

MARCH NEWS



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“Epigenetics, a process by which the operation of genes is changed, but not the DNA itself. Epigenetic changes occur on the outside of the gene, mainly through a process called methylation. In methylation, clusters of atoms, called methyl groups, attach to the outside of a gene like microscopic mollusks and make the gene more or less able to receive and respond to biochemical signals from the body.” -NYT



Humans and rodents have about the same number of genes - this implies that human complexity does not come directly from our number of genes. Rather it comes from all the factors that influence genetic expression.

Epigenetics

Why DNA does not determine our fate!

When talking about health, the topic of genetics frequently comes up. I can not tell you how many times I’ve heard, “It’s because of my genes” or “Well my parents have [insert health issue here] so I don’t have a chance!” The truth is, diet and exercise greatly influence how our genes do their jobs. And that is the science of epigenetics. The word “Epigenetics” means how external or environmental factors influence cellular expression. These external factors influence what instructions our genes transmit to the molecules that make up our bodies. This field of study is changing the long-held belief that DNA exclusively controls biology.

As you might have guessed by now, I believe this to be a very fascinating and important topic to discuss. This new science suggests that people are not limited by their genetics as much as we once thought. We CAN improve our genetic predisposition through lifestyle choices. Previously it was believed that genes simply turn themselves on or off according to ones DNA. We now know that there are external factors which trigger our gene “expression”. These factors are our diet, physical activity and the environment we live in.

A light was shone on this topic when scientists began studying the Human Genome Project, which was intended to identify every human gene. They found that humans have between 20,000-25,000 genes, only 1,000 more than a simple worm! This proved that the complexity of human beings does not come directly from the number of genes. Moreover, even though

identical twins have the same genetic code their genetic expression is not necessarily identical; hence why one twin may live much longer. It is a direct reflection of the individuals themselves. This caused scientists to explore factors such as emotions, nutrition, stress management, exercise, etc. All of these factors send signals that influence if genes become active or lie dormant. Improving your nutrition and physical activity can cause 500 genes to change in their expression. These are opportunities just waiting to respond to your healthy lifestyle in a positive way!

Nutrition and Epigenetics

Have you ever heard of eating a rainbow diet? Or of antioxidants and phytonutrients? Bioactive compounds in our food follow specific pathways through our body and change available substrates. This influences enzymatic activity and provides methyl groups which act as epigenetic tags, altering gene expression. Antioxidants are natural substances that (may) prevent or delay cell damage. They are found in many foods, including fruits and vegetables. Phytonutrients are plant-based, health promoting compounds that affect our well-being all the way to the transcription level of our genes. Thousands of these little guys have protective and healing qualities! Many of them found in plant pigments...hence eating a colorful diet.

Color	Bioactive Compound(s)	Foods	Health Benefits
Red	Lycopene	Tomatoes, Watermelon	Helps Cell Renewal
Orange	Beta-Carotene	Carrots, Mangos	Support Immune System
Yellow	Flavonoids	Lemons, Pineapple	Detox Harmful Substances
Green	Sulforaphane	Broccoli, Arugula	Builds Healthy Cells
Blue	Anthocyanins	Blueberries, Plums	Destroys Free Radicals
Purple	Resveratrol	Grapes, Blackberries	Destroys Cancer Cells
White	Allicin	Garlic, Onion	Prevents Ulcers

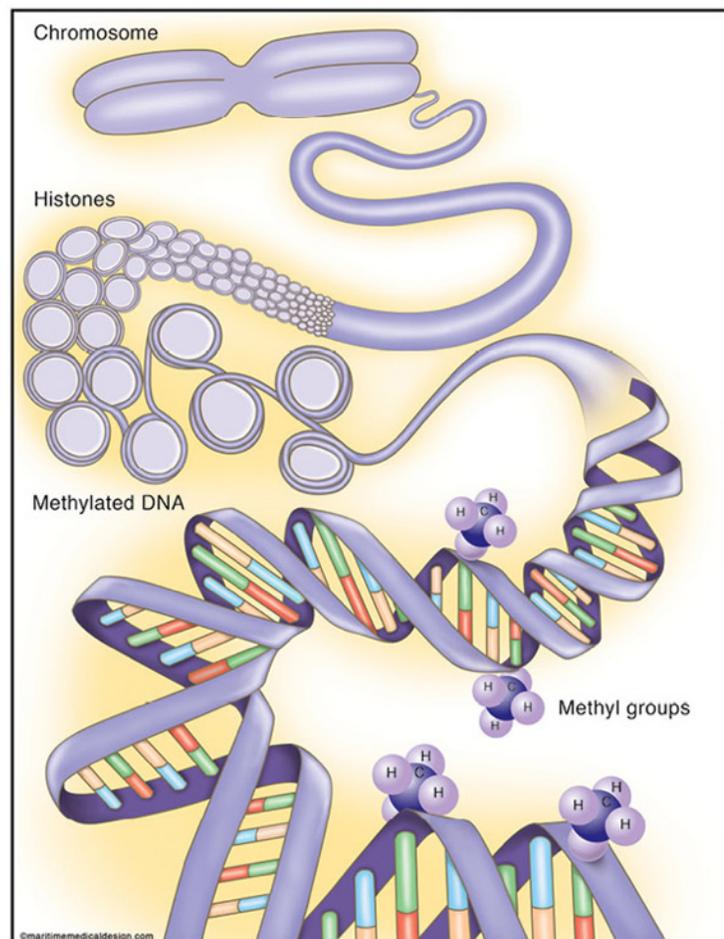
Dining and DNA

A recently discovered biochemical process called DNA methylation is a natural gene-regulating mechanism and is affected directly by food consumption. Bioactive compounds in our food go through specific pathways, altering available substrates, influencing enzymatic activity and providing methyl groups which act as epigenetic tags to silence gene expression. This is important because these tags, consisting of methyl molecules and protein peptides, are either activating or causing genes to lie dormant without changing the DNA. The understanding gained from all this is that these mechanisms are critical to the aging process, in inflammatory conditions and in the development of diseases such as cancer. Compounding evidence shows that DNA methylation is associated with turning on genes that suppress tumor growth in cancer cells and others designed to repair cells. Bottom line: we have the potential to use food for disease prevention and treatment.

Exercise and Epigenetics

According to a recent study done by the Lund University, "Exercise, even in small doses, changes the expression of our innate DNA. New research has described for the first time what happens on an epigenetic level in fat cells when we undertake physical activity." In the study they used men around the age of 35 who were slightly overweight who had not previously engaged in physical activity. They had these men workout regularly doing either spinning or aerobic classes over a six month period. "They were supposed to attend three sessions a week, but they went on average 1.8 times," says Tina Rönn, Associate Researcher at Lund University. When researchers re-examined their DNA, they found that 7,000 genes had undergone epigenetic changes. Further research proved that the genes which can cause type 2 diabetes and obesity had undergone changes as well. This led them to believe that the DNA was altered as a direct result of physical activity.

Another example of this was found when scientists at the Karolinska Institute in Stockholm recruited 23 young, healthy men and women. They were first brought to the lab and asked to perform physical activities and medical tests, including a muscle biopsy. They were then then asked to exercise half of their lower bodies for three months. They did this by having the volunteers pedal one-legged at a moderate pace for 45 minutes, 4 times per week. They were attempting to isolate the pedaling leg to show changes related to exercise alone. After three months of this one-legged exercise regimen they administered the same tests, including the muscle biopsies. As they predicted, they saw obvious improvements in both physical appearance and power in the exercised leg(s). However the changes that had taken place within the muscle cells' DNA were more interesting. It was discovered that more than 5,000 sites on the genome of the muscle cells now had new methylation patterns, some had more methyl groups, some less. As well, in thousands of the muscle cells the gene expression was increased or changed. Most of these genes had a direct connection to energy, metabolism, insulin response and inflammation within muscles. So to sum this up, they affect how healthy and fit our muscles and bodies are.



JoAnne Jones

Cardio Queen!

My name is JoAnne Jones and here is my fitness journey:

When we relocated to Denver I was interested in a personal trainer. Our connection to Jess is that she is a friend of our sons, Erik and Greg. They met while they were all going to Colorado School of Mines.

Two events sparked my interest in working out with Jess:

Jess was at our home with a local TV channel promoting her personal training business, and my Mom had begun treatment for breast cancer. It puts things into perspective when someone you love has a life altering experience like cancer. Both of my boys and Chris, my husband, encouraged me to start working out with Jess...and so my fitness story began. My main goal for training is to be healthy as I age.



I remember the first few weeks; I was so sore and stiff that I knew I had to keep up the hard work if only so I didn't have to experience that type of soreness again. I have been working out with Jess for at least six years now and I feel as if I am more in shape than I have been for years. I really feel better, my carriage is better, I stand taller and am wearing clothes that are at least two sizes smaller.

I have met some great people working out at the gym, some younger. I always remind the younger ones that I am old enough to be their mother. I have also met some older people, who are a huge inspiration to me, and some people that are close to my age. I feel our friendships have grown because we are all working to achieve our individual fitness goals.



My cholesterol, resting pulse and body fat verses muscle metrics have improved as a result of my work with Jess. My last major physical showed that I had lost body fat and gained muscle - and for a lady that has a big birthday coming this year that was very encouraging. Since working out with Jess, I have lost at least 20 pounds and plan on losing more.

Jess is always very encouraging and positive to me. She knows exactly what I need and understands my goals. Through my fitness journey we have also become friends, she is a huge inspiration to me and has always made me feel good about myself.

I told Jess I would love to be able to do at least one unassisted pull-up this year. I have never fallen in love with burpees, but at least realize how important they are. I never thought I could do many push-ups but now I can do quite a few during my workouts. Sit-ups and cardio workouts are great and leave me with more energy than I thought I would ever have. Now I also have a personal goal of walking six miles a day, either on the treadmill or walking our two black lab puppies.

My future health goals are to lose weight once and for all, and as I mentioned before I have a milestone birthday at the end of this year (60!!). With Jess's help and encouragement I know I will make my goal and now can say that I feel the best that I have felt in many years.

A Note From the Trainer

JoAnne is SUCH a pleasure to work out!! She has never once told me "No" or that she is incapable of something; she is a go-getter and often can out-perform clients half her age. I am always excited to have her try new exercises and see how she conquers the challenge! Her smile and laugh is contagious and often encourages others at the gym.

One of my favorite things about JoAnne is she is always asking questions: "What does this exercise work?" "How does this modification make it different?" "What would you say my body fat percentage should be?" "How do I stretch this muscle that is bothering me?" I LOVE that she asks these things because she wants to **learn** how to make herself healthier and stronger.

She is constantly saying that she wants to find a balance in both her exercise program and diet that she can continue to do as long as she lives - a way of life that is maintainable for her throughout the days, weeks, months, and years. I think this is an excellent goal! I consider JoAnne a wonderful friend and I am proud to be her trainer. Keep up the terrific work, lady!!!



10 Strongest Women Of All Time

Physical strength is a trait that doesn't often come to mind when you think of women... but maybe it should be! Here is a list, in no particular order, of some of the strongest women in the world thanks to *Muscle & Fitness Hers*. These 10 tough-as-nails women paved the way for the rest of us to be as strong as we were born to be!



01. Bev Francis

BORN: FEB. 15, 1955
GEELONG, AUSTRALIA

Accomplishments:

Bev has broken more than 40 world powerlifting records and retired undefeated. Most notably, she was the first woman to bench 300 pounds.

02. Robin Coleman

BORN: MARCH, 30, 1973
FRIENDSWOOD, TX

Accomplishments:

At a 2001 strong-women competition where the challenge was to squat a car as many times as possible, Coleman completed 15 reps while most couldn't even lift it once.

03. Tatiana Dashirina

BORN: JAN 24, 1991
NOGINSK, RUSSIA

Accomplishments:

Tatiana won first place in the 2014 World Weightlifting Championship where she now holds five new world records. Two most notable are her 341 pound snatch and her 425 pound clean and jerk.

04. Heini Koivuniemi

BORN: JUNE 6, 1973
FINLAND

Accomplishments:

Koivuniemi holds the Guinness World Record for throwing a beer keg for highest vertical throw: lobbing a 27 pound keg over a bar set at 11 feet, 4 inches high.



05. Iris Kyle

BORN: AUG. 22, 1974
BENTON HARBOR, MI

Accomplishments:

Kyle is the most winningest olympic champ of all time. She held this title as Ms. Olympia, holding first place in that category from 2006 to 2014.

06. Jan Todd

BORN: MAY, 22, 1952
PENNSYLVANIA

Accomplishments:

At Jans first competition in 1975, she broke the Guinness World Record of a one-rep lift by a women, when she did a 394 pound deadlift. She was also the first women to total more than 1,200 pounds in the squat, bench and deadlift combined.



07. Becca Swanson

BORN: NOV. 20, 1973
PAPILLION, NE

Accomplishments:

Becca is currently the only woman to squat more than 800 pounds, more than 4 times her

body weight! Swanson’s best lifts are an 854.3 pound squat, 600.8 pound bench and 683.4 pound deadlift.

08. Aneta Florczyk

BORN: FEB. 26, 1982
MALBORK, POLAND

Accomplishments:

Aneta holds the Guinness World Record for winning both the World’s Champion & Strongest Women more than any other woman in history. She also holds a Guinness Record for most people lifted and thrown in two minutes: 12 people.



09. Chen Wei-Ling

BORN: JAN. 4, 1982
TAINAN, TAIWAN

Accomplishments:

Chen can lift more than 3 times her body weight. In the World Games the 101 pound weightlifter deadlifted 430 pounds and squatted 457 pounds earning her first place!



10. Abbye “Pudgy” Stockton

BORN: AUG. 11, 1917
SANTA MONICA, CA
DIED: JUNE 26, 2006

Accomplishments:

Stockton, the “Queen of Muscle Beach,” wrote a column called *Barbells* in 1944 for **Strength and Health** that inspired other women to be fit despite common beliefs that weightlifting made women masculine. At 5’2”, 115 pounds Abbye would perform a hand-balancing act in which she would hold her husband over her head for extended periods of time.