known, established scientists. They will pay for their travel expenses and then they will give a keynote speech at their meetings. Then they claim association with real scientists who are doing real research on aging. And that, I think, is how they developed some sort of legitimacy—by linking up with scientists who are doing real scientific research.

BINSTOCK: My look into it indicates that at first blush they are able to get a little bit of money out of these various parties because, as you stated their goal, who could object to that goal?

KONDRACKE: Right.

BINSTOCK: That would be the goal of many geriatricians, by gerontologists and so on. So for example, the Retirement Research Foundation, which I believed funds this particular program in part, gave them an initial grant when they started up and left the sports medicine business in about 1993 for organizing a board of directors. They gave them \$15,000, and so then they were able to say, "supported by the Retirement Research Foundation." They were just starting up saying, "We have these great objectives."

KONDRACKE: They list as promising areas of research—they don't claim that they are doing it, but they are advocating it—some of the same things that I guess gerontologists are looking toward as future possibilities for breakthroughs: genetic engineering, including work with stem cells, cloning, nanotechnology, artificial organs, nerve impulse continuity. Are they trying to lay claim to some of the same activities that legitimate biogerontologists are undertaking in difficult laboratory research?

OLSHANSKY: Well, the vast majority of that list represents technologies that do not currently exist, and which do not currently influence the duration of lives of most people.

In fact, I think there have been only a handful of people who have been influenced by any of those technologies, and it may be years, decades, perhaps never, that some of those technologies will have some influence on aging.

Remember, you listed all of these potential technologies. None of them currently exist that have had any dramatic effect. And yet they are claiming that it is already possible at anti-aging clinics that exist today, using the products that they are selling, to slow, stop, or reverse aging.

So you get this complex mixture of statements that it is already possible, and then a set of comments suggesting that the future will permit us to influence aging.

And so it makes perfect sense to me that they would do that, but clearly there is nothing that is on the market today that has, in fact, been demonstrated to influence aging in humans.

BINSTOCK: What's interesting to me about that list is that it doesn't resemble all the promising lines of biological research in gerontology, which in my view, are likely to make great progress in extending the human life span in a healthy fashion, and not in the far distant future.

KONDRACKE: Which are?

BINSTOCK: Things related to the successful experiments in caloric or dietary caloric restriction in animal models. There are scientists working on ways to mimic the biochemical effects of that so that people won't have to dietary-restrict themselves, and yet at the same time enjoy the same benefits that the rats and the mice have, which in some cases, as I think you know, Morton, is forty percent increase in average life expectancy and life span, from your interview with Rich Miller.

KONDRACKE: Um-hmm.

BINSTOCK: So that would be one example. There is the genetic manipulation work in the round worms, which looks promising. And there are a whole bunch of other things. But these things don't bear any resemblance to what biogerontologists are working on, or where the research really is.

KONDRACKE: Well, certain biogerontologists are working on stem cells.

BINSTOCK: That's right. That was one exception on the list.

KONDRACKE: Is this fight fundamentally about the efficacy of nutritional supplements and other nostrums on their part and what to do about them? Or is it a deeper philosophical claim about what is actually possible in aging research?

OLSHANSKY: I think most biogerontologists believe that there will come a time in the future when we understand enough about the aging process to develop an intervention that will slow it down, and most of us are optimistic that this will eventually happen.

In fact, to be honest with you, there is actually very little research going on focused specifically on identifying and going after the biological process of aging itself. The vast majority of the funds that are being spent are focused on specific disease processes, not the biological process of aging itself.

KONDRACKE: What percentage of the NIA budget is devoted to aging research—that is, the processes of aging—and what percentage toward diseases, such as Alzheimer's?

OLSHANSKY: Do you know the answer to this one?

BINSTOCK: Not off hand. I would take a guess that maybe the basic stuff is about twenty to twenty-five percent.

OLSHANSKY: Yes.

BINSTOCK: I'm not sure.

OLSHANSKY: I'm not sure. I will tell you, there is going to be a session at the forthcoming Gerontological Society of America meeting focused specifically on this issue, so I presume someone will provide an estimate at that time. I don't know what the percentage is, but it's far smaller than what is currently being spent on all the major fatal diseases.

KONDRACKE: Just on the philosophical level there are three—I believe one of you has written that there are basically three attitudes toward aging. One is compressed morbidity, which I will leave you to define. Another is decelerated aging, and a third is arrested aging, which is what the anti-aging group is all about.

Now, would you define what these three are and what makes them different, and what the potential is for compressed morbidity, for example?

How long do you think we could extend the life span? What is it possible to do scientifically?

BINSTOCK: Well, I wrote about it, but Jay seems eager to answer it.

OLSHANSKY: Well, no, actually, why don't you talk about compression of morbidity.

BINSTOCK: The basic concept of compression of morbidity takes the fact that at the moment there is a maximum life span and says the goal—

KONDRACKE: Which is?

BINSTOCK: Well, it's estimated to be about 120 years, give or take things. The oldest woman in France died at 122.

Let's say the goal is to eliminate diseases and disabilities so that morbidity, the name for those, will be eliminated and people can live active, healthy lives until they reach the normal human maximum life span, and then just sort of fall apart and die like the old one-horse shay in Oliver Wendell Holmes' poem.

KONDRACKE: So would this push us beyond 120, or not?

BINSTOCK: No. It would push us up to where the maximum life span is without extending it.

KONDRACKE: OK.

BINSTOCK: It would certainly increase average life expectancy, however, because people wouldn't die of all these various diseases.

Decelerated aging is slowing the rate at which various aspects of aging take place, and they do it in concert in all the different species. This is the graying of the hair, the loss of the muscle mass, the loss of lung capacity, and so on and so forth.

So that's been accomplished in the animal model, such as in rats and mice. It has basically kept them healthy until near the end of their lives, but there is still a period of morbidity. What it has done is extend average life expectancy by roughly forty percent, and maximum life expectancy by roughly forty percent.

So Richard Miller, for example, says that through slowing the rate or decelerating aging, you would have the average life expectancy of 112 for an American Caucasian woman with an outlier of 140 years. His estimate.

Arrested aging is something that has been pushed very much by a geneticist at the University of Cambridge, although Americans have joined with him in this. The idea is to engineer negligible senescence, and maybe you can explain this better biologically, but to a layman, as I read the paper, what they are saying is, "We believe it will be possible to reach in and deal with the various biochemical things that cause these aging-related changes to take place, and reverse them before they cause damage." And that will arrest aging right there.

KONDRACKE: Give us an evaluation and tell me which side you are on.

OLSHANSKY: Well, this—

BINSTOCK: Do I pass?

OLSHANSKY: You get a C plus! And I'll talk to my students about this next week.

The issue of slowing and arresting the biological rate of aging is a difficult one to deal with. Let me just tell you; it is not currently possible to measure the rate at which aging occurs in any species. There is no measure. There is no suite of biomarkers, there are no magical whatever that we can use that will tell us how old we are biologically, and when we are going to die.

In the absence of measures of the biological rate of aging, it is therefore not possible for anyone who makes the claim that we have slowed aging, to defend it.

So what is used in its place, what is used in place of some sort of objective biological measure of aging, is something that is known as the actuarial rate of aging. It is known that the risk of death increases exponentially in humans about every seven years after the age of thirteen. You see comparable exponential increases in mortality among many other sexually reproducing species.

So aging has been defined by this rate of increase in the risk of death. When scientists have, through caloric restriction or genetic modification of one form or another, altered the death rates of these populations—and principally the way in which it is done is that the point of inflection, or the time period in the life span when the mortality rate increases, has been postponed from, but the rate of increase in the death rate for the most part remains the same—they have concluded that aging has been slowed.

What I would suggest, and this is actually the topic of a manuscript that my good friend and colleague Bruce Carnes from the University of Oklahoma and I are working on, is that we need to be questioning whether that is a viable measure of aging, the actuarial rate of aging itself.

So when someone says, as you have just said a moment ago, that researchers have demonstrated that we have slowed aging, I would throw a word of caution in there.

They have extended the duration of life of a wide variety of species. And we can extend the duration of our own lives by altering our lifestyles, by reducing our risk of a number of diseases, by wearing our seatbelts. Have we altered the basic biological process of aging? There is no evidence to support that claim at this time.

BINSTOCK: Well, you gave the demographer's answer. I give the layman's answer from reading the articles, which are entitled "Biomarkers of Aging," and "Reporting on What People are Finding."

So it seems to me that in the studies they have measured all sorts of things.

OLSHANSKY: Remember, there have been a number of studies on biomarkers of aging and the general conclusion is that there are no definitive biomarkers that enable us to measure aging. There has been plenty of research focused on biomarkers.

KONDRACKE: But you are a compressed morbidity person, are you? That is to say that that is what you think is presently possible? Or you think that decelerated aging is something that probably can be done but can't be measured at the moment?

OLSHANSKY: Well, if you are asking me what I would like to see happen, you know, this compression of morbidity argument was originally developed by Jim Fries in 1980. And, of course who wouldn't want to live very healthy right up until the moment in which they died? It is a desirable goal. Clearly it is something we would like to see happen.

But decelerated aging is something that, in my view, is—and you may find this surprising coming from me who is railing against this anti-aging industry—but what I would argue is that instead of focusing so much attention on the manifestations of aging, the heart disease, the cancer, and stroke, and while it is, of course, important that we continue to focus on those diseases, we would achieve far more in the way of improved public health if we were to succeed in finding a way to slow down or decelerate the rate of aging.

Arresting the rate of aging, which to me implies that we are not aging at all, or that the risk of death is actually declining as we grow older, to me—

KONDRACKE: So say we find out biologically what causes aging, and learn how to do something about it.

OLSHANSKY: Learn how to do something about it to slow down the process. And the result would be, I hope, a simultaneous postponement of all of the manifestations of aging. So essentially, we would be younger longer.

KONDRACKE: Well, Dr. Binstock, I know, wants to say something about the societal implications of this, so let me ask a question about that.

Suppose we did any or all of that. We have extended life expectancy. We've got a lot more eighty-year-olds and one hundred-year-old people. And you know, there's all kinds of terrible demographic and economic possibilities from this, if we've got an aged population that is not working, that fewer and fewer young people have to support, etc., etc.

What is your view of the future?

BINSTOCK: I certainly think the implications of achieving this would be radical in terms of changing every institution we know.

However, I don't make the same assumptions that you do, such as that older people wouldn't be working.

If we have healthy, active older people, why wouldn't they be working? They'd want to be consuming things. We'd have all sorts of jobs and they would need to support themselves.

How could we support Social Security? Well, who says Social Security would be the same when that happens? In fact, there are some who are trying to make drastic changes in Social Security right now.

Would they all be politically together? These prolonged old people and the old, old and the young old and so on. Well, programs make constituencies, and so the way we shape programs might have a lot to say about that. Plus, they will have a lot of other identities than that. So extrapolation from what we know is about the worst mode of prediction, particularly in social affairs, particularly with respect to public policy.

KONDRACKE: It's a journalistic bad habit, I should tell you!

BINSTOCK: Well, no. Everybody does it and it's a great line for me to come out with.

But you know, this is very seriously happening. And I'd just like to make three points in very brief order.

The NIH has actively launched a program of trying to apply what we have learned from the caloric restriction experiment for applications to humans. They've got some pilot studies going on that with dietary restriction right now.

The implications of achieving anything like what's been done with animals and with caloric restriction or some of the other things are far more profound than the implication of cloning or stem cells. We are not even beginning to discuss it. I think if we begin to discuss this and debate its desirability or undesirability, as Leon Kass is posing, and what we can do to shape the future now through anticipatory deliberation, it would serve us all very well.

KONDRACKE: I think what we should do is have another session and bring you back on the societal implications. We have done some of that, but we'll do it in the future.

Let me just take a couple of questions that have been e-mailed in: "Many anti-aging compounds, DHEA, human growth hormones, melatonin, etc., are natural compounds that can't be patented and thus are unlikely to attract funding from large pharmaceutical companies. Who will pay for the clinical trials to determine their efficacy?"

OLSHANSKY: That is a good question. I don't know. Actually, interestingly enough, I've had a discussion about this very issue with Ron Klatz from A4M, where I was suggesting, you know, if you know clinicians who are administering growth hormone and other hormones to their patients, why don't you enlist them in a trial? And he would say, "Well, we can't get funding for this kind of work." I don't know how hard they have tried

to get funding, but—I don't know the answer to that question, exactly how that funding would be dealt with.

KONDRACKE: OK. Is it possible that the highly marketed concept of anti-aging medicine could improve the visibility of gerontology? In other words, you have raised their visibility. Is it possible that they are raising yours?

OLSHANSKY: Not in a positive way. I think it's been in a very negative way, and I would clearly distinguish between this anti-aging industry, which I refer to as an industry rather than medicine, and regenerative medicine, which is that whole list of technologies that may come in the future that will enable us to perhaps go after diseases much more effectively.

Then, hopefully, at some time many of the research scientists who I hope are listening, will focus in on the aging process itself and find a way to go after that. I would emphasize in terms of public policy that the age wave has yet to hit. It's not going to hit until the year 2011.

So as much as we like to consider ourselves an aged society, believe me, we haven't seen anything yet until after the year 2011. And for twenty years or thirty years after that, we are then going to see an aged society.

So I think if we don't attempt to focus in on the aging process itself, we are making a mistake, and there is as potential risk of dramatic increases in frailty and disability among the extreme elderly in the future.

BINSTOCK: I think that nothing but bad could happen from the anti-aging medicine movement for gerontology because of conflating what Jay was just talking about.

Indeed, when the "No Truth to the Fountain of Youth" thing made the *AARP Bulletin*, the AARP message board was full of complaints from people saying, "There is truth to the fountain of youth."

So I think staying away from engaging with them and attacking them is the best strategy. I think there's a big tar baby there. The best thing is to promote one's self.

KONDRACKE: OK. We've got only four minutes left. So, does either of you have something burning that you want to say about any or all of this? Or else I will ask you a bottom line question, which I have asked before, but I just wanted to repeat it again.

OLSHANSKY: I'll take a question.

KONDRACKE: OK.

OLSHANSKY: Certainly.

KONDRACKE: This legislation was passed when?

OLSHANSKY: 1994.

KONDRACKE: 1994. Let's suppose that Congress revisits the subject. Let's propose that. What would that legislation say and do to correct the problem?

BINSTOCK: Well, I think the basic point is that you would try to get clinical trials done on all sorts of things that are not subject to them now, before they could be marketed.

OLSHANSKY: Bob and I were talking about this earlier. The question is, do you want to restrict access to these kinds of products by people who really want to use them? I think there is a real question as to whether or not such restrictions should be enacted. I'm not sure I believe that they should be enacted.

But the clinical trials need to get underway. We need to evaluate efficacy and potential dangers, and people need to be made aware of the potential dangers associated with these products.

I'm very concerned about clinicians, physicians at anti-aging clinics making claims that are not substantiated by the scientific literature.

KONDRACKE: So would you create or empower an agency that already exists to begin testing and test according to what people's guesses are about what's the most dangerous, and start publishing results? Would that be an effective beginning at least?

OLSHANSKY: Yes. What is the organization that is already doing work?

KONDRACKE: There is an office at the NIH of Alternative Medicine.

OLSHANSKY: Yes, I think that would be a good place to start. Clearly, funding research through that organization may be on one of the best approaches.

KONDRACKE: OK. Thank you very much for being with us.

End.