



Riordan  
Clinic

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Riordan Clinic is a world-renowned, academic medical center that has led the world in integrative oncology and complex chronic illness care since 1975. The Riordan Clinic was established as a 501 (c)(3) non-profit organization with missions in research, provider education, and patient education. The Health Hunter Newsletter has been published since 1986 as an educational resource to providers and patients.

## Using Epigenetic Modifications to Improve Your Overall Health



AUTHOR

Ron Hunninghake, MD

We are all born with a DNA sequence, which is set for us through our lives. While the DNA sequence does not change, epigenetics can influence how our bodies use and read our individual DNA. Epigenetics are changes to gene activity that do not change a person's underlying DNA or its associated proteins.

Epigenetics can change how your body reads a DNA sequence and influences gene expression and the functioning of cells and tissues, diseases, and conditions.

However, epigenetic changes are also reversible and can help reverse or improve impacts from metabolic dysfunction, autoimmune issues, and other conditions.

### Link to Metabolic Syndrome

Metabolic syndrome is a cluster of conditions, including obesity, high blood pressure, high cholesterol, and high blood sugar that together can raise the risk of heart disease, stroke, and type 2 diabetes.

There are five widely-accepted characteristics of metabolic dysfunction, and having three or more indicates metabolic syndrome. They are obesity or excess abdominal fat, elevated blood pressure, abnormal lipid levels in the blood (such as high triglycerides or abnormal cholesterol), and high blood



### Epigenetics 101

Epigenetics explains how behavior and the environment can cause changes that affect how your genes work. Epigenetics do not change your DNA sequence, but they can change the way your body reads your DNA. [1]

sugar or insulin resistance.

According to a study published in March in Nature Journal, epigenetic regulation can play a crucial role in the occurrence and progression of diverse metabolic diseases, such as heart disease, stroke, and diabetes. Epigenetics can influence gene expression patterns associated with metabolism and inflammation, both key components in metabolic dysfunction. [2]

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In addition to metabolic syndrome and conditions typically associated with it, epigenetic modifications can also contribute to other chronic illnesses including cancer, neurodegenerative diseases such as Alzheimer's and Parkinson's, autoimmune disease, respiratory conditions such as asthma and COPD, and mental health disorders such as anxiety, depression, and schizophrenia.

### The Computer Analogy

When we buy a computer, it is pre-programmed with specific coding necessary to run properly. Typically, different brands of computers will have small variations in the coding and will be loaded with various programs that are also coded to do specific functions. Interestingly, the precise coding for these functions can vary widely from one brand to another. And each brand will require ongoing updates in order to continue performing well.

When humans are born, our cells are "programmed" with their own unique genetic DNA coding. This coding varies considerably between life forms and species but is very similar in all humans. However, it is not identical. Like various computer brands, humans vary in stature, facial characteristics, skin colors, nationalities, cultural background, childhood education, and their complex array of life experiences.

### Look What Can Happen to Identical Twins

Identical twins have exactly the same DNA coding at the time of their conception. They are like two computers of the same brand, model, and new software. But it doesn't take long for those two "perfectly alike" computers to change dramatically in the hands of two active users.

The uterine environment of our twins' mother, while very similar, could be slightly different for each twin baby – for example, the size of the placenta. So while even when they are developing in their mother's womb, their coding begins to show distinct differences.

After delivery, one twin might get sick while the other stays well. Even as young children, they will begin showing unique traits and propensities.

One maintains a healthy weight, eats a nutritious and balanced diet, gets regular exercise, and limits exposure to environmental toxins as much as possible. While the other eats a highly-

processed diet, gets little or no exercise, is indifferent to toxin exposure, and begins showing signs of metabolic dysfunction. Over time, they no longer look alike, and their health is likely very different.

In summary, genetically identical twins will epigenetically evolve differently in response to different environments and experiences.

### How Epigenetics Work

The good news is that you have some control over your epigenetic changes and can use them to your advantage. Lifestyle choices and environment play a role in epigenetic changes. Improvements in those areas can result in improvements to your health.

Essentially, epigenetic changes can turn genes "on" and "off," which can potentially have both positive and negative results. Epigenetics can affect gene expression in different ways. Two common ways are DNA methylation and histone modification.

The Centers for Disease Control and Prevention explains that DNA methylation works by adding a chemical group to DNA, usually in specific places, where it blocks proteins that attach to DNA to "read" the gene, which usually turns the gene "off." A gene can be turned back "on" when the chemical group is removed. [1]

In histone modification, DNA wraps around the histone proteins. When histones are packed together, the proteins that read the genes can't easily access the DNA, and the gene is turned "off." Loosely packed histone allows proteins to read the genes, which turns them "on." [1]

### Using Epigenetics for Health Advantages

While epigenetics can contribute to making you sick, it can also contribute to making you well and reversing metabolic dysfunctions.

Epigenetic profiles can vary among individuals, contributing to variations in disease susceptibility and treatment responses. Knowing your unique epigenetic profile can help personalize your approach to using epigenetics to your benefit.

Epigenetics can contribute to controlling metabolic dysfunction by allowing for early detection of potential problems and serve as biomarkers for risk assessment and identifying people at high risk for developing metabolic syndrome.

An epigenetic profile can help guide early intervention and targeted preventative strategies, including lifestyle and nutritional choices. Diet plays a crucial role in epigenetic modifications, and a balanced, nutrient-rich diet can support healthy epigenetic regulation. Eating foods rich in methyl donors, such as folate, vitamin B12, and choline, can support healthy DNA methylation, and foods with anti-inflammatory properties, such as fruits, vegetables, and omega-3 fatty acids, may help reduce the inflammation associated with metabolic syndrome.

Regular exercise has been shown to have beneficial effects on DNA methylation patterns and gene expression related to metabolism. Aerobic exercise, strength training, or ideally, a combination of both, can positively impact metabolic syndrome by influencing epigenetic processes.



Be mindful of your weight. Maintaining a healthy weight or reducing excess weight can positively influence genetic markers linked to DNA methylation that are related to metabolism and insulin sensitivity.

Stress reduction and sleep quality are also important factors in positive epigenetic modifications. I recommend activities such as meditation, mindful practices, and relaxation techniques as well as prioritizing good sleep hygiene and adequate duration.

Exposure to air pollution, heavy metals, and endocrine-disrupting chemicals can influence epigenetic markers associated with metabolic health. You can minimize your exposure through proper ventilation, water filtration, and reducing the use of chemical-laden products. The website EWG.org offers a variety of consumer guides with information about everything from chemicals on food to cleaning and beauty products.

Epigenetic modifications can also influence other generations. Fetal development and early childhood are two important times when epigenetic alterations occur. Early life interventions, such as maternal nutrition and reduced exposure to harmful environmental factors, may help prevent epigenetic changes associated with an increased risk of metabolic syndrome later in life. Epigenetic markers can also have intergenerational impacts, as epigenetic modifications can influence future generations. Improving your metabolic health may benefit you and your family for generations to come. [3]

### Metabolic Syndrome and Niacin

With metabolic syndrome and epigenetics so intertwined, improvements in one area can benefit the other. Niacin (vitamin B3) can be beneficial in improving metabolic syndrome. It plays a key role in energy metabolism by helping convert carbohydrates, fats, and proteins into usable energy forms. It also can significantly impact lipid metabolism, especially in regulating cholesterol.

Emerging information also shows that niacin may have beneficial effects on glycemic control and insulin sensitivity. High doses may improve glucose tolerance, reduce insulin resistance,

and lower fasting blood glucose levels. It also exhibits anti-inflammatory properties by inhibiting the production of excess pro-inflammatory cytokines and promoting the release of anti-inflammatory substances. Niacin can also help widen blood vessels, which can improve blood flow and has beneficial implications for cardiovascular health, a key concern with metabolic syndrome. [4]

In addition to metabolic syndrome, niacin supplementation may benefit other conditions, including Alzheimer's and Parkinson's, stress, anxiety, fatigue, cancer, addictions, and cardiovascular disease.

I recommend nutrient testing before starting a supplement regimen. Testing is always better than guessing. I do guide co-learners to what I call the "trifecta" of three key nutrients: vitamin C, niacin, and D3/K2. Dosages should be tailored to each individual's nutrient needs.

### Global Trends in Metabolic Health and Epigenetics

Metabolic syndrome, and the associated changes in epigenetics, has become a significant public health concern not just in the United States, but also worldwide. Metabolic syndrome has been on the rise for the past few decades, which can be attributed to factors such as sedentary lifestyles, poor dietary patterns, and the growing prevalence of obesity. It is estimated that in most countries between 20 and 30 percent of all adults have metabolic syndrome, which accounts for an increasing portion of the cardiovascular risk worldwide. [5]

This growing prevalence is not limited to developed countries. It affects populations across different regions, ethnicities, and socioeconomic backgrounds in low- and middle-income countries as well, often coexisting with undernutrition and infectious disease. It can, however, point to socioeconomic disparities, as limited access to nutritious foods, lower physical activity levels, and increased stress in disadvantaged populations can contribute to metabolic dysfunction. [5]

The strong association between metabolic syndrome and obesity is growing as the global population's waistlines grow. Excess body weight, particularly around the abdomen, is a major contributing factor to the development of metabolic syndrome and changes in epigenetic markers.

### In Conclusion

Epigenetics can influence multiple aspects of your health, in both positive and negative ways. Lifestyle changes are not always easy, but paying attention to the things we can control – such as food choices and physical exercise – can help prevent conditions from occurring or reverse or lessen the impact of those you may already be experiencing.

#### RESOURCES

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# Honoring Olive White Garvey's 130th Birth Anniversary



**AUTHOR**

Melody Spurney

This month, the Riordan Clinic recognizes Olive White Garvey, one of our co-founders. July 15 will be the 130th anniversary of her birth. She was born in 1893 in Arkansas City to Oliver and Caroline Hill White, the youngest of four daughters. Before Oklahoma became a state, the family lived on a ranch in what was then known as the Oklahoma Territory, after which, Caroline encouraged Oliver to move to a larger community for better education opportunities for their daughters. The family settled in Topeka, where Olive finished grade school, attended high school, and enrolled at Washburn University. She earned her degree in 1914 and taught English at Augusta High School until 1916.

It was at Washburn that she met Ray Garvey, whom she would later marry in July 1916. The couple originally settled in Colby, Kansas, where Ray practiced law and worked for a land company, which sparked his interest in real estate. The couple had four children – Ruth, Willard, James, and Olivia. The family later moved to Wichita, where Olive was active on the board of the Garvey Foundation, as well as several social organizations and enjoyed writing.



Olive Garvey's granddaughter, Ann Garvey, of Wichita, remembered that her grandmother enjoyed raising her family and contributing socially to the communities in which she lived. It wasn't until Ray Garvey was killed in an automobile accident on June 20, 1959, that Olive Garvey stepped fully into a leadership role in the Garvey Foundation business in her mid-60s.

According to Ann, and the book "Dr. Hugh D. Riordan's Legacy" by Marilyn Lake Landreth, Olive Garvey traveled to New York after her husband's death to convince bankers that a substantial loan that they had granted personally to Ray would be repaid, which it was.

Ann said her grandmother used her charm, intellect, and determination to convince the bankers and move forward with the business.

## Creating The Center

It would be another 15 years before Olive Garvey, at age 80, would become co-founder of what was originally named the Center for the Improvement of Human Functioning, now known as the Riordan Clinic. She believed in a holistic approach to medicine and the connection between nutrition and good physical and mental health.

According to Landreth's book, Olive Garvey recruited freelance writer Bill Schul to study what was being done in other locations on the effect of nutrition and the mind. After six months, 12,000 miles, and visits to 13 states and Washington, D.C., Schul presented Olive Garvey with his preliminary findings in late 1973. This presentation made her even more committed to the concept of using nutrition to treat the mind.



**Olive Garvey (center right) and Dr. Hugh Riordan, MD (center left) are pictured in 1982 at the SkyBreaking for the current Riordan Clinic campus in Wichita.**



**The pyramid was under construction in July 1983 when a second SkyBreaking was held in celebration of campus construction progress and Olive Garvey's 90th birthday.**

Olive Garvey met her future clinic co-founder following a lecture in Wichita where Schul invited Dr. Hugh Riordan, MD, and Dr. Carl Pfeiffer, MD, PhD, and founder of the Brain Bio-Center in New Jersey to meet the executive director of the Garvey Foundation, Clifford Allison. Allison invited Dr. Pfeiffer and Dr. Riordan to meet Olive Garvey. After a brief discussion, Dr. Pfeiffer encouraged her to give Dr. Riordan funds to open a laboratory in Wichita like the one he founded in New Jersey.

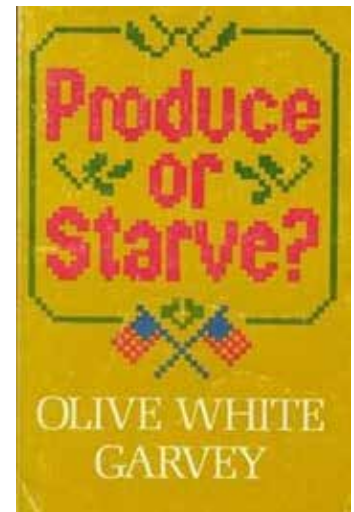
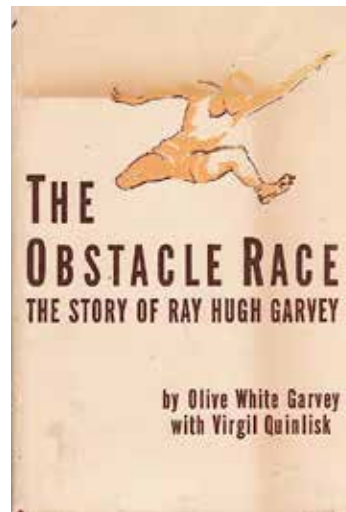
While Olive Garvey was very generous, making approximately \$100 million worth of donations throughout her life, Ann remembered her grandmother as organized and disciplined. "She didn't just give things away to people," she said.

However, Ann added that Olive Garvey "was accepting of the possibility of almost everything until it was disproven."

Landreth recounts in her book that about a week after their initial meeting, Olive Garvey asked Dr. Riordan to write a grant request to set up his laboratory. With multiple such requests submitted over the years, he did not think he would receive the grant and submitted his hand-written proposal to her, asking for funds for the next three years.

In an interview in 2000, Dr. Riordan said that he told Olive Garvey, "I don't know what I will do, and you don't know what I will do, but I will spend the next three years doing it."

Olive Garvey and Dr. Riordan, who was a psychiatrist by training, shared a vision of using nutrition to improve mental health. He received his grant from the Garvey Foundation, which committed \$100,000 each year for three years for a nutrition research laboratory.



In 1975, the Bio-Center Laboratory was established in a building on East Douglas and received its certification from the Centers for Disease Control in 1976. It was that year when The Center for the Improvement of Human Functioning opened in its original location on North Oliver, not far from the Bio-Center Lab.

In 1981, the Garvey Foundation transferred the title to the 92 acres that would become The Center's new home on North Hillside, and Olive Garvey made a significant financial commitment to its development. Plans and a "SkyBreaking" were held on July 15, 1982, and The Center held a dedication and celebration the following July for the progress on campus construction and a surprise recognition for Olive Garvey's 90th birthday. By 1984, the eight geodesic domes and a 39-foot pyramid were completed and ready to welcome patients and advance Olive Garvey and Dr. Riordan's shared vision of nutrition-based healthcare.

Ann said that her grandmother was involved in the campus design, and the uniqueness of the design appealed to her.

### Remembering Olive Garvey

Ann recalled various memories of her grandmother on a recent afternoon at her Wichita home. In addition to health and nutrition, she said that her grandmother was passionate about music, theater, reading, and her friends – of which she encouraged Ann to make friends of various ages and backgrounds.

In addition to co-founding the clinic, she was also co-founder of Music Theatre of Wichita and the Institute of Logopedics (now Heartspring) and substantially endowed both Friends University and Washburn University.

She was also a playwright and author who published two books, "Produce or Starve?" and "The Obstacle Race: The Story of Ray Hugh Garvey," among other writing.

Ann said Olive Garvey was extremely philosophical, and while not necessarily sentimental, "she had an infectious giggle."

One of Ann's favorite memories of her grandmother happened when she was about 22 and still in college. She said she was struggling to settle on a post-college direction and called Olive Garvey for advice, to which her grandmother replied, "Follow the path that is closest to your heart."

It wasn't as specific as she hoped, but Ann said it was true to Olive Garvey's nature.

"She was an 'Everything Enthusiast,'" Ann said.

### In Her Own Words

Among the many tributes to Olive Garvey is her presence in the Plaza of Heroines at Wichita State University. On the website honoring the women featured in the plaza is this excerpt from Olive Garvey's books.

"Looking back, I feel that I have been the most fortunate of women and that I have lived through a golden age ... The greatest satisfaction which life has given me is my family. My second satisfaction is that our business experience has been in the field of public service, producing food, shelter, and energy for those who deserve it, providing employment and opportunity to hundreds of people. My third pleasure is that I have been granted the handling of sufficient means to have been able to help many, many worthy causes."

Olive White Garvey passed away on May 5, 1993, in Wichita.



Olive Garvey (seated center) is pictured with her children, Olivia Garvey Lincoln (seated left), Ruth Garvey Fink (seated right), Willard Garvey (standing left), and James Garvey, (standing right) in 1983.

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# 15% OFF ALL SUPPLEMENTS!



## JULY 14-17



## ONLINE ONLY NO CODE NECESSARY



 **Riordan Clinic**  
**NUTRIENT STORE**

# Watermelon Kiwi Popsicles



Enjoy a healthy and refreshing summer snack with your family and friends this summer and enjoy fresh fruit in season!

## INGREDIENTS

1/2 small seedless watermelon  
4-5 kiwi fruit  
1 tsp honey, or more to taste  
Serves: 10; Prep: 30 minutes

## DIRECTIONS

1. Remove flesh from the watermelon rind and cut into large chunks.
2. Process in a food processor or blender until smooth. You will need 2 cups of puree.
3. Fill 10 popsicle molds about 3/4 full with the watermelon puree. Place in freezer to set for 30 minutes to firm up.
4. Meanwhile, peel the kiwi and cut into chunks. Puree in the same manner. You'll need a cup of puree.
5. Add the honey to taste to kiwi puree.
6. Fill each of the popsicle molds to the top with the kiwi puree and insert a stick into each slot. The mixture will be thick enough that the sticks will stand up by themselves. Freeze until solid, about 4 hours or more.
7. To remove, fill a sink with hot tap water and immerse the mold up to, but not over, the top lip for about 5 seconds or just until the mold releases.

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Thank you for reading.



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**COMING JULY 11**

#### USING GENETICS TO GUIDE HEALTH CHOICES

*Kashif Khan, CEO of the DNA Company and author of The DNA Way*

In this episode of the Real Health Podcast, Dr. Ron Hunninghake, MD, Chief Medical Officer, and Kashif Khan, author and CEO of the DNA Company, discuss how understanding your personal functional genetics can help guide individual health choices.



**EPISODE 59**

#### IMPORTANCE OF AMINO ACIDS

*Dr. David Minkoff, MD*

In this episode of the Real Health Podcast, Dr. Ron Hunninghake, MD, Chief Medical Officer, and Dr. David Minkoff, MD, Medical Director of the Lifeworks Wellness Center, discuss the importance of amino acids and how they are the building blocks for proteins. Many people are deficient in amino acids, which can lead to diabetes, obesity, cancer, and chronic diseases.

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