LPI on Health - 2009 Diet and Optimum Health Conference
Dr. Tomas Prolla, Speaker
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Introduction/Conclusion: Naomi Hirsch, Environmental Health Sciences Center,

Host: Sandra Uesugi, Environmental Health Sciences Center

Guest: Dr. Tomas Prolla, University of Wisconsin

[THEME MUSIC]

HIRSCH: Welcome to LPI on Health, a podcast series to inform you about the recent micronutrient research and events coming out of the Linus Pauling Institute at Oregon State University. For more information, visit our website at http://lpi.oregonstate.edu.

[THEME MUSIC]

UESUGI: This is Sandra Uesugi with the Environmental Health Sciences Center at Oregon State University. In the quest to find ways to live longer and also live healthier, researchers have proved that calorie restriction is a successful way to prolong life as well as reduce indicators of chronic disease such as insulin resistance, high blood pressure, and high body mass index or BMI.

However, though it's not starvation, calorie restriction requires reducing calorie intake by 10-25% less than typical Western diet, a difficult challenge for the average person to maintain on a long-term basis.

Recently, scientists have searched for alternative ways to achieve these benefits without calorie restriction. At the 2009 Linus Pauling Institute Diet and Optimum Health Conference in Portland, Oregon, I talked with Dr. Tomas Prolla of the University of Wisconsin to discuss his research in this area.

PROLLA: I'm Tom Prolla. I'm a professor at the University of Wisconsin in the department of Genetics. My work focuses on aging and in particular, the role of dietary interventions in retarding aging.

UESUGI: Today your talk included calorie restriction and the effects of resveratrol. Can you comment about calorie restriction and the studies that have been going on with that and why you're looking at resveratrol in combination with that?

PROLLA: Sure, so caloric restriction is really the only intervention that has been shown repeatedly to retard the aging process across multiple species. The original observations were in rats many decades ago. The field of caloric restriction has really increased in scope dramatically, I would say, over the last ten years.

There's a wide-spread belief that if we can understand how caloric restriction retards aging in rodents or in other animal models, we can apply that information to humans and in particular, in the design of compounds that might have some or most

of the benefits of caloric restriction in retarding aging. Several different types of compounds have been proposed including antioxidants or compounds that mimic some of the metabolic effects of caloric restriction such as increasing insulin sensitivity. Resveratrol is probably the one that received the most press.

Resveratrol is a compound found in plants and in particular in plants that have been under stress. It has been well established that resveratrol has cardiac, cardio-protective properties. The findings that resveratrol may increase life span are relatively recent, and they're controversial because some laboratories have reported these findings in diverse organisms including yeasts, *C. elegans, Drosophila*, mice. Other laboratories have done similar experiments and haven't seen the effects.

What we have decided to do is to examine the role resveratrol using DNA microarray since they provide a global view of aging and also the metabolic effects of caloric restriction and any other substance that can be fed to animals.

UESUGI: In regards to the doses that you gave to the animals in the study of resveratrol, what would be an equivalent amount?

PROLLA: An equivalent amount of resveratrol would probably be about 300 mg per human. Now to put that in perspective, wines that are very rich in resveratrol maybe would have a few milligrams, maybe 10 mg at most of resveratrol let's say per bottle. If you were to obtain these amounts of resveratrol from drinking wine, you would have to drink a lot of wine. But we don't know what is the lowest effective dose. It could be 10 times lower or maybe 100 times lower than what we tested.

Also, red wine has many other polyphenols that might be as active or even more active than resveratrol. So the idea that one would have to drink many bottles of wine to obtain these health benefits is probably incorrect. You probably get many of the health benefits by drinking red wine simply because it is really a mixture of polyphenols. But having said that, these doses of resveratrol can be achieved by supplementation. So I think we need more studies to determine what are the minimum effective doses of resveratrol.

UESUGI: Are food products like grapes and grape juice also high in resveratrol? Or is there something about the wine that helps?

PROLLA: In terms of the wine, it has to do with the type of grapes. So some grapes would have more resveratrol than others. I know that resveratrol is present in grape juice. I don't know the amounts. I don't know if it compares to a high resveratrol wine or a low resveratrol wine, but in the same way as red wine, the grape juice also has many polyphenols. In fact, I am aware of experiments that have been done where feeding grape juice to humans has lead to improvements in cardiovascular parameters.

UESUGI: How did you become interested in researching aging?

PROLLA: I've been interested in studying aging since I went in college, so I've been interested in it for more than twenty years. It just seemed to be an interesting problem to study. I think for a scientist to do really well, they have to identify a biological problem. I'm talking obviously about a biological scientist. You have to identify a problem that really gets you motivated, and in my case, aging was something that early on caught my attention. Now it's a field that has received, is receiving a lot of attention. But it didn't used to be like that. Like, twenty years ago there were very few labs doing high-level aging research.

UESUGI: You mentioned that you were using microarray technology. Are there other new developments and technologies? That didn't exist when you began your studies.

PROLLA: Right, yes.

UESUGI: Are there other technologies that are allowing you to be more efficient or more thorough work?

PROLLA: Well, we almost exclusively do DNA microarray gene expression work, but we saw a talk today on the use of redox proteomics. That's another approach. Proteomics is another technique. It hasn't been used as widely as genomics or gene expression profiling because, I think mainly of two reasons. One is that the equipment to do proteomics is more expensive, and second, because protein is more susceptible to artifacts. Anyone who's worked with proteins knows how difficult it can be in terms of degradation or reproducibility. But I think, eventually, it will probably be as important in terms of getting global pictures of aging.

UESUGI: Great, well thank you!

PROLLA: Thanks.

[THEME MUSIC]

HIRSCH: Thanks for tuning in. This podcast was produced in collaboration with the Environmental Health Sciences Center with funding from the National Institute of Environmental Health Sciences.

On behalf of everyone at the Linus Pauling Institute, we wish you optimum health. Have an awesome day!

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