

Eating Well? The Link Between Nutrition and Your Skin's Health
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Rajani Katta, MD, FAAD, interviewed by Elisa Gallo, MD, FAAD

ELISA GALLO, MD, FAAD: Hello, this is Dr. Elisa Gallo for *Dialogues in Dermatology*. And today, we're going to be interviewing Dr. Rajani Katta, from Houston, Texas, where she is on clinical faculty at Baylor College of Medicine and the University of Texas in Houston. She currently practices in a private practice there, as well. Welcome, Dr. Katta.

RAJANI KATTA, MD, FAAD: Oh, thank you for having me. I'm so excited to be here today.

ELISA GALLO, MD, FAAD: Well, we are very excited to have you. And today, we are going to be speaking about the nutritional research in relation to skin health. So I'd like to begin today by some of the research approaches to the study of the impact of nutrition on the skin. Would you like to tell us more about that?

RAJANI KATTA, MD, FAAD: Absolutely. I think it's such a fascinating area, because in dermatology we've known for such a long time how much nutrition and diet affects the skin. But what we're starting to see, especially in the last decade or two, all of these different research approaches to really delineating this idea. So now, we have some really interesting population cohort studies. We have longterm human interventional studies. And we also have shorter term randomized controlled trials that have looked at specific foods, and even specific dietary patterns.—

--So you can really approach this from several different aspects, but they're all pointing to the fact that we do know that there's an impact in nutrition on the skin.

ELISA GALLO, MD, FAAD: It's very interesting. And can you tell us a little bit more about the epidemiological studies that have demonstrated how healthier eating patterns result in less clinical signs of skin aging and disease?

RAJANI KATTA, MD, FAAD: This is an area that I thought was really interesting. So we have several really well done epidemiologic studies. And there was one that came out just a few years ago in the *JAAD*, where they looked at elderly Dutch individuals. They were looking at measuring their wrinkles. And what they found was that women who had a better adherence to the Dutch Healthy Guidelines actually had significantly fewer wrinkles.—

--And then the flipside of that was that in women who had a dietary pattern where they were really dominated by red meat and snacks, that that was associated with more facial wrinkles. So that was one example of a really interesting epidemiologic study.

ELISA GALLO, MD, FAAD: And I understand there's been another study of over 500 non-diabetic subjects, comparing their glucose levels and the relation to sun damage. Can you tell us a little about that?

RAJANI KATTA, MD, FAAD: Yes, I also thought that was really interesting. Because I know as a dermatologist, for decades we've talked about the fact that patients who have diabetes have poor wound healing. So we know that there's some effect on the skin. But then they found that even if you don't have diabetes that as your glucose levels are elevated, that your perceived age increases. And in this particular study, that was even after accounting for how much sun damage they had, and smoking, and weight, and other factors. It was just as that blood glucose level rose, you started to have a perceived higher age.

ELISA GALLO, MD, FAAD: That brings us to the next question, is what are some interventions that we can take with specific foods that will affect our skin health?

RAJANI KATTA, MD, FAAD: Right now, we've been talking about population studies or epidemiologic studies. But I'm also really fascinated by the fact that we have all these randomized controlled trials looking at the effects of specific foods. So not pharmaceutical

interventions but food interventions. And there was one that came out just a few years ago that got a lot of press. And I thought it was really interesting because it looked specifically at almonds and it was a randomized controlled trial.—

--And this was a small study but it was really well done. And basically, the participants had two ounces of almonds per day and that was compared to a control group that had a different snack. And at the end of four months, the intervention group had a wrinkle severity that had decreased by 9 percent and an overall wrinkle width that had decreased by 10 percent. So significant differences compared to the control group. And again, a small study, so I'd love to see this in large groups, but really very promising.

ELISA GALLO, MD, FAAD: It does sound very interesting. And I am curious if it applies to other nut groups, as well.

RAJANI KATTA, MD, FAAD: Yeah, I'd be really interested to see that research, as well.

ELISA GALLO, MD, FAAD: So why does our skin age?

RAJANI KATTA, MD, FAAD: That's such an important question. And when I think about how you can intervene nutritionally to try to impact skin aging, if you look at the literature it really comes down to three major biochemical processes. So it's due to oxidation, inflammation, and glycation. So those three processes on really a cellular, molecular level are the ones that cause the clinical features that we think of as typical of skin aging.

ELISA GALLO, MD, FAAD: Well, let's start with how we can benefit from dietary antioxidants.

RAJANI KATTA, MD, FAAD: So if you think about the fact that oxidation is one of those major factors, and when I'm talking to patients I talk about the fact that you get, whenever you're exposed to UV radiation, that triggers the production of free radicals. And those free radicals are

almost like hail, just bouncing off of the roof of your house and they cause all this damage in the process. And so antioxidants help to quench those free radicals. And we actually have a really large body of literature looking at different antioxidants.—

--So some of these studies have looked at specific nutrients, like for example beta carotene or lycopene or astaxanthin. And then there are also a number of really well done studies that have looked at specific foods. So foods such as tomato paste, green tea, pomegranate. They've actually done intervention studies with those that have shown benefits, in terms of limiting the effects of oxidation in the skin.

ELISA GALLO, MD, FAAD: The ones that interest me the most are, of course, the cocoa and polyphenols because I am addicted to chocolate, for sure.

RAJANI KATTA, MD, FAAD: I know, right. Me, too. Give me a square of dark chocolate. They actually have done some nice studies looking at, they call them high flavonol cocoa powder, so it's cocoa powder that has a high concentration of certain polyphenols. And in one study that I thought was really interesting, they actually showed that they were able to improve the minimal erythema dose in volunteers, in human volunteers who ate this high flavonol cocoa powder for 12 weeks. They actually had an improvement in that minimal erythema dose, so yeah, go for it, eat more chocolate.

ELISA GALLO, MD, FAAD: Fascinating and very tasty. Moving on, while dietary antioxidants are critical in battling the effects of oxidative stress, it's also important as you mentioned to get the right dose, ideally the physiologic dose. What can you tell us about looking into that a little further?

RAJANI KATTA, MD, FAAD: This is such an important area, because when researchers first started looking at this area, so there are multiple studies that show that individuals who eat a

diet that's high in fruits and vegetables, foods that are naturally high in antioxidants, that they have a lower risk for cancer. And so what happened was that researchers started extrapolating that and said, "Okay, if antioxidants are good, let's start giving people high dose antioxidants in the form of supplements. And let's see if that can reduce the risk of skin cancer."—

--So I did a review article where we really looked at a lot of these different studies. And study after study came up with the same conclusion, which is that high dose antioxidants given as a supplement did not prevent the formation of nonmelanoma skin cancer. And, in fact, some studies have shown that if you take these supplements with high doses of antioxidants, it can actually increase your risk of skin cancer.—

--And there was one study where they gave women a pill that had multiple high dose antioxidants in it, such as vitamin E, beta carotene, zinc, and selenium. And they found that after 7-1/2 years, as compared to a control group, they actually had a higher risk of nonmelanoma skin cancer. So we no longer recommend those high dose antioxidants as a preventive measure for nonmelanoma skin cancer.

ELISA GALLO, MD, FAAD: Very interesting. If supplements aren't the key then, let's talk more about foods, and specifically antiinflammatory foods. What can you tell us about that?

RAJANI KATTA, MD, FAAD: We know that foods that are rich in antioxidants definitely have beneficial effects on our skin. We also know that antiinflammatory foods can also have benefits on our skin. So, for example, some are able to block the action of matrix metalloproteinases, such as collagenase and elastase. And we know that those are the enzymes that can start to really break down that structural matrix of our skin. So they found that there are multiple foods that can help interfere with these inflammatory pathways.

ELISA GALLO, MD, FAAD: Interestingly, the ones that we see on a regular basis in the stores: green tea, white tea, pomegranate, and adding foods such as, I believe, tumeric, cloves, ginger, and garlic, can be very beneficial. Would you like to talk for a moment about the flavonoid quercetin?

RAJANI KATTA, MD, FAAD: I like this one because I love onions, I add onions to a lot of my food, and cauliflower has gotten really popular. But both of those foods have a particular flavonoid called quercetin. And in studies that has been shown to be one of those substances that is able to inhibit collagenase, so it acts as a collagen protector.

ELISA GALLO, MD, FAAD: Fascinating. So what are some of the dietary patterns that impact glycation, as you had mentioned earlier being the third reason that our skin ages?

RAJANI KATTA, MD, FAAD: When I'm talking to patients about oxidation, inflammation, and glycation, I talk about the fact that if you think of your skin like a house, oxidation is that hailstorm pounding away. And then inflammation is your defense and repair processes sort of going out of control. So it's sort of like if you hire a repairperson to fix a tiny leak in your roof and then by the time you're done, you end up with this giant hole, that's inflammation, chronic inflammation sort of out of control.—

--Glycation is the third part of that. And I think of glycation as sort of if you have termites eating away at the walls of your house, glycation is a non-enzymatic process where you have a sugar that binds to a protein, and so you get this compound called an advanced glycation end product. And those compounds sort of glob onto collagen fibers and they start to make them more brittle and more easily damaged. So just like termites eating away at the walls of your house, these compounds start to eat away at the collagen that's holding up the roof of your house.—

--And one of the biggest reasons that we get glycation is your body forms these compounds in the presence of elevated levels of blood sugar. So if you're talking about dietary patterns, you just have to think about all of those factors that increase blood sugar levels and you want to avoid. So that can just start with avoiding added sugars and avoiding processed carbohydrates to begin with.

ELISA GALLO, MD, FAAD: Very interesting. And I do like the acronym for that, AGEs, for advanced glycation end products, very appropriate. So let's move on to discuss meats and fats. As a general rule, what can you tell us about that in relation to these advanced glycation end products?

RAJANI KATTA, MD, FAAD: We talk about the fact that if your blood sugar levels rise, you have more glycation. But one interesting thing that I found when I started looking into this research was that these compounds are naturally found in certain foods. So these bad compounds are things that you can just eat. And one of the biggest contributors to AGEs in your diet, as a general rule, it's going to be meats and fats.—

--And when I talk about meats, the type of cooking method really makes a big difference, because if you have a dry heat cooking method, so if you are grilling or roasting or broiling your meat, you can actually increase that formation of AGEs by 10 to 100 fold. So be careful about your meats and your fats but also be careful about how you're cooking those meats.

ELISA GALLO, MD, FAAD: And interestingly enough, the fruits, vegetables, grains, and milk contain lower levels.

RAJANI KATTA, MD, FAAD: Yes. And so I've had people, when I give lectures and I'm talking about, okay, you don't want to roast your meat, people have said, "Well, what about roasted vegetables?" Completely different. Vegetables have such a tiny level to begin with that even if

you do all these dry heat methods, it hardly budes the amount of AGEs that you're consuming. So vegetables are just great all around.

ELISA GALLO, MD, FAAD: Let's discuss the dietary compounds that support DNA repair mechanisms now.

RAJANI KATTA, MD, FAAD: This is so important when we talk about nonmelanoma skin cancer especially. And one of the substances that's been studied more extensively in the last few years is nicotinamide. And this is, in the studies that have been done, they actually have looked at the particular supplement nicotinamide. But in one really important randomized controlled trial, patients who were at high risk for skin cancer because they had already had a skin cancer, when they took nicotinamide after a year's time, they actually had close to 25 percent lower rate of new nonmelanoma skin cancers compared to controls, so it was a really promising study.—

--And I just want to make the point here that nicotinamide is not an antioxidant. It is believed to work by boosting cellular energy, which then helps boost DNA repair.

ELISA GALLO, MD, FAAD: So the impact of nutrition on dermatoses, we can all agree, is very significant. And now I'd like to take us into a discussion of specific dermatoses that we see on a regular basis in practice. So why don't we begin with acne and the dietary patterns that promote or trigger changes that we would like to avoid.

RAJANI KATTA, MD, FAAD: So it's really interesting, because patients are really asking a lot about, "Okay, if I have acne, what dietary changes do I need to be following?" So one of the studies that I point them back to, a really excellent study out of Australia. It was a randomized controlled trial that they had patients follow a low glycemic index diet for 12 weeks and that was

compared to a control group. And at the end of 12 weeks, those patients had a greater decrease in their total lesion count, so improvement in their acne.—

--But when you looked at serum studies, they actually had a reduction of the free androgen index. And they've done later studies of that same intervention, that low glycemic index diet, and they've actually shown things like a decrease in skin sebum. And by skin biopsy, they've actually shown decreases not only in skin inflammation, but even in the size of the sebaceous glands. So really impressive results from low glycemic index diets.

ELISA GALLO, MD, FAAD: Let's move on to talk about rosacea, a relative of acne, and how we can use diet to influence its impact on rosacea.

RAJANI KATTA, MD, FAAD: Rosacea is one of those areas where I think all of us, for like forever, have been telling our patients, "Yes, you need to be careful about certain foods, especially things like alcohol and hot beverages." But surprisingly, when I did a review of the literature, there's actually not that much research done on those specific dietary compounds or foods and rosacea. But there was one that I really liked and this was a survey of patients by the National Rosacea Society.—

--And what they found was that certain foods, even beyond hot beverages and alcohol, were really linked to flares of rosacea. And I think a lot of us know about spicy foods, but there were other foods that were common triggers that patients reported. And these included tomatoes, citrus, and chocolate. And I found that really interesting, because there's a whole other line of research that has looked at something called transient receptor potential channels. And these are channels that when you activate them cause vasodilatation.—

---And we know that vasodilatation is one of those factors that plays a role in rosacea. And interestingly enough, there are certain compounds in tomatoes, citrus, and chocolate that

activate those TRP channels leading to vasodilatation in animal and laboratory studies. So those are the foods that I recommend that my patients try avoiding for eight weeks, if they want to see if there's a link.

ELISA GALLO, MD, FAAD: And that's important to do a short trial, I think it's very important because it gives patients a sense of taking control, as well as a sense of whether or not this indeed is something that affects them. Now, moving onto atopic dermatitis, I think we've all been asked the same question by our patients, if not at least once a week, many times thereafter. They're always wondering, should we change our child's diet? And what can you tell us about that?

RAJANI KATTA, MD, FAAD: Well, there's sort of two factors here. There's sort of two broad areas that I look at here. And this is a really complex topic. So the first factor is, should I change my child's diet, specifically do I need to be avoiding gluten or do I need to be avoiding eggs or milk? And the corollary to that is, what tests do I order so that I can find out if my child needs to be avoiding these foods?—

--And what I will say is that food allergies are really common in patients with atopic dermatitis. And there is a subset of those patients in which those food allergies can make atopic dermatitis worse. But it's actually a complex topic in terms of testing, because there are different types of food allergies and there are different types of tests for those food allergies. And so I always start with a food diary, I think that's the best place to start, because there's not one blood test or skin test that we can order that will cover all of that.—

--But if parents are working with a food diary and they are suspecting that there's a certain food that might be a trigger, one of the things that I tell them is that there are some foods that trigger atopic dermatitis within minutes to hours. If you're allergic to peanuts and you eat peanuts, your skin may start itching one hour later. But there's also a type of, they call it delayed eczematous

reaction, where you might eat a certain food and your skin might not flare for up to two days later.—

--So as you're using that food diary, you want to keep track of those 48 hours beforehand. And then if there's a suspect food, I would actually refer to an allergist, and not every allergist does this, but some do what's known as a double blind, placebo-controlled food challenge. So then they can confirm whether or not your child is allergic to let's say eggs. And then patients have said, "Well, if I think my child is allergic to gluten, can't I just have them stop eating it?"—

--And, of course, now we know that you have to be really, really careful in children about just avoiding foods because that can increase the risk of food allergy. So that's why I recommend that progression with confirmation by testing before you just eliminate any food in children.

ELISA GALLO, MD, FAAD: That's a good point. And let's discuss now, moving on to psoriasis. What are some of the dietary modifications that we've looked at with respect to psoriatic flares?

RAJANI KATTA, MD, FAAD: Psoriasis, patients can really – well, we know psoriasis just can be a very hard disease to live with. And so unfortunately, there's been a lot of individual reports by patients, let's say on social media, where they say you have to eliminate gluten if you have psoriasis. And so one of the things, that's a common question that I've heard. So one of the things I do tell patients with regard to gluten is that there are case reports of people who have celiac disease and psoriasis both.—

--And when they've eliminated gluten, their psoriasis has improved. But those are case reports. And so one of the things we tell patients is that if there are risk factors, if you suspect you might have celiac disease, that it's worth getting tested. And if you have, not even just celiac disease, there's a small study that suggests even if you have anti-gluten antibodies and if you eliminate gluten, you may actually have an improvement in your psoriasis.—

--But on the flipside, if you don't have celiac disease and you don't have those anti-gluten antibodies, there's no effect on psoriasis that we've seen. So that's a common question I get. The common question I don't get is how do I reduce my risk of comorbidities in psoriasis, but that's the question that, as physicians, I think we really need to be bringing up to our patients with psoriasis, because we know that they're at higher risk for multiple comorbidities. And not just obesity, but diabetes, dyslipidemia, cardiovascular disease.—

--And so for our patients with psoriasis, I think the most important dietary modification is a healthy diet that reduces the risk of those comorbidities.

ELISA GALLO, MD, FAAD: We are getting to the end of our session. And I was wondering if you could provide us a little summary as to what you feel are the most important take home points from this session?

RAJANI KATTA, MD, FAAD: I think for our patients, one of the most important things when we're speaking to our patients is to emphasize that yes, there have been definite links between what we eat and our skin health. But it's really important for our patients to look for those evidence based recommendations. And in terms of sort of a global approach to this topic, I think one of the first things is to really think about, the number one thing I would think about dietary-wise is if you have a specific skin disease, is there an increased risk of comorbidities? And if there is, let's think about dietary approaches to reduce those risks of comorbidities.—

--And then beyond that, I think about are there any particular foods or substances or compounds that are linked to a worsening of the skin disease. So I call those triggers, so be aware of potential triggers. And then finally, I think about certain helpers. So are there any dietary patterns or foods or compounds that might help in the treatment of that disease? And then let's focus on that, such as the low glycemic index diet for acne. So that's kind of how I look at it globally: comorbidities, triggers, and helpers.

ELISA GALLO, MD, FAAD: Excellent. Thank you so much for joining us today, Dr. Rajani Katta, from Houston, Texas. And we wish you all the best. And that is the end of this session.

RAJANI KATTA, MD, FAAD: It was my pleasure, thank you.