THE HEALING SECRETS OF FOOD REVEALED

WHOLE PERSON INTEGRATIVE EATING®

SPECIAL SERIES

21st CENTURY NUTRITION G.E.M.s*

3 Scientific Breakthroughs
TO
Build Your Body-Mind Health

*1. **G**enetics 2. **E**pigenetics 3. **M**icrobiome

SPECIAL SERIES:
21st Century Nutrition G.E.M.s: 3 Scientific Breakthroughs to Build Your Body-Mind Health
EPISODE 6 May 14, 2024
#2 Meta-Discovery: Food, Epigenetics & Health

Epigenetics: Reset Your Genes—NOW—for Weight Loss & Well-Being

Because of cutting-edge, 21st century, scientific discoveries, we now know everyday foods you choose have the power to switch off genes that put you at risk for a particular condition. The end result: Increase odds of preventing—even reversing—an ailment with diet. Welcome to the world of Nutritional Epigenetics!

G.E.M.
META-DISCOVERY
#2 of 3

Food, Epigenetics, Health

SPECIAL SERIES: 21st CENTURY NUTRITION G.E.M.s

In this episode 2 of my 3-part Special Series: **21st Century Nutrition G.E.M.s: 3 Scientific Breakthroughs to Build Your Body-Mind Health**, I discuss the second of three breakthrough findings that are so huge, they actually create a re-visioning of the power of food to prevent health problems for which you're at risk; and also to turn around—and reverse—many chronic body-mind conditions, from overweight and obesity to heart disease, diabetes, depression, and more.

All three meta discoveries are intimately interconnected, but I'm telling you about each independently, so you'll realize the powerful role each plays in health and healing, and what you can eat, every day, to reset your genes for weight loss, health and healing.

Today I'm discussing the second of three meta discoveries, called *epigenetics.* Epigenetics is the study of how your behaviors and environment—especially the food you eat each day—can create changes that affect the way your genes work—and in turn, wellness or illness. Today's focus: NUTRITIONAL EPIGENETICS.

NOTE. The next and final episode in this Special Series on 21st century meta discoveries about food and health explores yet another groundbreaking, scientific breakthrough that empowers you to reclaim your health. One meal at a time.

TRANSCRIPT

Hello! Welcome to The Healing Secrets of Food Revealed. TODAY'S TOPIC is Epigenetics: Reset Your Genes—NOW—for Weight Loss, Health & Healing. Epigenetics is meta-discovery #2 in my special 3-Part series: 21st Century Nutrition G.E.M.s: 3 Scientific Breakthroughs to Build Your Body-Mind Health.

I'm Deborah Kesten—nutrition researcher and host of The Healing Secrets of Food Revealed, and I'm on a mission: To give you the science-backed, weight-loss wisdom you need to eat less and weigh less. Without dieting.

In each episode, I'll translate cutting-edge weight-loss research into actions you can take that can make a real difference in your weight and well-being.

LET'S GET STARTED!

Meet Meta-Discovery #2: Food, Nutritional Epigenetics, and Your Health

Today's "big picture" healing secret of food is this: The emerging science of *epigenetics*—specifically, NUTRITIONAL EPIGENETICS, reveals that the foods you eat switch genes on or off that can lead either to wellness or illness. Not only for you. But also for your children, even of unborn generations.

Some call this dynamic new science a "new paradigm" and "the medicine of the future." At the same time, it is so profoundly changing our understanding of health and healing, the National Institutes of Health (NIH) has poured multi-millions of dollars into research on nutritional epigenetics.

What's the brouhaha about? I've already told you that *nutritional epigenetics* is about how the foods you eat switch genes on or off that can lead either to wellness or illness. But this paradigm-shifting understanding of food, genes, and health does even more, because it provides a crystal ball not only into your potential health, but also into the health of your children, even of unborn generations. Be assured: the age of nutritional epigenetics has arrived.

Food, Nutritional Epigenetics and Your Health

In this episode 2 of my 3-part Special Series about 21st Century meta discoveries, food, and health, I'm discussing breakthrough findings that are so huge, they actually create a re-visioning of the power of food to prevent health problems for which you're at risk; and also to turn around—and reverse—many chronic body-mind conditions, from overweight and obesity to heart disease, diabetes, depression, and more.

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Today I'm discussing the second of three meta discoveries, called *epigenetics.* Epigenetics is the study of how your behaviors and environment—which includes the food you eat each day—can cause changes that affect the way your genes work—and in turn, wellness or illness. Today's focus: NUTRITIONAL EPIGENETICS.

The Promise of Nutritional Epigenetics

Here's a simplified version of how epigenetics works: "Epi" means "on top of, while "genetics" refers to the DNA coded in the 20,000-25,000 genes that are housed in your *genome* in every cell in your body.

What's fascinating is this 21st century discovery: Sitting on top—remember, "epi" means "on top of"—sitting on top each genome that houses your genes, is another genome called an "epigenome." And while genes in your actual genome don't change, healthful nutrients in the food you eat may switch off the

expression of ailments some genes are coded for; or conversely, health-harming chemicals and additives in, say, ultra-processed food and fast food—may also interact with your epigenome, and in turn your genome, and enable disease coded in your genes to express itself.

What I'm saying is this: A revolution is taking place in biology. For decades, scientists believed DNA determined health destiny—for both ourselves and what we pass on to our children. But the newly emerging science of *nutritional epigenetics* is re-writing the rules of heredity and health. For it tells us that while you might be born with a genetic predisposition to a particular ailment—say, obesity, heart disease, or diabetes—the tendency comes not only from genes you inherited from parents, it may also be due to your parents' *diet*—even your grandparents' diet—which influenced your *epigenome*.

In other words, research on epigenetics tells us that the food choices we make each day—as well as other aspects of our lifestyle and environment—have the power to "override" the health tendency coded in your genes.

This means that your daily diet may have a powerful impact on your genes and health *and* the "health status" of the genes you pass on to your children. With this in mind, the promise of epigenetics is pregnant with promise. Why? Because it has the potential to change medicine as it is practiced tomorrow—and provide a new nutrition-health paradigm for the twenty-first century.

But you don't have to wait and see. You can start practicing nutritional epigenetics today. And if you do, both you and your children—even your unborn grandchildren—could start reaping its health rewards now.

A Trip to Sweden

I want to tell you the story—the amazing story—of the scientist who discovered the link between the food you eat and its influence not only on your genes and health, but also on the genes and epigenes that influence the health of your children. And then I'll share a few fascinating studies about nutritional epigenetics and weight, and how it may protect you against some cancers, and more.

The Story of Nutritional Epigenetics

The story of nutritional epigenetics starts six thousand years ago, when the first settlers arrived in a remote area of Northern Sweden, now called Överkalix. Located in the far-north regions of the Sweden Lapland near the Arctic Circle, Överkalix is surrounded by dramatic mountains, lush coniferous forests, thousands of lakes, and even today, virgin wilderness. Plus two vigorous national rivers run through this idyllic town.

For centuries, the farmers of Överkalix complemented their access to fish with crops, such as potatoes and grains, and farm animals, such as pigs, which provided ham, bacon, pork chops, and sausage.

With its geographic isolation, Överkalix might have remained unknown—had a particularly unique aspect of the tiny town not caught the attention of Lars Olov Bygren, PhD, of the University of Umeå. A Swedish epidemiologist, his interest is studying causes of disease in different populations—ranging from whole nations and cities to town and small parishes like Överkalix.

In the 1990s, Dr. Bygren developed a special interest in Överkalix because of its unique remoteness, combined with its sparse population. In particular, though, his fascination was in its centuries-old registry, filled with well-kept details of births, deaths, and harvest records. What he wanted to tease out from the data in the meticulous registry was whether the nutritional environment—in this case, the effects of famine and food scarcity—experienced by a generation of locals around the turn of the 20th century could affect their health. It seemed like a simple enough study: relate food availability to health.

But while scanning the well-kept registry for clues, he stumbled on something curious that changed his focus: It appeared that *a famine affected the health of grandchildren born two generations after their grandparents had suffered a food shortage*—even though the grandchildren, themselves, hadn't experienced food scarcity. And the impact was so far-reaching, it seemed to be linked not only to an

increased risk of diabetes, heart disease, and cancer in the grandchildren, but also a much-shortened lifespan.

How could this be possible? To explore the seeming phenomenon, Bygren turned to the extensive database at the University library. Had anyone else ever observed—and written about—what seemed impossible: that the food supply available to a generation of grandparents could leapfrog over the parent generation and affect the health of the grandchildren? After many hours, Bygren found a singular possibility in the work of clinical geneticist Marcus Pembrey, who had published a theory paper on the topic in an obscure medical journal. In his article, Pembrey speculated about if—and why—genes might carry a "memory" from one generation to the next. And he wondered if some kind of "imprinting" in a generation of grandchildren could be linked to diet and other environmental influences experienced by their parents or earlier ancestors. And if so, might such imprinting lead to unexplained health problems in grandchildren?

If this proved to be so, it would be the first evidence that the genetic effects of a person's diet (nutritional environment) could be passed down and inherited by grandchildren!

Making the Link

Okay. Let's cut to the chase. Bygren and Pembrey wanted to know if science could provide an actual explanation for their seemingly incredible speculation that health effects due to the diet consumed by parents could be passed on to their *grand*children?

What they found was unexpected and surprising. The archives in Överkalix revealed that the grandsons whose grandfathers had an abundance of food lived *thirty-one years less* than grandsons of grandfathers who had had poor food availability. And not only did death certificates reveal their lifespan was significantly shorter, *they died early from heart disease and diabetes*. And a similar shortened lifespan and tendency toward disease occurred with the granddaughters whose grandmothers had abundant food availability.

Clearly, the food supply of the grandfathers affected their grandsons *only*, while the food supply of grandmothers affected the lifespan of granddaughters *only*. The "inheritance puzzle" gets even more confusing when we consider that genes pass on certain *fixed* traits or health conditions, but, genes *don't* pass on health problems that manifest from the *food* we eat.

Or do they?

Finding the Missing Link

Reflecting on the diet-transgenerational dynamic that was unraveling in Överkalix, Pembrey said, "Up to now, geneticists thought inheritance is just in the genes, the DNA sequence." Such thinking was understandable. After all, for decades, the cornerstone on which conventional genetics rests is that genetic inheritance is fixed and unchanging from the moment we're conceived.

But by the 1990s, Pembrey and Bygren speculated there was a missing piece to the puzzle. And they were determined to find it.

Enter Professor Wolf Reik, a developmental geneticist at the Babraham Institute in Cambridge, England. Reik's interest was "genetic imprinting," the term that describes the mechanism that turns off the influence of a gene that's inherited from either the mother or father. What he wanted to know at this point in his career is: *What* could cause certain genes to switch on or off, and in turn, potentially influence the health of offspring?

The concept of genetic imprinting—the way in which genes "express" or "reset" themselves based on the interaction between genotype and the environment—was also of special interest to Pembrey in his search for the mechanism behind the Överkalix phenomenon, because genetic imprinting not only can originate from either your mother's or father's genes, *genes can also be influenced by environmental factors* (such as diet) *and possible interactions between the two*.

Reik's pioneering first study on genetic imprinting revealed that environment itself—outside of the fetus—can turn a gene on or off. But his findings go even further, for they demonstrated a link between environment (such as diet) and throwing gene switches on and off in such a way that it can lead to *abnormal* gene expression—a kind of "faulty switch" that increases odds of health problems in offspring.

But the question still remained: Is it possible that the life experiences (such as diet, stress, air quality, and other environmental factors) of one generation to be "transferred" to future generations?

Discovering Epigenetics: Genes ARE NOT Your Destiny

To give you some perspective… In the first few years of the 21st century, when both Pembry and Reik were making their discoveries, conventional genetics and its DNA-is-destiny dogma still reigned supreme. The scientific community thought it impossible that the mechanism that switched genes on and off could be inherited. Still—although it was verging on blasphemy—Reik wanted to know if this were possible.

To find out, he would conduct another experiment. This time, he would take some mice whose gene switches had already been altered, and then breed them. When the visionary researcher looked at the gene profile of the offspring, epigenetics as we know it today was born: He discovered that the genetic switch in one generation was clearly present in the second generation.

Says Reik: "Nobody had seen this kind of thing before." And because Reik's study was the first to show that epigenetic genes—in addition to genes—were passed from generation to generation, classic geneticists working on the billion-dollar Human Genome Project at the same time were having a hard time believing that Reik's data was accurate.

But they were wrong and Reik was right. Epigenetic genes—that can switch genes on and off, and that are influenced by environment—can be passed from generation to generation.

From Obesity and Illness to Normal Weight and Health
The Agouti Mice Study

What's also amazing about the influence of environment on genes and in turn health, is this: Since Reik's discovery, rapid progress in the field of epigenetics has given us insights into its power to launch your genes on a path that leads to illness; or conversely, to activate "health" genes—often instantly—that can promote a longer, healthier life. For both you and your offspring.

Perhaps the best demonstration of how the new science of nutritional epigenetics is rewriting the rules of diet, heredity, and disease, is a landmark study published in 2003 by Robert Waterland, a postdoctoral student at the time, and Randy Jirtle, a professor of radiation oncology at Duke University.[36] Waterland and Jirtle were especially interested in epigenetics and the way in which it might influence phenotype and gene expression. Given this, they focused their attention on a particular strain of mice that carry what's called the *Agouti* gene, because not only does the mutant gene cause Agouti mice to inherit a yellow coat, it makes them obese, ravenous, and prone to cardiovascular disease, cancer, and diabetes, and in turn, shortened lifespans.

Given the extreme physical and health manifestations that Agouti mice inherit, the question Waterland and Jirtle wanted to explore was this: Would a mild modification in the diet of Agouti mothers affect the genetic legacy of a yellow coat and susceptibility to disease they passed on to their children? If so, it would mean that a subtle nutritional change in the pregnant moms' diet could have an epigenetic influence on her offspring that was so dramatic it might lead to normal weight, a normal mousy brown coat, a disease-free life, and a normal lifespan.

To proceed, Waterland and Jirtle designed their deceptively simple, but groundbreaking, study. Just prior to the mother mice becoming pregnant, the scientists supplemented the mothers' already-adequate diet with a group of four vitamins that are called *methyl donors*: this includes the B-vitamin folic acid, B12, choline, and betaine. They chose these methyl-rich supplements, because many prior studies had linked

this particular methyl chemical group with the power to launch epigenetic changes that switch genes either on or off.

Would the chemical switch made possible by the methyl group consumed by the mother mice silence the harmful and lethal effects of the Agouti gene in their children? Remarkably, the offspring in Jirtle and Waterland's study suggest this is exactly what happened.

Unlike the yellow, obese, sickly parent mice that were given the methyl donors, most of their offspring had the normal brown coat of mice; they were slender; they weren't prone to heart disease, cancer, and diabetes; and they had a normal lifespan.

Bottom line: *Without changing the DNA of the mice, the methyl donors—meaning, the four vitamins—that had attached to the Agouti gene in pregnant Agouti mothers, suppressed its devastating health effects in the offspring*. And the profound transformation was due to a simple change in the moms' diet just before conception.

Curtailing Breast Cancer:
The Landmark Shanghai Breast Cancer Study

This astonishing study on Agouti mice introduced the world to nutritional epigenetics and its profound healing possibilities. But the question still remained: Can diet-gene science be of applied to human beings? Can it help the millions of us who struggle with weight concerns, heart disease, diabetes, cancer, and other chronic conditions that have become common to many Americans?

The answer is 'yes'; scores of studies have been done on human beings over the last few decades that support the healing power of the food-gene-health connection. One such study I'd like to tell you about is the landmark Shanghai Breast Cancer Study (SBCS), a major research project that illuminates the benefits of (1) genetic testing (so you can know of genes you may have that could challenge health) (2) and it also sheds light on the role of nutrition in lowering the odds of breast cancer. I especially like the Shanghai Breast Cancer Study, because it looks at naturally occurring nourishment in real-live food—not supplements—that we eat everyday.

Conducted by a team of geneticists, cell biologists, and epidemiologists from China and the United States, beginning in 1996, the question the researchers wanted to answer was this: Is there a relationship between the consumption of a particular group of vegetables, called cruciferous (*Brassicaceae*) vegetables, and a risky gene linked with breast cancer called GSTP1 val/val? Part of the mustard family, cruciferous vegetables include foods we're all familiar with: broccoli, radish, turnip, and arugula, and greens such as collard, kale, mustard, and China's bok choy.

To find out more, the researchers created the largest and most comprehensive study of its kind. Called a population (epidemiological) case-control study, the three-year project included women between 20 and 70 years of age living in Shanghai, China. One group of 3035 women already had been diagnosed with breast cancer, while the second group of 3037 randomly selected women, were cancer-free. At the start of the study, all women were given an extensive in-person interview about their medical, family, and lifestyle histories.

Th breakthrough findings…

The two key results of the study are exceptional and groundbreaking, because they provide insight, hope, and proactive dietary possibilities for the much-feared diagnosis of breast cancer.

- The first finding is that the scientists identified one of the genes that put women at risk for breast cancer; called the GSTP1 val/val genotype variation, it is one of the three variations in the GSTP1 genotype.
- The second key finding is that women with the val/val genotype—who also have a low intake of cruciferous vegetables—have a 1.7-fold increased risk for breast cancer. Women with the same genotype who consume a diet high in cruciferous vegetables lower their odds of breast cancer,

because nutrients in these particular vegetables seem to lessen the potential cancer-causing effects of the val/val genotype.

Ultimately, the key take-away message from the Shanghai Breast Cancer Study is this: if you have the GSTP1 val/val allele (the genetic variation that makes you vulnerable to breast cancer) **certain phytonutrients in cruciferous vegetables can** compensate for the breast-cancer gene you inherited and in turn, **lower your risk for breast cancer**.

The Takeaway:

Here's the takeaway about epigenetics and what we now know about the power of nutrients in food to reset your genes—NOW—for health and healing.

First, groundbreaking research, in the 21st century, has created a clear connection between diet and its ability to silence—or switch off—the harmful effects coded in genes. Such findings raise the possibility that diet can "redirect" genetically inherited, DNA tendencies coded in our genes—so much so that health may manifest instead of illness.

Second, seemingly small changes in the foods we choose everyday can activate an epigenetic change in both you and in a developing fetus that is so powerful it can alter its health and extend its lifespan.

The bottom line: Fulfilling the gene-health promise made at the turn of the 21st century will require considerable commitment and resources—from researchers and organizations worldwide—before its full potential can realized. In the meantime, there's a lot you can do to benefit from the wisdom derived from the epigenetics research and the Human Genome Project. For instance, consider discovering your own, personal, genetic profile—there are excellent organizations that offer this—and then make modifications in your everyday food choices that have the power to switch off genes that put you at risk for the condition. The end result: You increase odds of preventing—even reversing—a chronic condition.

Your 'In-Action' Exercise
A tip, step, or reflection that can contribute to your success.

So you can reap the rewards of what you discover on each episode of The Healing Secrets of Food Revealed, I close each episode with an '**In-Action' Idea** for you to try. This may be a **Quick-Tip** about how to implement the healing secret of food we just discussed; or a **Practical Step** you can take, such as ordering a size-down of your favorite coffee concoction. Or perhaps I'll suggest a **Self-Insight Exercise**, an internal-reflection that can lead you closer to achieving your food-related health goals.

I'll offer an In-Action Exercise at the end each episode that can contribute to your transformation from today's, 'new-normal' way of eating—which leads to overeating and overweight—to Whole Person Integrative Eating—which I describe as your scientifically sound, personal guide to eating less and weighing less. Without dieting.

Consider keeping a Healing Secrets of Food Revealed journal to write about your experience with each In-Action Exercise.

TODAY'S IN-ACTION 'SELF-INSIGHT' REFLECTION:

Here's today's In-Action, Self-Insight Reflection.

SELF-INSIGHT REFLECTION

Please read this short excerpt, from today's podcast, about the nutritional-epigenetic power of nutrients in food to switch off health-harming genes, so that offspring are healthy.

"The study [about the Agouti mice] created a clear connection between diet and its ability to silence the harmful effects coded in genes…so much so that health may manifest instead of illness."

Consider what the epigenetic meta-discovery about food, genes, and health means to you, personally. For instance, if you're prone to a certain illness that has been typical for your parents or other family members, do you think certain modifications to your most-of-the-time way of eating may be beneficial to your health? If "yes," how so?

Thank you for joining me today on The Healing Secrets of Food Revealed.

If you would like a summary of today's In-Action Exercise, please visit HealingSecretsPodcast.com. Then look for the yellow light bulb next to the "In-Action" CTA. At HealingSecretsPodcast.com, you can also listen to this episode again, read the transcript, and, please consider joining The Healing Secrets Podcast Community—where I'm looking forward to meeting you.

In the next episode of The Healing Secrets of Food Revealed—which is Episode 3 of this 3-part series on Meta-Discoveries: Food, Genes & Health—I'll tell you about another 21st century scientific discovery that broadens our vision of nutritional health, and that empowers you to take charge of your health so you can reclaim your health destiny for wellness. Not illness.

I want to thank you for joining me today on The Healing Secrets of Food Revealed. With each show, I'll share step-by-step, science-backed insights you need to nourish 'all of you' – body, mind, soul, and social well-being – each time you eat. So you can thrive.

I'm Deborah Kesten, host of The Healing Secrets of Food Revealed.

Until next week, BE NOURISHED.

