## Structured Panel Discussion

**Leader:** Neile K. Edens, PhD, Abbott Nutrition, Columbus, OH

**Dr Edens:** During the last 1½ days, we have had some great presentations and discussions, and I for one feel replete with data. Now I would like to integrate some of those data. Because we have both basic and clinical scientists at this conference, I would like to hear everybody's unique perspective on the following question: Can we reduce or how can we reduce the severity or the risk of sarcopenia?

**Dr Morley:** Clearly, we should build muscle mass when we are young. It is like bone. If you build bone when you are young, you do better when you are old. I am convinced that if we did not build muscle when we were a teenager, it will be much harder when we are old. We see patterns within muscle in older people. People who used to exercise seem to do better, at least in my patient population when I try to re-exercise them.

I think we need adequate protein throughout life. And we have to be careful about the common belief that as we get older and have some renal failure that we should cut back on protein. The data I know indicate that protein may hasten the time to dialysis in people with severe renal failure, but it does not necessarily kill.

There are endocrine interventions, but the amount of data on them is insufficient to recommend anything other than trials. Of these interventions, the one that appears the best is the testosterone anabolic hormones.

I think that we have to “fix”people before they are born, through childhood, and through middle age. It is never too late to do exercise. It is never too late to eat relatively well. However, it is much harder when you are 85 years old, if you did not exercise and eat well when you were 40 years old. It is a little late to fix people at age 85 and tell them it is now time to exercise.

**Dr Supinski:** I am in favor of nutrition, exercise, and endocrine interventions, but not to the level of intervention in some sports stars.

Exercise is great, but it is hard. In one Woody Allen movie he was in a future time when we would take a pill and not need to exercise. That maybe is not a bad idea. I think we need to learn more about all these pathways, and that if we are really smart and clever, we might come up with drugs to manipulate these things, because there always will be people who will not exercise, no matter how hard we urge them to do it, and there always will be people who will not eat adequately. So there must be, in the long run, pharmacological therapies.

We age. Data show that weight lifters do not lift as much when they get older. I think subtle alterations in the gene programming of these satellite cells and other cells occur,

and that if we understood that process, we could develop a pharmacological means of blocking it. Maybe some of the pharmacological interventions will be biopharmaceuticals, but I have more hope for the future. I think in the long run, we will come up with treatments for these things that will block the advance of sarcopenia and weakness, even if we cannot exercise all of our patients.

**Dr Suetta:** Because we do not have that pill yet, I think the quick answer is exercise. It is not a pill we have to take only once when we are young or middle-aged. We have to do it through all ages. In contrast to what Dr Morley says, I believe the important take-home message is that the muscle function of older weight lifters is much better than that of their nonweight-lifting counterparts.

It has been shown that specific force in aged individuals who have been performing resistance exercise for a long period is not different from that of young, in contrast to endurance-type-trained elderly individuals or sedentary individuals [Klitgaard H et al: *Acta Physiol Scand* 1990;140:41-54]. By doing resistance exercise, we can counteract many of these decreases that occur with age. Of course, we cannot counteract everything. We cannot counteract loss of type 2 fibers and some of the neuronal components in sarcopenia. If we train throughout life, however, we can maintain an independent level of life, and that is important.

**Dr Volek:** In the spirit of succinctness, consume adequate protein, plenty of leucine, plenty of good fats, primarily monounsaturated fat, and carbs in an amount you can

tolerate. I see little downside to adding creatine and beta-hydroxy-beta-methylbutyrate (HMB) for muscle mass. Of course, there are thousands of caveats to those general recommendations.

**Dr Schols:** Start as young as possible with a healthy lifestyle that includes exercise and nutrition, focusing on nutrition, not only to maintain muscle mass but also to modulate cardiovascular risk. Do not start smoking, or stop if you are smoking.

Generally, children are fit, but we also want to reduce risk for various chronic diseases. As people age, depending on their genetic profile and their lifestyle, they will sooner or later develop functional impairments. I wonder whether the exercise focus should shift from endurance to resistance type of exercise as people age. I would not advocate that for young people.

Because of aging and variability in the population, I advocate for tailored intervention strategies, including nutrition, exercise, and, if needed, endocrine interventions.

**Dr Reid:** I agree. It is hard to argue with physical activity. I have learned much at this session about the importance of protein. I am eating my protein. Vitamin D is an interesting nutritional approach that I have not given much thought to, and it looks very interesting. I agree with Dr Tisdale that it is worth exploring antioxidants as a possible application.

I am not a sportsman and was not an athletic kid, but I am becoming more interested in physical activity as I get older, because I see my body changing. I think there is the potential to get people up and out, and get them active, even as they start to move into their older years. We need to inform them about the importance of this activity.

**Dr Boseaus:** I would advocate nutrition and physical activity instead of exercise, more for the purpose of upholding a normal energy metabolism. Throughout life, in the absence of specific disease, this will create an endocrine environment that probably will link in with what we consume. There may be different windows in life when these things are more important than others—metabolic programming, for instance, more in young childhood than in utero. I know very little about reprogramming of metabolic functions in old age, but perhaps the relation of diet with the changing endocrine environment is worth looking into.

As to high-peak muscle mass achievement, I think it is a bit more complicated than just saying that the high-peak muscle mass is such and such. Women tend to live longer than men with lower muscle mass to start with, and males with a high muscle mass tend to lose it faster. What is the balance of that? I do not know if there is a specific gender effect or if it is a functional muscle mass per se.

**Dr Hegazi:** I would pay more attention to nutrition in the hospital. For elderly patients in the hospital, I would not depend on nutritional assessment and a given recommendation. I would be more aggressive. If the patient is not taking oral nutritional supplements, they

could best be helped by initiating tube feeding to meet nutritional needs and selecting nutritionals that could help break the catabolic cycle. Perhaps we can develop nutrients in pill form, not just a nutritional supplement that the patient either takes or not.

**Dr Johnson:** My grandmothers were physically active and did their own work way into their 80s and 90s. I always saw them eating well, and right now, I am counseling my own mother to drink some milk before she takes a walk and again when she comes back. This is an inexpensive intervention.

We know that if people with a very-low body weight have snacks or oral nutrition supplements in between meals, it does not affect the quantity of food they eat at their meals. So I would probably recommend that people consume more frequent, smaller meals throughout the day, trying to do as much of their own house and yard work as possible, as well as walking some every day.

**Dr Cederholm:** For prevention, I think it is crucial to increase public awareness of the role of exercise, for weight control, but more for maintaining muscle mass. We know that "fat and fit" lives longer than "lean and lazy." When it comes to treatment later in life, it is never too late to start exercising. Muscle is a plastic tissue, much more plastic than bone.

To repeat what the others have said, the data on leucine and HMB are very interesting. We can hope to develop our knowledge about certain nutritional compounds such as amino acids and combinations with eicosapentaenoic acid (EPA).

It also is crucial to increase awareness among professionals, because what medical professionals in the hospital find to be important will diffuse into society. When professionals acknowledge the importance of muscle mass and muscle function, I think we will have an effect with the public as well.

**Dr Tisdale:** This is important for me, because I am in the age group that gets sarcopenia. Unfortunately, I know very little about it, but I would say until we understand the molecular mechanisms that are responsible for sarcopenia, we cannot answer the question that Dr Edens asked. We might be biased one way or another, but we cannot truthfully answer the question without knowing the molecular mechanisms.

I would, however, disagree with Dr Morley about the importance of muscle protein. He says we die when we run out of fat, but we get cold when we run out of firewood and that is basically because we do not burn the house down to keep warm. It is the same way with the body. We die when we run out of fat, because once we start destroying the "house," we lose everything and we die. So muscle protein is important.

**Dr Lanza:** I am partial to exercise, but the evidence says that all of the above measures are effective. I also agree that the answer to Dr Edens' question depends on what type of

sarcopenia we are looking at. A person who is obese and has metabolic syndrome with sarcopenia is going to be very different from someone in the ICU who has sarcopenia.

As to the issue of aging and muscle, it seems like much of the focus is on muscle mass and strength, which is very important. But think about kinds of activities of daily living. If we have sufficient strength to pick up a 30-pound grandchild but our muscle does not have the fatigue resistance to carry the child up a flight of stairs, what good is that? I think there is more than just mass and strength; more attention should be paid to fatigue and mitochondria and muscle energetics.

**Dr Baracos:** I would like to introduce the topic of synergy. I think there is an evident and important synergy between anabolic stimuli to muscle of whatever nature and having the building blocks necessary and essential to build it. I am also struck by the negative synergy between, for example, immobilization or bed rest and old age and other insults. I posit that a woman who is admitted to a hospital for repair of an abdominal aortic aneurysm, develops an infectious complication, and stays in hospital for 2 weeks, will experience the vast proportion of total lifetime muscle loss during the course of that event. If I had a drug or a food product, I would aim it more pointedly in the direction of those people at risk for synergistic catabolic catastrophes rather than in some vague way toward people living in the community who might be having a muscle loss of a very different nature.

**Dr Guttridge:** I have learned much in these last few days because nutrition is not my expertise, and I have really come to appreciate it. However, I can draw from some of my background in cancers. The number one killer in cancer is lung cancer. For many years, people have been trying to understand the mechanisms of lung cancer and trying to find the perfect pill to treat lung cancer. Yet the correlation between smoking and lung cancer has been evident for many years. What is making a dent in that disease is the aggressive anti-smoking campaign that children are exposed to at a young age. My third grader at school is being told not to smoke and not to take drugs. This is very different than when I grew up. That generation probably will grow up not smoking, and we will really see the fatalities drop. It was not a pill; it was just good common sense.

I am a huge supporter of exercise, but increasing it is going to take the same kind of aggressive campaign. We need to reach the population before they are age 60, to encourage exercise in combination with eating right, creatine, HMB, and other helpful measures to supplement that exercise.

**Dr Paddon-Jones:** A more global approach to exercise is to find something that we like to do and can do regularly. Then, if we want nuanced improvements, we can consider creatine, those sorts of value-added supplements. The second prong is more acute. When we face a catabolic crisis, we should react aggressively and use a combination of strategies. That could be amino acids, antioxidants, and maybe physical therapy, if and when appropriate.

**Dr Wheeler:** I agree with everything that has been said here. One thing that still bothers me is that from a clinical perspective, we continue to overuse body mass index (BMI). I would like to see us get away from that as a gold standard of health, and start using body composition and educating people about body composition. Publications including those from the American Heart Association always focus on BMI. It is our fault, because we are not teaching people about what the distribution of muscle and fat means relative to overall health.

I also think that it is important to emphasize resistance weight training. My mother, who is 86 years old, had an abdominal aortic aneurysm and is extremely frail. I have seen the effects of her not doing positive things such as specific exercises at the age of 50, 60, and 70 years. What would she be like today and how would she have survived that horrific surgery that saved her life, but left her frail, if she had taken better care of her body? We need to begin to educate and push more toward, not just exercise, but specifically whole-body resistance exercise.

**Dr Rosemary Riley [Abbott Nutrition]:** I have a couple of concerns. First of all, I am concerned that our young generation is going to be hitting the sarcopenic categories earlier than our parents and ourselves, because of their lifestyle—the way they eat and their general sedentary behavior. Our recommended diet that includes a moderate or good dose of protein three to four times a day is not how they eat, and they are giving up milk at a very early age. So we are challenged to help young people change their diet and lifestyle, and of course, we need to treat those people who need treatment right now.