
Steven Blake, ScD: Neuroprotection of Brain Cells in Parkinson's Disease

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Moderator: Okay. Steve Blake is a faculty, Nutritional Biochemist at Hawaii Pacific Neuroscience. He has offered many classes at the University of Hawaii. He has designed the Hawaii Dementia Prevention Trial of Clinical Study at the Hawaii Alzheimer's Disease Center. He is personally involved in conducting his clinical that uses dietary changes and nutrients found in his targeted nutritional supplement brain and body food which you can get here. Steve Blake, author of The Diet Doctor, Software for Analyzing Dietary Nutrients. One of the causes of most of our disease process is deficiency of nutrients so that's a very good software program. It gives a detailed analysis of your dietary fats, tocopherols, carotenoids, and many other nutrients.

He has also maintained one of the world's largest databases of plants he uses medicinally called the Herb Doctors. He study scientific research on the connections between food and disease. He sees himself as a translator of the medical literature into understandable science-based language. Steve Blake attended the University of California. He is a research specialist in Nutritional Biochemistry. He lives on a solar-powered, organic farm on Maui with his wife, Katherine. Welcome, Steven Blake.

Dr. Blake: Welcome. Thanks so much for coming tonight. I do read the peer-reviewed science literature and I feel like I work with a lot of neurologists, gerontologists, and neuropsychologists who use drugs like most modern medicine on neurologic diseases. The drugs can have helpful do read the peer-reviewed science literature and I feel like I work with a lot of neurologists, gerontologists, and neuropsychologists who use drugs like most modern medicine on neurologic diseases. The drugs can have helpful do read the peer-reviewed science literature and I feel like I work with a lot of neurologists, gerontologists, and neuropsychologists who use drugs like most modern medicine on neurologic diseases. The drugs can have helpful effects with Parkinson's disease. There's no doubt that the drugs have helpful effects but they don't look generally at nutrition and nutrients. I get the wonderful position of being able to find out ways that heal, that help, that slow progression, and that are completely non-profitable which is really fun for me. Because instead of developing drugs I look for things that help people that are generally not a patentable thing, you know, food. You can't patent bell peppers which I'll talk about.

On the other hand they can be tremendously helpful. Tonight's talk I'm going to break it into 3 segments. The first segment is our bodies make dopamine in the substantia nigra pars compacta. I'll show you a picture of where that's in the middle of the brain. If the dopamine gets very low then the symptoms of Parkinson's can develop. We make this dopamine ourselves from an amino acid tyrosine which gets transformed into levodopa but we can also can take drugs that have levodopa in them. Both of that leads to more dopamine. There are dietary proteins that can interfere with this process so whether you're using tyrosine to make your dopamine the way we're designed or using levodopa to boost your dopamine the way drugs are designed the dietary protein can really interfere with this process or not interfere which can have some wonderful effects. Some of the people we're seeing are able to control their Parkinson's with less drugs or in early cases no drugs just by changing protein. That's interesting.

The second thing I'm going to talk about is there are certain toxins in our environment that seemed to be attracted to this mid-brain area that kill off the cells that make dopamine. Well, wouldn't it be a good idea for us all to avoid those toxins? I'll identify them, tell you what foods they're in and how you can avoid them. By the way, I'm going to get to this later but I have to tell you now when Parkinson's was first diagnosed typically 60% of the dopamine-producing cells in the brain have already died off. All of us in the room who have not yet developed Parkinson's disease we may be down 10% in our dopamine-producing cells. We may be down 40% or 50% but not showing symptoms yet. Delaying the progression of Parkinson's disease might be very helpful for all of us in this room and not just people who already have it. Neurodegenerative diseases, all that I've studied, take decades to develop. Let's not develop them.

Third step is that ... This is common to many neurodegenerative diseases especially Parkinson's disease, the cells die off because of oxidation. Brain cells are typically very fragile. They have membranes made of phospholipids with very fragile fatty acids, arachidonic acids and docosahexanoic acid are 4 and 6 times desaturated, very fragile, very easy to oxidize for them to die off. Antioxidants form a really good defense for us to keep our brain cells alive. Of course the side effect of that is to protect all of your brain cells not just the ones that produce dopamine.

This is a picture that you can see of where the substantia nigra is. It's in the middle of the brain and of course it has to do with movement. Parkinson's disease is a movement disorder. It's clear that it would be near the spinal column, on top of the spinal column in the middle of the brain. When the cells die off that make dopamine then Parkinson's disease can develop and I'll show you a picture showing that rigidity, tremors, and gait disturbances are things that people really notice at first with Parkinson's disease, cramped handwriting and masked face and several others. Protecting these dopamine-producing cells, dopaminergic in medical literature, that's our goal. We want to protect these cells so they don't die off.

My talk tonight will focus on the progression and risk reduction and really there isn't that much difference because things that slow down the risk of getting Parkinson's disease are also going to slow down the progression of Parkinson's disease. No matter where you are in the continuum of ... Maybe someone in this room has a 100% of their dopamine cells are still intact and maybe someone in this room only has 70%, maybe 30% intact. Whatever it is we want to protect whatever's left and slow the progression of cell death in the brain to everything. At any stage dietary changes can help, at any stage avoiding those toxins can help, at any stage antioxidants can help. I hope that all of us will benefit from this talk.

Here's a little diagram that shows this typical symptoms of Parkinson's disease. People may notice at first shakiness of the hand. Essential tremor can be confused for Parkinson's disease if a hand is shaking a little bit but when you move the hand essential tremors stop shaking. With Parkinson's disease if the hand is shaking and you have Parkinson's disease it's more likely to continue shaking. Katharine Hepburn's famous for having shaky lips. You can see that there's a stooped posture associated

with more advanced Parkinson's disease, a masked-like face that doesn't show emotions so well, and a very slow gait called bradykinesia, difficulty walking, difficulty initiating movement, and cramped handwriting. There's lots of signs of Parkinson's disease.

Parkinson's is a progressive disease. I have to say that among neurologic diseases Parkinson's disease is one of the nicer ones to get. I know that's a crazy thing to say about a disease. On the other hand people live long healthy lives with Parkinson's disease. We're working with an old guy who's had it for 35 years and he's walking with a stick and he had been falling down everyday. Luckily he did some dietary changes, he's now not falling down, and that's right there really a good thing. There are scales that tell the progression of Parkinson's disease. The Hoehn and Yahr Scale is an old one, one is almost normal and by 5 you're wheelchair bound. It tells you where in the continuum of this very slow moving neurologic disease that you might be.

The unified Parkinson's disease rating scale is a more exact test and it looks at different things. Mental clarity and function, behavior and mood can be ... Dopamine is involved in behavior and mood, too and addiction and lots of other interesting things. As you lose dopamine other changes may occur. That one looks at activities of daily living, can you feed yourself and go to the bathroom and close yourself and all that stuff. Of course movement, which is the crux of it. Now there is Lewy Body Dementia. Lewy Body Dementia is caused by misfolded protein sometimes alpha-synuclein, and this misfolded proteins can occur in the memory and thinking areas of the brain not the mid-brain at all. That this is not an automatic thing with Parkinson's disease but it may develop and co-develop with it. I've got some ideas for you on Lewy Body Dementia, some things that would slow down the folding of these proteins even a few things that might disaggregate the misfolded proteins.

The standard of treatment for medical doctors for Parkinson's disease is levodopa and it may be mixed with carbidopa or many other drugs. There's also monoamine oxidase inhibitors, MAO inhibitors for short. What these do is slow down the degradation of dopamine much like the drugs that slow down the degradation of serotonin. There's more dopamine in the cells so less symptoms. The levodopa is absorbed from the intestine into the blood stream through the large neutral amino acid transporter. This transporter can get saturated so if you have too much protein in your intestine at that time the levodopa and also the tyrosine are not absorbed well into the bloodstream. Well, very similar transporters work at the blood-brain barrier to move the levodopa or the tyrosine into the brain.

Of course dopamine itself cannot transverse the blood-brain barrier so no one gives dopamine as a drug. Levodopa is a precursor so that's given. Again, if there's too much protein in the blood stream then the absorption of levodopa and tyrosine into the brain isn't as good. I made a little diagram to show this. Here's tyrosine, dietary tyrosine, very easy to find in the diet. You don't need to go to great lengths to get it. Then tyrosine is transformed in the mid-brain, tyrosine hydroxylase is the enzyme into levodopa or you can take levodopa as a drug. Either way these are inhibited by excess protein from actually getting to where they're needed to make dopamine.

Then the levodopa is transformed by aromatic L-amino acid decarboxylase, that's a mouthful, isn't it, into dopamine which then can be degraded by monoamine oxidase, the B type of that.

This is how it works and we're going to talk for a minute about how protein prevents this from happening. We have to get the levodopa in the dopamine-producing cells before they can make dopamine. If you can't get the tyrosine or the levodopa there then you can't make dopamine. A study was done in Italy by researcher Luciana Baroni. When I first read it I showed it to our neurologist who's really our expert on Parkinson's. I said, "They're getting 50% reduction of movement disorders by changing diet." She said, "No. They must be testing at the wrong time. There's an on-stage and an off-stage with Parkinson's." She said they must be testing. I corresponded with Luciana Baroni where-, in an international scientific group on nutrition. She was kind enough to write back and describe that yes, they were testing at the right time.

The study looked very, very good. It was a plant food diet that she was using. Why plant food? Because plant foods are lower in protein than animal foods. They also have more antioxidants and more fiber to slow the absorption of these things, too. Of course most of the Parkinson's patients in the study were taking levodopa, this is the standard of care it's very, very common. After one month on the diet motor function scores were twice as good as in the normal diet group. One month, that's really quick. It was found that reduced protein increase the transport of levodopa and tyrosine into the brain as I've been describing. I do give citations here on the bottom of the screen, this was in *Nutritional Neuroscience*, 2011. All of my information is based on peer reviewed scientific studies. None of it is based on books, magazine articles, other lectures, hearsay, websites, or anything else. Just peer reviewed literature.

Even so, I very carefully choose the research that I look at. I very carefully screen the research to make sure it's not sponsored, for one thing, or if there are mistakes in the research. Some people collect stamps, I collect research studies. I have over 5,200 folders that I have found to be really good studies and I rename them so I can find them and then put the citation up for you. Couple of other studies I want to share. A plant-based diet helped after only 1 week. Both tyrosine and levodopa were more effectively absorbed and transported in order to increase dopamine production in the substantia nigra of the brain. That was just from the *Neurology journal*, 1988.

Another study reported in the *Archives of Neurology* used a low but adequate protein diet significantly prolonged the effectiveness of levodopa therapy. I'll elaborate on that for a minute. In early Parkinson's disease someone maybe given levodopa once a day or twice a day and it works to control symptoms. As Parkinson's progresses slowly over the years or decades the doses become closer together in 2 to 3 hours or 2 hours apart. At a certain point like with this nice old guy who's had it for 35 years even giving drugs every hour isn't enough to control the symptoms. There's still a lot left over. By prolonging the effectiveness this is very, very useful. I'm not suggesting that people discontinue levodopa and carbidopa whatever drugs they're on but I'm urging

the people make them more effective. I'm considering a diet that is adequate in protein but not excessive. Yes?

Audience: How many grams a day would that be?

Dr. Blake: A very good question. How many grams a day of protein are adequate and how many are excessive? Well, with my diet doctor software I analyzed diets not just individual people diets but types of diets, Atkins diet, standard American diets, and raw food diets and all kinds of different diets. Even the Bulletproof diet I've analyzed. I look at the amount of protein that people get. Actually our need for protein for everyone in this room is probably going to be something like 50 grams. That's very well established. The World Health Organization, the Institute of Medicine, just about every government body is all-, they've all come up with about 10% of calories should be protein as an adequate range.

Nobody gets that little. I mean virtually no one. I have 3 people in 30 years of testing I found they were actually low in protein but their dietary intake of calories was also too low to sustain life. If you adequate calories you're more than likely to get adequate proteins. Low protein while a wonderful myth just doesn't seem to exist if people are getting enough calories to sustain life. High protein on the other hand is extremely common. Typical American diets run about a 150 grams a day. Mediterranean about a 100 grams. Bulletproof around 200 grams. This is 50 to 100 to 150 grams of excess protein. That excess protein is then going to compete with tyrosine and levodopa for the large neutral amino acid transporter, both through the intestinal wall and at the blood-brain barrier and reduce the effectiveness of both tyrosine and levodopa for Parkinson's disease.

A study was done in Brazil. Now Brazil they eat a lot of red meat so they didn't cut out all meat, just red meat and they added some B vitamin to it. Motor skills improved 60% in 6 months with 50% improvement in only 3 months just from reducing red meat. Of course red meat had a lot of protein. That was one of the ways. There maybe some other ways that I'll describe in a minute that the red meat may also be contributing to Parkinson's disease. They use riboflavin, vitamin B2, as well in this particular study. Again, that's pretty good results. Knocking down motor deficits by 50% is really helpful. That has been effective in delaying the need for medication in many people which is a good thing because the medication has side effects. It can perhaps lower the dose or the frequency of dose of people because mostly people in Parkinson's are self-controlled in their dosing. If their symptoms don't come back they wait a little longer. If they come back harder and faster they medicate a little sooner.

Plant fibers I mentioned slows the absorption of tyrosine and levodopa and that helps get the symptoms smoother. You need less medication at less frequent intervals and then it's more slowly absorbed. Clinical study on this down at the bottom. Which diet is perfect? Well, finding a low protein diet that meets all of your nutritional requirements is really pretty easy. Basically that's going to be a plant-based diet. In the later stages of Parkinson's disease people tend to get too thin. This just seems to be just part of the disease. There was a lot of energy burned up in tremors and rigidity

that burns up a lot of calories. It can be done that you can have a plant-based diet higher in fats if people are getting very thin.

In fact this wonderful old guy who has had Parkinson's for 35 years ... My wife is especially good at describing recipes for people to help do what we're talking about and the recipe she gave him was avocado with chocolate powder and a sweetener, vanilla, and a pinch of salt stirred up or blended and put in the freezer as ice cream. This is extremely high caloric. If you're trying to lose weight forget about this but it's really yummy, too. No one would suspect that there's any avocados in there. The idea that we're using something low protein but high calorie to assist people in keeping their weight on without getting that protein that's going to cause trouble. If we used cow milk then that would've been much higher protein so a lot of casein and whey in there.

Audience: Has he improved at all?

Dr. Blake: Yes. Yes. Yeah, he has. Like I say he had his first day without falling down. Really remarkable certainly after he changed his diet and we'll be seeing him again when we get back home. Changing patient's diet is something that ... My wife and I work in a neuroscience clinic and our job is to help people understand why and how they can change their diet to prevent strokes, to lower their risk of epilepsy, Parkinson's disease, many of the neurologic diseases, amyotrophic lateral sclerosis. I'm solely working through all of these diseases and compliance can really be a problem. If you're telling someone, "Well, you might get a heart attack in the future if you don't lower your saturated fat intake." People don't listen too well. I mean, so what? There are no symptoms until you drop dead.

This is different because people with Parkinson's disease have symptoms all the time. If those symptoms go away within a week and come back within a few days as they change their diet then compliance would be much, much better. In fact compliance has been found good in Luciana Baroni's study, compliance was excellent on this diet. It can be made tasty. My wife has a cookbook, Healthy Recipes for Friends, with all plant-based nutrition in it so people can eat this diet and have a guideline for how to make things cheap, tasty, fast to make, and yet still low in protein.

I want to talk about food contaminants. Standard registered dietitians look at the nutrients in food but they don't look so carefully at the contaminants in food. I find studies about contaminants in food really quite fascinating. I call this 'gloom doom'. It needs to be looked at. Which food contaminants are going to kill off the dopamine-producing neurons to speed up the progression of Parkinson's disease or to increase the risk of it? Here they are. This study is a recent study in The American Journal of Epidemiology. The large study showed a decrease of Parkinson's disease with decreased dairy consumption. People with the lowest dairy product consumption has 60% decrease risk.

One thing might be the excess protein because dairy products have a lot of protein. When I analyzed that I see that dairy adds a big chunk of extra protein to a diet.

Another thing maybe excess pesticides that are concentrated in fatty substances. I'm going to talk about some of these pesticides as I go through. The persistent organic pollutants persist in fatty substances and then perhaps the cow might eat these substances through her life and put them in her milk. Then people eat the milk or cheese throughout their life and concentrate them in what part of the human body is the most fatty part? The brain. If someone calls you a fat head it's a compliment. It's supposed to be fatty. Unfortunately, some of these contaminants concentrate right in the dopamine-producing cells. It's a really good idea to avoid them.

Another study showed an 80% less risk of Parkinson's disease in men who consumed less dairy products. None but just less. A study in Honolulu showed 2.3 times less Parkinson's disease for people who did not consume dairy products versus those who were heavy dairy product consumers. A lot of people are lactose intolerant in Hawaii because there's a lot of Asians living there so a lot of people don't eat it. Good study population for that. Eating organic food, I noticed all the food tonight was organic, can be helpful. Big [meta 00:24:26] study looked at 46 studies to see if pesticides in general increase the risk of Parkinson's disease and the risk was 62% higher. That's a pretty big boost in risk. If there were job related exposures a 150% increase risk, so 1 1/2 times the risk there with ...

I think for people with Parkinson's disease organic food would be an exceptionally good idea. For the rest of us I think it's a good idea. It's getting cheaper. Animal fat tends, as I mentioned, to concentrate the persistent organic pollutants like dieldrin. There's a class of pesticides called the organochlorines, heptachlor dieldrin, lindane, DDT is in that class, and there are many other pesticides that have been used throughout many decades. They persist in the environment. I mean you find them in penguins in the north pole, you find them everywhere. Wild salmon in Alaska have these in them, too. Very virtually impossible to eat a fatty food that doesn't have these pollutants in them. Dieldrin has been found in the brains of Parkinson's disease patients much more than in normal people's brain.

Lindane, another organochlorine, raise the odds of getting Parkinson's disease 4 times over people who had low lindane levels. That's a really amazing amount or more reported in the Archives of Neurology and [Excellent 00:26:00] Journal in 2009. Major potential dietary sources of lindane include milk, eggs, dairy products, and there's lesser extent fish, too. Now, PCBs, polychlorinated [biphenyls 00:26:14] were used as insulators in transformers and they also were used in fire proofing other things. They accumulate in fat just like the other persistent organic pollutants. They're found throughout the world. They've been shown to damage cognitive functions so this is a problem for all of us whether or not we have Parkinson's disease. They're very hard for the brain to eliminate. They're called persistent organic pollutants because we really have no mechanism to get rid of these things.

The brains of Parkinson's disease patients have been found to be much higher in these polychlorinated biphenyls than normal brains. In 1977 they were banned but they just switched to a different one. I'll tell you about it in the next slide. Polychlorinated biphenyls lower the production of dopamine, exactly what we don't

want. They inhibit tyrosine hydroxylase. Remember tyrosine hydroxylase is the one that takes dietary tyrosine that's been absorbed into the brain, converts it into levodopa. Levodopa's the drug that's used for tyrosine-, for Parkinson's. This is an important enzyme to help dopamine production and it's damaged by this.

The other enzyme that it damages is aromatic acid decarboxylase which makes dopamine from levodopa. That's damaged, too so the specific pathways that these do. Also, when dopamine is made inside the cell dopamine itself can be oxidized and very damaging to the cell and kills the cell unless the dopamine transporter is there to move it to the vesicle near the synapse. That also is damaged by polychlorinated biphenyls and that damage is enough to kill off dopaminergic cells, dopamine-producing cells. It's a good idea to avoid polychlorinated biphenyls. As I mentioned in 1977 they were banned and now we have polybrominated diphenyl esters, arguably even worse. Chemistry is very similar, they do the same thing. They interfere with the same enzymes that concentrate the same substantia nigra pars compacta in the brain and damage-, do a lot of damage to the dopamine-making neurons.

It's interesting, this also contribute to excitotoxic calcium signalling it. If you know about epilepsy and another disease that we treat in our clinic and I've worked up a nutritional guideline for a lot about excitatory neurotransmitter, glutamate, versus GABA. Anyway, this one's not a good thing. Where are they found? They're both found in fish oil. Now, looking at this will give you some pause to actually gobble down capsules of fish oil. Some fish oil is distilled to remove some of these. Certainly not all. Study show that they're not all removed but at least not that huge bar on the top down a little bit. Fish themselves are by far the highest source of polychlorinated biphenyls and polybrominated diphenyl esters.

Eggs and dairy products both have quite a bit, too. You'll notice what's in common, fat. That's what's in common. It is persistent organic pollutants accumulate in fat. The baby food is heartbreaking, that fatty baby food. Obviously, vegetable baby food when they have this in there. Even vegetable oils concentrate a little bit of this stuff that's just ubiquitous in the environment. However, fruits, vegetables, and cereals have virtually none. This maybe another reason why the plant-based diet is so effective. Yes?

Audience: Are these contaminants in organic eggs, milk, and [inaudible 00:30:02] products?

Dr. Blake: Yes. They occur in both organic and non-organic because these are not currently used. Most of the organochlorine pesticides have been banned in America and they're not currently used but they're just in the environment. Fatty substances absorb them. There is, by the way, really not much in eggs that you can get somewhere else if you didn't want to eat them anymore. You can certainly get phosphatidylcholine, one of the four phospholipids, from many other sources. Beans are an excellent source. The amount of carotenoids is tiny anyway in eggs. You could possibly live without them. I do. It seems to work.

It's interesting to know where these things are. Where in your diet are they. Mercury is a big one, too. Now, I'm not even going to talk about fushi-, Fukushima and radiation and fish because I don't know all the details, I don't know how much is in there or what the pathways are into that part of the brain. Mercury we know very well that fish eating is a principal way that Americans get mercury, methyl mercury, the dangerous form of it. It binds the cysteine so it can be transported across the blood-brain barrier by the same neutral amino acid transporter that we've been talking about. It has a substantial impact, mercury, on the normal function of ...

When they say nigrostriatal dopamine system the dopamine is formed in substantia nigra and the axons of the nerve go ... They're long, you know, motor nerves, they go into the striatum, another part of the brain, to initiate action. This is a system that they damage. They increase oxidative stress, they damage mitochondria. Mitochondria, the energy factories of our cells, and when mitochondria and brain cells are damaged that often leads to brain cell death, apoptosis, program cell death. We want to make sure that our mitochondria are well protected with antioxidants and not attacked by substances in our diet. Of course all of these results in lower dopamine production. This is from Neurotoxicology a recent study in 2012.

Okay, we got through the toxins. That was pretty tough. Some of our foods might not be as healthy as they were once. These foods I'm talking about a 100 years ago wouldn't have any of these pollutants in them. This is 2015 and they do have them now. I know soy products are one of the many beans and genistein is a substance in soy products that's anti-inflammatory and antioxidant. It's been very well studied. In this case they used purified genistein. The treatment reduced the dopamine-producing neurons from injury. It improved learning and memory. It's actually an animal study. It restored tyrosine hydroxylase so that restores the ability of the dopamine-producing cells to transfer tyrosine into levodopa, an essential step and a really important one.

When this is damaged in people before, during or later stages of Parkinson's disease it's really a good idea to restore this enzyme back to life. They saw that in fact the dopamine levels went up after administration of genistein. It is possible to get purified genistein but on the other hand you could just eat some beans and if you're going to eat soybeans I think I'd recommend the organic ones especially if you have Parkinson's disease and certainly also if you don't. Now ... Yes?

Audience: Will it also be really important that they were non-GMO soy products?

Dr. Blake: Well, organic soybeans are by definition non-GMO so that takes care of it.

Audience: They are?

Dr. Blake: Right. Yeah. The organic definition means they're actually tested for it to make sure they are not genetically modified. We don't really know the effect so far. I haven't seen studies on how GMO products might affect Parkinson's disease but I adhere to precautionary principle until GMOs are proven safe then I don't think it's wise to eat

them. That'll be the day. It could take a while. Another favorite food, sesamin, sesame seeds. Sesamin is a heat-activated antioxidant found in sesame oil and sesame seeds and it modulates the expression of tyrosine hydroxylase which means it helps the cell make more tyrosine hydroxylase. It's a protein that genes produce in the cell. We make a little more of that we can make more dopamine. Yes? In the back.

Audience: Is that [inaudible 00:34:51]?

Dr. Blake: I can't ... I'm sorry, I can't quite hear.

Audience: Is the mechanism of the action of the increase in tyrosine hydroxylase through [sesamin's 00:35:02] action [inaudible 00:35:05]?

Dr. Blake: It's a good question and I can't answer that for you at this time. Suffice it to say that it is protecting that system and this study didn't mention that camps and so I'm not sure.

Audience: Is there a mechanism of action that [inaudible 00:35:28]?

Dr. Blake: Yes. Both anti-inflammatory and antioxidative. Those are the actions by which it protects it because enzymes can be vulnerable to oxidation, too. This is new stuff, we're delving into it. I'm thrilled to see that we're going to learn more and more about this as time comes on. So far sesame actually has some interesting actions. It increases superoxide dismutase which is ... Especially the mitochondrial form of superoxide dismutase, the manganese form, protects the mitochondria and this really helps, too because making dopamine requires energy. By assisting energy production by having our mitochondria stable and not oxidized is a good one, too.

Fruit-eating helps reduce risk and progression. A big study, over a 130,000 people reported in the journal Neurology just a few years back, it looked for 20 years and people ate more fruit at 25 to 40% less risk of developing Parkinson's disease. Principally because of the flavonoids which are anti-inflammatory and antioxidative. Of course organic fruit would be a good idea because pesticides are often sprayed right on the face of the fruit that you eat. Flavonoids again protect dopamine neurons from oxidative damage and cell death.

This is a real interesting one. Cigarettes are protective against Parkinson's disease. I'm not suggesting that we all go smoke a pipe. However, nicotine has an interesting effect. It's a monoamine oxidase inhibitor. The enzyme that gobbles up dopamine in the dopamine-making cells is inhibited so it gobbles up less dopamine so there's more dopamine to quench the tremors and smooth them out. Instead of smoking I have for you bell peppers today. Potatoes, tomatoes, peppers reduce the risk of Parkinson's disease by 19% but in people that never smoked risk was reduced 87% by peppers. Most peppers, you can't eat that many of, but bell peppers you could. Organic's very important with bell peppers because they're in the dirty dozen of most sprayed and sprayed right on the surface there. They reduce the amount of ... They increase the amount of dopamine effectively. Yes?

Audience: [inaudible 00:38:07] which is the enzyme you're talking about earlier. [inaudible 00:38:13] citation.

Dr. Blake: Okay. They don't affect tyrosine hydroxylase instead they affect MAO. Now, the MAO, being inhibitors, are often used for Parkinson's disease that's one of the drugs that many people with Parkinson's disease are prescribed in order to prevent the breakdown of dopamine and have more dopamine left in the cell. I think that's pretty interesting. There's medicine for you, it's red and beautiful and a lot of fun. Chewy, tasty.

Coffee, black tea, and green tea reduce the risk of Parkinson's disease 40 to 50%. Some studies showing a little less, 25 to 30%. Caffeine itself reduces risk. I don't know the mechanism for this. Caffeine has been found to stimulate many processes in the brain obviously. It's what most people use it for. I want to talk a little bit about antioxidants and how to protect our brain cells from damage and destruction. When our brains break down dopamine with monoamine oxidase which is inhibited by peppers, but when they do we form hydrogen peroxide which is a dangerous free radical in our brain. However, that can be transformed into water by which enzyme? Glutathione peroxidase. Glutathione peroxidase absolutely must have selenium in order to work.

If we don't have enough superoxide dismutase the permeability pores in the mitochondria can open and just leads right to cell death. That means one more dopamine-producing cell has died and that's not what we want. We want to make sure that we get enough dietary selenium. How do you do it? Well, you could eat brown sesame seeds but not white ones. They have a fair amount of selenium. You can eat brazil nuts, have a lot of selenium. You also can get a toxic amount of selenium if you eat too many brazil nuts. Is it a balancing act to get the right amount of these nutrients? Well, I did ... Because these enzymes are involved, the superoxide dismutase especially and the glutathione peroxidase are involved in other neurodegenerative diseases I did develop a brain and body food to have the right amount of these minerals in them to support our endogenous, our own human enzymes that are antioxidant. One reason ... Yes?

Audience: [inaudible 00:40:44]

Dr. Blake: If you just repeat that louder. Something about the acoustics in here.

Audience: [inaudible 00:40:53] Any comment on that?

Dr. Blake: Well, I know [selenium 00:41:00] is an antioxidant and it's been compared with vitamin E a lot. It looks like vitamin E, works better and I think I might trust vitamin E a little bit more. If it happen to be in one of the natural forms which is extremely rare in the market place. I did put the real not synthetic alpha-Tocopherol and an equal amount of the other 3 tocopherols in my brain and body food but it's almost

impossible to find it on a store shelf. I know of only 2 manufacturers in the country that even make it.

Okay. Why is oxidation such a problem for people with Parkinson's disease? Well, one reason is that rigidity and tremors burn up a lot of energy and when you burn energy you can make more free radicals. It's just normal. For instance, more exercise creates more free radicals. Now, I think we should all exercise but then we need a little bit more antioxidants when we do exercise and if we don't exercise. Rigidity and tremors are not exactly exercise but they also create more free radicals. The electron transport chain in the mitochondria as a side effect knocks out some free radicals. Those are typically eaten up by coenzyme Q10 and superoxide dismutase in manganese form.

Also, tyrosine hydroxylase, as I mentioned, can form reactive oxygen species specifically hydrogen peroxide, H₂O₂. Metabolism of dopamine makes reactive oxygen. That dopamine has to be sequestered in vesicles right away, which is interesting because when people are given levodopa some of the side effects are because the levodopa goes to serotonin-producing cells which also can be then made into dopamine, but the serotonin-producing cells have no way to sequester the dopamine so the dopamine oxidizes and can kill the serotonin-producing cells. That's one of the reasons for some of the side effects of levodopa therapy.

Finally neuro-inflammation itself creates reactive oxygen species. Our brain has immune system components called glial, and normally they service the cells, they prevent them from dying, if they're in really bad shape they kill them off. If they become overactive then free radicals increase and they often become over reactive in Parkinson's disease. Excess iron can increase oxidation in the brain and specifically in the dopamine areas. One reason why the non-meat diets help is because there are 2 forms of iron, there's non-heme iron and there's heme iron. Now, heme irons are only found in blood-containing things so it's found in beef and pork and chicken and fish but it's not found in dairy products. It's also not found in any vegetable products or plants of any sort.

The way it works with iron is our bodies are very, very careful not to get too much iron in because it's such an oxidant. We need some but not too much. Dietary iron of the non-heme type adheres to a receptor inside the intestine but is not directly absorbed. If our bodies need iron it can reach in and pull it in but if we don't need iron it goes away. However, that heme iron is absorbed regardless of need so it can lead to too much oxidative stress and that can damage many areas of the brain not just the dopamine-producing cells.

These 2 studies are really looking that oxidative stress is the underlying mechanism by which the dopamine-producing cells are killed off. Maybe 60% are already killed off by diagnosis of Parkinson's disease. In advanced Parkinson's disease we may only have 5 or 10% of the dopamine-producing cells left in order to produce all the dopamine we need. There's no other way to get it in the brain. These are the antioxidants. From plants we have carotenoids in fruits and vegetable. They're all fat-

based antioxidants. Then we have vitamin C from plants or if you're taking it in a supplemental form I would recommend only the fully ascorbated forms and not the similarly sounding ascorbic acid form.

Ascorbic acid is irritating, pH 3, poorly absorbed and ascorbates are neutral pH and are rapidly absorbed quite easily. Vitamin E, again, from nuts and seeds, avocados, olives, these are really good sources of vitamin E. I don't generally ... Even though there is vitamin E in many oils I don't generally recommend that people use a lot of food oils and if you want to know why I have a book called *Understanding Fats And Oils: A Scientific Guide To Their Health Effects*. It's on my website for under 10 bucks, if any of you want to read it. If you don't have 10 bucks email me, I'll send you a copy. Certainly you can learn a lot more about how oils are processed. The fact is when they take a bean or a seed or a nut and they process it into an oil they're taking out a lot of the goodness and leaving it with almost pure calories but without a lot of the things that you want in there like vitamin E or fiber or manganese or magnesium. So many things are pulled out. Then there's the rancidity factor and the hexane solvent. Anyway, interesting chapter on how oils are processed.

Polyphenols are found in berries and other plants like this beautiful picture up here of beautiful berries. The proanthocyanidins are some of the most useful ones founded-, go into the brain and protect our brain cells both memory areas and the substantia nigra. Now, the ones we make in our bodies there are many actually. I didn't list catalase and some of the others here. Very little catalase made in the brain anyway. Zinc, copper, and manganese are needed for superoxide dismutase. Selenium for glutathione peroxidase, and coenzyme Q10 is needed ... It's the only fat-soluble antioxidants that humans make. Fat-soluble means it protect our LDL and the-, low density lipoproteins and they're transport through our body which is essential for lowering the oxidation and result in atherosclerotic problems with heart attacks and strokes.

They also protect our brain cells so it's really a good idea to have coenzyme Q10. We make it. Every cell in our bodies makes coenzyme Q10 perhaps a bit less with age. If you're taking statin drugs they've been found to lower production on the body by about 40%. Taking supplementary coenzyme Q10 is not as good as making it in your body but certainly something that any of us could consider since it's extremely safe. Possibly a good idea to protect our brain. Anyway, we're using coenzyme Q10 in the clinical trial that's now running in Hawaii, the Hawaii Dementia Prevention Trial as antioxidant booster. The antioxidants all work together, all of these work together so you don't want to be deficient in one you want to have a broad spectrum of antioxidants.

I look in diets to see how they do on antioxidants. The standard American diet didn't do very well on vitamin C, vitamin E or carotenoids. The Atkins diet didn't do very well either. The Zone Paleo and South Beach diet did pretty good on vitamin C but didn't get in the bare minimum of vitamin E. You know 93% of Americans don't get the bare minimum of vitamin E and I think this has a lot to do with neurodegenerative disease. More nuts and seeds will be the key there. However, the vitamin E and the

carotenoids were low in those diets. Now, looking at the transition vegetarian diet, you have an omelet in the morning, a cheese sandwich for lunch, macaroni and cheese, then some ice cream for dessert. This is not a very healthy diet. The antioxidant levels are very low. It's not easy to say all vegetarian diets are healthier. In fact, it may be less healthy.

Now, a Mediterranean diet also didn't have quite enough carotenoids and vitamin E, that came close. It had enough vitamin C. The plant-based diet this one in the bottom one they had plenty of antioxidants because of a lot of nuts and seeds are eaten so vitamin E, a lot of fruits and vegetables are eaten so a lot of vitamin C, and the same reason carotenoids. Now, the Ornish McDougall diet are examples of heart attack-proof diets where very little fat is eaten of any kind. No food oils, no avocados, no nuts and seeds, nothing fatty. They're not getting the vitamin E, in fact 3 milligrams recommended 15 minimum, not getting enough even vitamin C and the carotenoids are low plus on this diet the carotenoids are unlikely to be absorbed because they're just not enough of a trigger. You need a fatty trigger to trigger gall bile to chemical messenger, cholecystokinin, and you just can't do it without a little fat in the diet.

That's how the various diets stack up. You can analyze any of the diets with my Diet Doctor or some other tool to find out the antioxidants. Now in my dietary program I broke out the tocopherols. It was fascinating because walnuts only had 0.7 milligrams in a serving, in an ounce, of alpha-Tocopherol. I thought, "Oh, they don't have much vitamin E." When I broke out the different tocopherols, gamma-Tocopherol, 23 milligrams. You really have to look at the different tocopherols to get a clear idea on which nuts and seeds are valuable. There's only 2 nuts that I know of that don't have any vitamin E. Any guesses?

Audience: Cashews?

Dr. Blake: No. Cashews have some vitamin E, less than normal, yes.

Audience: Peanuts.

Dr. Blake: Peanuts? No, peanuts are pretty good. Peanut butter is a good source of vitamin E.

Audience: Coconut.

Dr. Blake: You're cheating. She's editing my fat book again. Coconuts and macadamia nuts are the only 2 nuts that don't have vitamin E and they don't need it. They have a husk and a shell protect them from heat, light, and oxygen, the 3 things that make the seed rancid and kill it. They can ... They don't it but we need it. Speaking of vitamin E, delay the progression of Parkinson's disease in average of 2.5 years. Couple of studies here are showing that high dose of alpha-Tocopherol ... I'm not a big fan of synthetic alpha-Tocopherol because first of all it doesn't include the other 3 tocopherols. Second of all synthetic alpha-Tocopherol is a mixture of 8 isomers only one of which is really alpha-Tocopherol. 4 of the 8 are completely ineffective as vitamin E which means that if they're implanted in a brain cell to protect that they don't do anything. It's like a

security guard that's blind, deaf, and dumb and has no gun but somehow it's very cheap to manufacture and there's a lot of profit in it.

Anyway, I have some ideas that vitamin E should really work in the brain and in the arteries and not be ineffective and cheap. This study looked at vitamin E and beta carotene reducing oxidation in ... Reduced risk of Parkinson's by 55% just vitamin E and that's the wrong form, and beta carotene reduce risk by 44%. Again, I prefer a mix of carotenes rather than just beta carotene. Some of the studies with a single carotenoid were not so favorable but when you start mixing them up, for instance in my brain and body food I put a mixture of 6 different carotenoids mimicking how food is, you know, a broad spectrum of these things so they can all fill in.

This study was done in Japan and so the vitamin E and the beta carotene were from food because these people didn't take supplements. Food-based vitamin E and beta carotene reduced risk by roughly half each and they're very easy to get. Handful of nuts or seeds a day. In our Hawaii Dementia Prevention study I designed it so people are getting an ounce of walnuts because people are old, perhaps poor digestion, and perhaps diverticulitis. We're having them grind up the walnuts and the sunflower seeds, one ounce of each to get the gamma and alpha-Tocopherol in their diet. Kind of a nice natural way to get them in there. Yes?

Audience: In reference to your statements on nuts I was wondering pecans ...

Dr. Blake: Pecans also have gamma-Tocopherol and they're good substitute for walnuts because sometimes walnuts can be a little bitter or even rancid. They're both very delicate. Walnuts also have alpha-linolenic acid, one of the only 2 essential fatty acids that humans need. The other one, linoleic acid, we all get way too much. It's hard to call it essential. They're extremely rare and a deficiency is ... Omega 3 plant-based form is very common to be low in diets and walnuts supply that along with gamma-Tocopherol so it's a 2 for 1 pack. Pecans are great, also very similar.

Audience: Question.

Dr. Blake: Yes?

Audience: Why grind the walnuts?

Dr. Blake: Why grind the walnuts? One reason is because when we digest fatty substances ... If you look under a microscope you chew up the walnuts and you see little mountains. The mountains can be digested only on the outside and the rest goes through the ferment, perhaps in diverticula bell pockets. Enough older folks have bell pockets that their doctor is saying no nuts. However, if they're powdered or blended ... For instance, my wife in the recipe book has a creamy walnut dressing. That's good stuff. The walnuts are all ground up fine so our digestive enzyme can get up to a thousand times as much gamma-Tocopherol and vitamin E out when they're ground up or blended as opposed to not. There's no problem with bell pockets so that's why. Good question. Yes?

Audience: Are you supposed to soak the nuts in water to get the enzyme inhibitor?

Dr. Blake: That's another way to do it. You can soak your nuts or you can grind them up or you can blend them. It varies but you can do one or two or all three if you like. You can soak them, grind them up, and blend them if you have time. Any of the three methods will help a lot in order to do it. I don't really have much problem. The days of soaking almonds overnight and taking the skins off I think are over, for me anyway. Just life is busy, you know. I say.

Certain vegetables really reduce movement problems. Now, especially the cruciferous vegetables. Kale is all the rage right now. Cauliflower, broccoli, Brussels sprouts, collards, these are all really helpful. They're rich in antioxidants and neuroprotective. They have sulforaphane which is an isothiocyanate and it is really better to chop them up first or blend them first and let them sit for a little while because there's an enzyme called myrosin that creates these isothiocyanates like sulforaphane which are powerful cancer fighters. Really excellent. You put them in a petri dish with healthy and cancer cells and the cancer cells die off but not the healthy cells. They're really useful substances.

Treatment with sulforaphane reduce motor deficits and protected the dopamine-producing neurons in a mouse model of Parkinson's disease. That sounds like something healthy in many other ways that you can incorporate into your diet just eat more cruciferous vegetables, perhaps instead of other vegetables. Now, berries are also found to keep dopamine-producing neurons alive. Neuron means brain cells. They took extracts from blueberries, grape seed, hibiscus, black currant, and mulberry and they're rich in proanthocyanidins. That's found either in the red, blue or purple pigment depending on pH. They exhibited great neuroprotective activity.

They reduced motor deficits and problems with the ability to create energy in mitochondria in a mouse model of Parkinson's disease. They have a way to mimic Parkinson's disease with a certain drug. There's a couple of different ways to do that then they test things on it. Yes, sir?

Audience: Any comments on sauerkraut?

Dr. Blake: Well, sure. Sauerkraut will be excellent. You're starting with cabbage and the fact that it's sitting for a while the myrosin is able to create the isothiocyanates. Sauerkraut sounds like a real winner. In fact it sounds delicious. Mulberries, again, berries are very protective to the brain. In a nurse's healthy study they found that one cup of berries a day delay dementia by an average of 2 years. The nurses who ate the cup of berries versus the nurses who didn't. Mulberries are really good, any berries will work though you don't have to find mulberries. I mentioned coenzyme Q10 before. The supplementation decrease the damage to the mitochondria and the loss of dopamine and protected the dopamine-producing neurons against degeneration. Also when they checked Parkinson's disease patients they found that coenzyme Q10 levels were low. Of course one reason is from statins which lower that.

Another is just old age, we don't produce quite as much coenzyme Q10. It might be a good idea to consider supplementation of coenzyme Q10. Safety concerns are not a problem with this particular one especially in the amounts of 200 to 240 milligrams per day that we're using in our study. It was found to be safe for all the folks. Vitamin D, as illustrated by this young lady making some, stabilized patients, Parkinson's disease patients, motor symptoms and prevented an increase in progression of the disease compared to people who didn't have it. What's really interesting here is that vitamin D supplements helped but vitamin D-containing foods made it worse. Can you think why?

What are vitamin D-containing foods? Like fish oils, right? If fish oils have all these contaminants that destroy the dopamine-producing cells. It was very interesting that vitamin D on the one hand really helped and on the other hand was unhelpful. Ashwagandha is sometimes been called Indian ginseng. It's not related species but it's been used in East India in the ayurvedic traditions for a long time. It's a nourishing plant, root. *Withania somnifera* is its botanical name, it's significantly increase dopamine production in brain cells and alleviated gait disorders. This is from a study in the *Journal of Aging Research and Clinical Practice* and also in another *Journal of Study of Molecules*. The plant root has been shown to increase antioxidant enzymes and reduce damaging products of lipid peroxidation.

Malondialdehyde is a difficult word but one to learn. This is a product of rancid fats and very damaging. Can produce [adox 01:00:51] to DNA and cancer. It's a good thing to avoid and ashwagandha got to seem to quench this. Only 7 days of treatment it reduced this and it may provide neurite growth which we now know is a way that nerves in the brain can regenerate. There's a lot of good effects from ashwagandha and it seems to be very safe. Do your own research but I found it to be gentle plant and not too scary at all. There have been many, many peer-reviewed studies on this plant.

Ginkgo biloba coincidentally we're using in our Hawaii Dementia Prevention trial as one. Now, you should not take ginkgo biloba if you're on blood thinners such as warfarin, pradaxa, or [inaudible 01:01:34]. If you're on any of these blood thinners don't mix it with ginkgo biloba. The Internal Review Board did say that 81 milligrams of aspirin was not a problem and I did a research on that. That maybe okay to take ginkgo with that small of a blood thinner. I think it probably is safe judging by the research. Again, do your own research, consult your doctor if you're taking aspirin or any other blood thinner with that.

Neuroprotective effect reduce neurotoxicity and really help with oxidation, that's one of its main things. Also opens up the blood flow to the tiny capillaries in the brain so many students are using it to pass finals. It's one of the most used plants in Europe and what is it used for? Boosting brain power, memory loss, cognition problems. Gambir, interesting looking plant with the little hooks. *Uncaria rhynchophylla* also has a neuroprotective effect that reduce loss of the dopamine-producing cells. Just

exactly what we want to low our risk of Parkinson's disease and slow progression, increased antioxidants, and slowed cell death.

Turmeric is a very well-known plant and turmeric contains curcuminoids. Curcuminoids are fat-soluble nutrients notoriously difficult to absorb. They protect the dopamine-producing neurons against neurotoxicity and kept them alive. Basically reverse the depletion of dopamine-producing neurons and also helps stabilize tyrosine hydroxylase to make sure that you can make your own levodopa in your brain. They reduce inflammation which is one of their well-known effects. Now with turmeric I usually recommend ... If you're taking a little capsule of turmeric, a half a gram or a gram, the amount in the studies are showing you're getting just a few nanograms into your blood stream. Perhaps a little benefit but not much.

On the other hand if you make a curry several tablespoons of turmeric powder and put it with all the other vegetables and delicious foods that you want a little bit of black pepper so the pepper can increase absorption of the curcuminoids dramatically then you've got a delicious medicine that you eat. Then you can get a significant amount of turmeric into your body in a very healthy and delicious way. Rosemary's also been found to be protective to dopamine-producing cells, decreases iron levels in the substantia nigra to decrease oxidation. It has carnisol which protects against neurotoxicity from rotenone. Rotenone is a pesticide, thankfully now discontinued, that can really close to causing Parkinson's disease. In other words, rotenone created the symptoms of Parkinsonism and perhaps is one of the causative factors in Parkinson's disease. It has been banned for a while and so hopefully ... It's only used to kill fish now and not for any other purposes.

I want to mention briefly a little bit about antioxidants and Lewy Body Dementia. Lewy Body Dementia is associated sometimes with Parkinson's disease. By no means all people with Parkinson's disease get Lewy Body Dementia. Lewy Body Dementia makes up perhaps 15% of the dementia. The vast bulk of dementia is Alzheimer's disease and vascular dementia. Now, a component of turmeric, curcumin, was able to prevent the aggregation of these abnormal proteins in Lewy Bodies. Sounds like more curries in order. Coenzyme Q10 also inhibits the concentration of these malformed proteins from clumping in Lewy Bodies and beta carotene and the other carotenoids also stop the aggregation into Lewy Bodies. This can help all of us because Lewy Body Dementia can be experienced by anyone with or without Parkinson's disease.

There's 2 substances, baicalin and baicalein, they're flavonoids that have been shown to reduce the depletion of dopamine in the substantia nigra and hinder the aggregation of alpha synuclein so they're very helpful for Lewy Body Dementia. Baicalin's really an interesting subject. It comes from Baikal skullcap and skullcap has several flavonoids that inhibit over-excitation of the brain, inhibits excitatory neurotransmitters which can be very damaging and increases the soothing quieting neurotransmitters in the brain. It's a very interesting flavonoid that's being explored now. In my epilepsy protocol I do use this. Also found similar substances in passion flower, which is Passiflora species. Long used for epilepsy and other neurologic problems but now we're finding out why the things are in them.

Actually these two from skullcap were found to break up the abnormal protein aggregation in Lewy Bodies. It sounds like a really good idea. However, caution, if you were to take some skullcap tea it might make you sleepy so you certainly would want to experiment with this in the evening when you're not driving or operating heavy equipment. It might interact with other sedating drugs or influences to make you sleepy. There was a time when I was incredibly stressed out and when it's time for bed I was exhausted but I had this nervous [innervation 01:07:23] almost like electricity in my brain, still going. I would take just a little quarter cup of skullcap tea and immediately feel the effects of it just taking the buzz off. At that point I didn't know enough about the neurotransmitters to know what it was doing but I knew enough that my exciting thoughts were over and it was time for bed. Yes?

Audience: I wonder if that would work against tinnitus?

Dr. Blake: Against?

Audience: Tinnitus.

Dr. Blake: I have not seen studies of baicalin and tinnitus but it might be a good idea to get on Google scholar and give that a look. I'm not sure. Good question. I want to talk, summarize my dietary protocol for Parkinson's disease. We need to reduce protein to needed levels. Practically the way to do this is to not eat excess protein. Now, okay, it's time for me to give true confessions here. I'm a plant-based guy. I've been a plant-based guy for 45 years. I'm now 65 so I started when I was 20. Even though I eat a strictly plant-based diet and no animal protein whatsoever my average daily protein is 83 grams, I need 46, 50 would be fine. I get 83. In other words there's just no way to get it down to 50 if you're getting enough calories to stay healthy. However, if someone would eat a plant-based diet and then add one meal, bacon and eggs, then instead of getting, say, 75 grams a day you'd probably get a 100 to a 110 a day.

Then if you add a turkey sandwich for lunch you might be up to 150. If you have a big steak for dinner you could be up to 200. Basically it's animal products that add the excess protein which if you don't have Parkinson's disease and you're sure you're not developing it then it may not cause a problem. On the other hand, precautionary principle might be a good idea to keep your protein level down. Now, in Parkinson's disease one strategy is if you are going to eat protein, for instance, even people on a plant-based diet for Parkinson's are eating beans or tofu or want something organic of course, in the evening, not during the day. Because the symptoms are worse after protein, it's something that people really notice.

If you're shaking in your sleep it's not so bothersome as if you're shaking during the day. Displacing protein intake until the evening is a good strategy whether you're still eating animal products or you're eating protein from plants which also can push you over the top. Beans have a lot of protein in them so you have to be careful with excess protein from any source. I analyzed my diet that's how come I know how much protein I get and I encourage all of you to analyze your diet then you know how much

protein you're getting. And other interesting things like saturated fat and calcium and all the vitamins and minerals. Avoiding dietary toxins ... Yes?

Audience: Given that [inaudible 01:10:33] with Parkinson's how much of that do you think plays into the issue of the protein, the undigested protein [inaudible 01:10:41]?

Dr. Blake: Well, studies on protein digestion at least in healthy people show that protein is really exceptionally well digested in human intestine. Assuming that you have some hydrochloric acid output from your parietal cells which is a pretty big assumption these days. In general, the in-pseudo medicine has looked at protein digestion and found that 75 to 85% of the protein is digested of all the various sources.

Audience: [inaudible 01:11:11]

Dr. Blake: In Parkinson's well, it happens in older folks and older Americans are very likely to have digestive disturbances. I could probably look at the digestion of carnivorous animals like cats, omnivorous animals like dogs or bears, and vegetarian animals and I can make parallels with human digestion so that you can actually look at an animal's internal parts. Lips, tongue, teeth in humans are very much like vegetarian animals and not at all like carnivores. Carnivores have a flat, thin tongue and lips that are very thin and can't manipulate food. Alpha-amylase, ptyalin starts predigesting in our mouths and in vegetarian animals but not in carnivorous animals. The trachea is very different in human because we have cartilage rings causing choking and choking's almost always from meat eating, very rarely from any other cause.

Our stomach acids are about as strong as a tomato whereas a dog or a cat's stomach acid is more like battery acid, enough to kill the bacteria off. For good digestion what we really want to do is feed the animal what it needs. I mean you could take a polar bear and feed him fruit and he'll live for a while but it's not the ideal diet for him. You can feed a human all kinds of crazy junk food, fast food, other things not the ideal thing. I would like all of us to have optimal health and to do that we need optimal food and optimal digestion. I think that digestion and the bacteria in our stomachs plays a huge role in all diseases. Again, if someone were to move to a plant-based diet for a Parkinson's disease chances are pretty good that they're E. Coli levels will go down dramatically and their lactobacillus levels would go up so that will certainly help the bacteria levels in there. Thanks for a very good question.

We can avoid animal toxins, it's as simple as avoiding animal fat. Now avoiding animal fat has a side effect. That means you're going to get less saturated fats and that's directly related to heart attacks and strokes. Despite Time magazine it really is related to heart attacks and strokes and so that's a good side effect from that one. We can increase dietary antioxidants. You don't want to change your diet in other ways, have a cup of berries, more fruit, cruciferous vegetables, nuts and seeds for vitamin E. You can just increase your antioxidants and that will help in 2 ways, it will increase your antioxidants and it might crowd out foods that don't have antioxidants. After all which foods have no antioxidants?

Audience: Ice cream.

Dr. Blake: Ice cream. Not ... Yeah, very, very little in ice cream. However, the equally delicious almond-based ice creams have vitamin E in them and they are truly delicious and really competitive with dairy-based ice creams. You can have ice cream and antioxidants. You can have ice cream and eat it, too. Something like that. Increasing bell peppers is a strategy to help instead of taking monoamine oxidase drugs you can eat some more bell peppers and see if that can help control symptoms in Parkinson's disease. A tasty alternative. In my wife's cookbook, Healthy Recipes for Friends, she's got a recipe called Best Friends, where she slices up bell peppers and cashews into tiny chunks, lightly sautees them and they become best friends. In that way you're getting your vitamin E and your nicotine all in one delicious topping. Then you put that on top of other things.

You can reduce Lewy Body formation with turmeric, coenzyme Q10, and baicalin from skullcap. There are many plants and spices that help reduce the progression and risk of Parkinson's disease. I haven't presented you with all the research that I've done on Parkinson's but I think hopefully your brains even in this Mensa group are satisfyingly full. Thank you very much for your patient listening. I appreciate it very much. Thank you.

Moderator: If there's any other questions for Dr. Blake you can go ahead and ask them now. Okay. Wait for the mic, please.

Audience: What are your thoughts on juicing vegetables? Juicing vegetables.

Dr. Blake: Juicing vegetables?

Audience: Yes.

Dr. Blake: Well, there's a problem with juicing vegetables. You run things through the juicer and you get a cup of juice. What else do you get? A big pile of stuff and there's polyphenols and carotenoids and all kinds of fiber and good things in there that might be really good for your health. An alternative might be blending instead of juicing then you get all the good stuff in there and lose nothing. There are times when juices are good if you're ... There are definitely times for juicing but considered most of the time blending preserves all your dietary dollar, too. I mean you're throwing away a lot of good stuff.

Moderator: Any other questions?

Audience: Any comments on stimulants that are based on the dopaminergic system?

Dr. Blake: Well, stimulants, huh? Dopamine plays other roles in the body and that is a really good and very deep question. Dopamine is involved in addiction patterns and many other things and as far as attention deficit hyperactivity disorders dopamine has a lot

to do with that, too way outside the scope of this lecture. I also have to admit it might be a little outside of my expertise. I think that it would be fascinating to research that.

Moderator: We have a question over here.

Audience: It's a little bit obtuse. A friend of mine has had Parkinson's since he was even I think 11 years old he was diagnosed. He's very heavy but he takes some kind of ... I wish I could remember, berry? Or substance coming from South or Central America, you know what that is and he swears by it. I should ...

Dr. Blake: What's it called?

Audience: I cannot remember.

Dr. Blake: That's a good one. It's best if you take it ground up, the 'I cannot remember' and then ... As I mentioned it might be gambir that I mentioned in this discussion. There are many, many plants. I have a database of plants used in 54 countries and region worldwide. I have 168,000 footnoted facts in there and certainly Parkinson's has many plants that have been used for all over the world. What I like is that my database kind of assembles where the great herbals agree on Parkinson's so this will be empirical science different than the rational science that I use normally.

Audience: Yes. Do you have a [sibling 01:18:44] and have you compare yourself with your sibling, your age difference? I'm fascinated by your hair. It's dark and since you revealed your age, is it natural?

Dr. Blake: Well, yes. My hair is actually, it's a natural color. If you look closer with your glasses on you will see some gray hairs in there. I am 65, I'm now on Medicare, thank you very much. I have found that several times over the years my hair has started to grow gray. It's interesting that those times coincided exactly was when I ran out of vitamins. At certain times that we did a sailing trip and we ran out of vitamins my wife says, "Hey, your hair is getting gray," and I took the vitamins and the weirdest part is that the gray out on the tips went away, too. Isn't that odd? Really odd. Anyway, I don't know. I do try and stay healthy. Healthy diet, exercise, living in the forest in an organic farm which rains avocados in Maui is really good for stress levels compared to the freeways here. I can't believe how rude people are. All of these things and freedom from environment toxins I do the best I can. Yeah, I mean I'm working on trying to stay young as I get old. [inaudible 01:20:15].

Moderator: Hold on.

Dr. Blake: Hold on. We'll get the mic over to you.

Audience: Yeah, sibling. Do you compare yourself with your ...

Dr. Blake: I have a sister who's 3 years older and I cannot comment on the grayness of her hair. She might watch this video.

Audience: How about your parents? How about your parents? Did they have a good genes that ... ?

Dr. Blake: My parents got gray hair, yeah. They're not around so I can't comment on them. I don't think it's genes. You know, I really don't look at genes so much as medical doctors typically do. I'm a research scientist if I haven't mentioned this before. I'm not a medical doctor. Genes are an excuse but really we can do so much with our genes. Now we know they can be epigenetically selected to turn on or turn off just because we have a specific gene, [ApoE 01:21:11], Epsilon 4 that might give us 4 times the risk for Alzheimer's disease doesn't mean we can't turn it off just with 2 B vitamins that make [inaudible 01:21:19].

Audience: I was just going to ask about the peppers. Including bell pepper in your diet, is that one pepper ... About how much pepper? Red bell pepper and it can be any color?

Dr. Blake: Yeah, the peppers not only any color but the hot peppers, too but I figure people won't eat very many hot peppers because well, they're hot. The bell peppers you can eat quite a bit. I think there's just a rational amount of bell peppers you can eat in a day before you get too many of them. You know they are very, very high in vitamin C as well, higher than oranges. Isn't that interesting? Yes, Michael?

Michael: One of the studies mentioned B2 is that, in your mind, very relevant?

Dr. Blake: Perhaps not. They didn't have controls on the B2, vitamin B2, riboflavin so because they didn't have controls I'm not going to listen to that part but they did have controls on the red meat. That's the part of the study that I found fascinating that they cut motor deficits in half in 3 months just by reducing red meat. That's something people in this audience could consider if they want to continue to eat animal products perhaps just shift the ones you're eating and get the risk down that way.

Audience: Is there any problem with deseeding peppers, taking the seeds out? Then any comments on strawberries as a berry to eat?

Dr. Blake: I didn't quite hear.

Audience: Is there any problem with taking the seeds out of like a hot pepper? Does that decrease the effectiveness? Then strawberries you didn't comment on?

Dr. Blake: On strawberries?

Audience: Strawberries, simple question. Strawberries is a [crosstalk 01:22:52]

Dr. Blake: Strawberries is very rich in proanthocyanidins. In our clinical trial we're using either blueberries, strawberries or red grapes to get their proanthocyanidins to protect the brain cells and they protect the dopaminergic cells just as much. As far as the seeds I don't think that's where the nicotine is so you probably ... Most people do take the

seeds out of bell peppers. When they analyzed them they analyze the edible portion which is without the seeds. I don't know what's in those seeds, they might be good for you though. I have to check.

Audience: Zeolite ...

Dr. Blake: Speak right into it, please.

Audience: Zeolite to remove toxic metals?

Dr. Blake: Well, he's asking about zeolite to remove toxic metals. Zeolite is a mineral from Hawaii and it has the ability to really latch on to heavy metals and hold them and bind them very tightly at least until they get too many heavy metals and then they don't. However, zeolite being a mineral I have seen no way that zeolite could possibly be transported out of the intestine into the bloodstream or any other part of the body. Think that zeolite would be effective in binding heavy metals in the intestine but not anywhere else so they could be helpful in that way. I discussed this with a professor at the University of Hawaii who's a zeolite expert and he can't find a way that could ever get into the bloodstream, neither can I. I mean you're talking about little rocks somehow being transported through the stomach lining, the intestinal lining. I don't think that's possible. I've looked into it.

Katherine: I just wanted to reply also to your question about the hair color. I was there. I've been with him 25 years now. Thank you very much. I've seen it, it's gone gray, black, gray, black, gray ... We're in a black stage now. What I like to do, what I like to think about is whenever we see ourselves not flourishing we look at how many aspects of our life we can alter to maintain optimal health. We're consistently improving it, it's a journey towards rejuvenation everyday. It can be done though. It's great.

Dr. Blake: My wife while still much younger than I am also has no gray hair and ...

Katherine: I'm 60.

Dr. Blake: I didn't say that but she did. She's 60 and she's doing very good for gray hair. I think that our brain and body food it's got some great B vitamins in it and I'm taking them if only for the gray part. Am I vain like everybody? Oh, no.

Audience: Clean food, clean food.

Dr. Blake: Yeah, that helps, too.

Audience: Other healthy habits and love ... Okay.

Dr. Blake: Thanks for all your questions. That make it a lot more fun for me.

Audience: Yeah. I also have a question about zeolite. Is it healthful if you put the powder in the water regarding cleaning the vegetable and pollution from the vegetable? Is it ... ?

Dr. Blake: The zeolite in the water would absorb heavy metals, that's what it does. Yeah, I think it can pull any heavy metals out. There are many ways to purify water but that's one.

Audience: Have you ever done detoxing or liver flush or heavy metal detox?

Dr. Blake: No. I personally haven't really done that. I did some fasting when I was younger but I didn't really like the liver flushes. I don't-, haven't found the real need for that. If I do, want to do a little liver cleansing I would use herbs for that. There's some wonderful plants, even the bitters basically.

Audience: I know we're talking about Parkinson's but do you have any advice for [ulcerative 01:26:52] colitis?

Dr. Blake: You know I have a lot of studies on ulcerative colitis and it'd be really hard to sum that up. Again, look at what influences might make the lining of the intestine, your colon, irritable such as coffee, alcohol, sugar, lots of things that can do that. Look at things that might make your lining of your whole digestive tract a lot more sooth and mucilagenous like slippery elm root which is-, or Marshallow root or oatmeal that are very soothing to the intestinal tract. There's lots more to it. I have a big folder full of research on ulcerative colitis and all sorts of irritable bowel syndrome and I think that diet has a huge effect on those things. Maybe you can get in touch ...

Moderator: Hold on.

Dr. Blake: Aloe vera, good idea, too.

Moderator: Yeah. Anything ending in -itis is inflammatory so like you said reducing sugar, all the inflammatory properties. Curcumins, anti-inflammatory, right?

Dr. Blake: Absolutely.

Moderator: Quercetin is a really good anti-inflammatory.

Dr. Blake: Yeah. Curcumin's going to work really well in the intestinal tract because it doesn't need to get absorbed and absorption's the problem with the curcuminoids. No, that's curcumin but no, don't take the black pepper if you have ulcerative colitis. I'd skip that and probably only eat sweet peppers.

Audience: Yes. I wanted for you to talk a little bit about rigidity in Parkinson's disease. You mentioned that ... I mean I remembered you mention the tremors as expenditure of energy and calories that's what you say people with Parkinson's disease tends to be thin. What about rigidity? I mean how does that ... ?

Dr. Blake: The same thing. Ridigity, I mean if you think about it it's like clenching a muscle. This is burning energy and then burnt up energy increases your caloric need. Getting those calories without getting a lot of protein means you're really going to have to lean on

some fats but there's very few fats that you can eat that aren't associated with protein. You know carbohydrates of course like lots of potatoes and sweet potatoes and all those things and the various grains that are of course non-gluten grains. Those things are ways to get calories but even grains can add up to enough protein to be a bothersome so that's why the avocado fudge was a really good trick for a man who's very thin in later stages of Parkinson's.

Audience: I saw rigidity as like paralysis but it's actually like clenching, it's an active thing.

Dr. Blake: Yes it is and it does burn a lot of energy and create more free radicals. Again, our concentration on antioxidants is good as well. Thank you.

Audience: Thank you. I'm curious the people that have this reduction and symptoms, for example vitamin D, how much-, how many are used do you recommend or what is the blood levels nanograms per milliliter that you consider as ... Is it AD and that you have observed that causes this reduction in symptoms?

Dr. Blake: Right, good question. Because there are 2 measuring scales for blood levels of vitamin D I like to just look at supplementation levels. Current upper level is 4,000 IUs per day and I consider that an extremely safe upper level and would recommend somewhere between 2,000 and 4,000 IUs of cholecalciferol, the vitamin D3 form, for people living in temperate climates like this. In Hawaii perhaps 1,000 might get away because we're exposed to a lot more UVB over there. That would be the level ... The levels in the blood vary by the standard that you use, nanomils or nanograms.

Audience: Right. I know the nanogram as well so because [inaudible 01:30:52] state so you don't know that?

Dr. Blake: Well, each testing scale is a little bit different. When you get your blood test back and it says you have 50 and the normal range is 40 to 80 then you know you're doing well. If you have 30 and the normal range is 40 to 80 then you know you're not doing well. It just depends on your lab and their testing protocol. There's lots about vitamin D. I'm in an international group of vitamin D scientists and I get hammered with papers almost daily on vitamin D. It's fascinating stuff, really useful. It's something I think all of us could potentially benefit from supplementing. One more question.

Audience: Yeah. How much for example ashwagandha, how many milligrams? Like a thousand 2, 3 times a day or about the amounts?

Dr. Blake: Yes. I ...

Audience: Or is it 1 pill that's usually like 500 milligram? Just curious about the amount.

Dr. Blake: Ashwagandha is often in Chinese medicine made into a soup or a stew. It's not so simple on the dosing. I suggest you look into that more. It would be difficult for me to say. It is fairly safe, check into it yourself but I have not seen drug interactions or side effects from it that would bother some in any way but check in to that. It comes in

this little sticks that look like large tongue depressors when you buy it from a Chinese store. Typically we put a few of those in a stew or a soup or herbal decoction where it's boiled for a long time at very low heat. That's how it's used, it's not a milligram thing.

Audience: Because here it comes in health food store in capsules and tinctures. That's why I was asking that.

Dr. Blake: I would have to look into that. I'm not ... There's a lot of safety considerations before I could recommend a dosage. However, on the side of the bottle that capsules come in it probably does recommend how many per day. Then they would know the potency of what they're selling, hopefully.

Audience: Okay, thank you.

Dr. Blake: It really varies how it's extracted.

Moderator: Okay. One more question then we're going to go to break here pretty quick.

Audience: Hi. I have a question about hydrogen peroxide you mentioned. How do you use it for the diet? Do you have any comment for that? Hydrogen peroxide.

Dr. Blake: How do you use it?

Audience: Yeah.

Dr. Blake: Well, hydrogen peroxide is formed inside the body, inside the nerve cell. What we want to do is neutralize it into water. To do that we need glutathione peroxidase and glutathione peroxidase necessarily needs the element mineral selenium. We need to make sure selenium levels are high enough. Not too high and not too low. If you're supplementing with it it should be the selenomethionine form. 55 micrograms per day is the accepted minimum and 100 micrograms per day I think is what I put in the brain and body food as a little more than you need but far below toxicity levels. That's how you support the efficacy of glutathione peroxidase in reducing hydrogen peroxide, turns it into water. It's really neat. Well, thank you and thank you all so much for your thoughtful questions and [inaudible 01:34:23], I appreciate it. Thank you. Thank you so much. day is the accepted minimum and 100 micrograms per day I think is what I put in the brain and body food as a little more than you need but far below toxicity levels. That's how you support the efficacy of glutathione peroxidase in reducing hydrogen peroxide, turns it into water. It's really neat. Well, thank you and thank you all so much for your thoughtful questions and [inaudible 01:34:23], I appreciate it. Thank you. Thank you so much. day is the accepted minimum and 100 micrograms per day I think is what I put in the brain and body food as a little more than you need but far below toxicity levels. That's how you support the efficacy of glutathione peroxidase in reducing hydrogen peroxide, turns it into water. It's really neat. Well, thank you and thank you all so much for your thoughtful questions and [inaudible 01:34:23], I appreciate it. Thank you. Thank you so much.

