

YOUR 3-STEP EPIGENETICS GUIDE

3 steps to change your gene expression for better health

By Dr Michelle de la Vega, Ph.D.
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About The Health Sciences Academy ®

The Health Sciences Academy ® is the largest online educator on nutrition science in the UK, focusing on science-based certification courses, from Sports and Exercise Nutrition, to Clinical Weight Loss, to Advanced Supplements, which are recognised by government-regulated awarding bodies, including YMCA Awards and SkillsActive/REPs.

Our mission is to mitigate the risk of wrong advice caused by conflicting dietary theories, health fads, and opinions that miss an adequate interpretation of the science. We take care of the complex research, so it's easier for you to gain science-based knowledge and practical tools that will help you make a meaningful difference in other people's lives.

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About Dr Michelle de la Vega, Ph.D.

Michelle de la Vega (Ph.D.) is a research scientist and lead instructor at The Health Sciences Academy®. She specialises in the molecular biology and epigenetics of diseases like cancer, and has published 12 scientific studies in top peer-reviewed journals. During her lab work at the Harvard Cancer Center, Michelle compared the effects of nutritional compounds on normal cells and on cancer cells. In addition to teaching Nutrition for Cancer Prevention and Longevity to her students at The Health Sciences Academy, she continues conducting ground-breaking research, and is a lecturer at leading universities.



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Let's begin with an interesting statistic...

Did you know that 95% of us were born 'genetically healthy'?

We didn't inherit a predisposition for serious diseases like cancer, diabetes, or morbid obesity.

This means they're preventable.

But what if you're in that dreaded 5%, the high-risk group?

Well, even if you were to inherit genes that predispose you to disease, these don't determine the outcome.

On the other hand, even if you were born genetically healthy, you're not 'off the hook'.

Why?

We know that, in most cases, disease is developed as a result of the foods you eat, the air you breathe, environmental pollution, stress levels, over-exercise, lack of exercise, and many other factors...

...all of which have a direct impact on how your genes are expressed.

Because all these signals can switch your genes 'on' or 'off'.

Imagine that you do have genes that predispose you to certain health problems (like cancer, diabetes, or coeliac disease) – these signals can either keep them either dormant or active.

Welcome to the fascinating world of epigenetics!

The old notion that “inherited genes control your health” has been replaced by new epigenetic discoveries.

We’ll discuss what epigenetics is in a moment. But first, remember this...

Your genes can be switched ‘on’ or ‘off’.

Indeed, the expression of your genes can be modified.

And in this guide, I’m going to let you in on some of the remarkable discoveries I’ve seen in my +15 years of scientific work in the lab investigating epigenetics and how diseases develop.

So, what is epigenetics?

Epigenetics is the science of how environmental signals select, modify, and regulate your gene activity.

Do you realise how extraordinary this is?

Although you inherit your genes from mom and dad, environmental influences can regulate whether these genes are switched 'on' or switched 'off'.

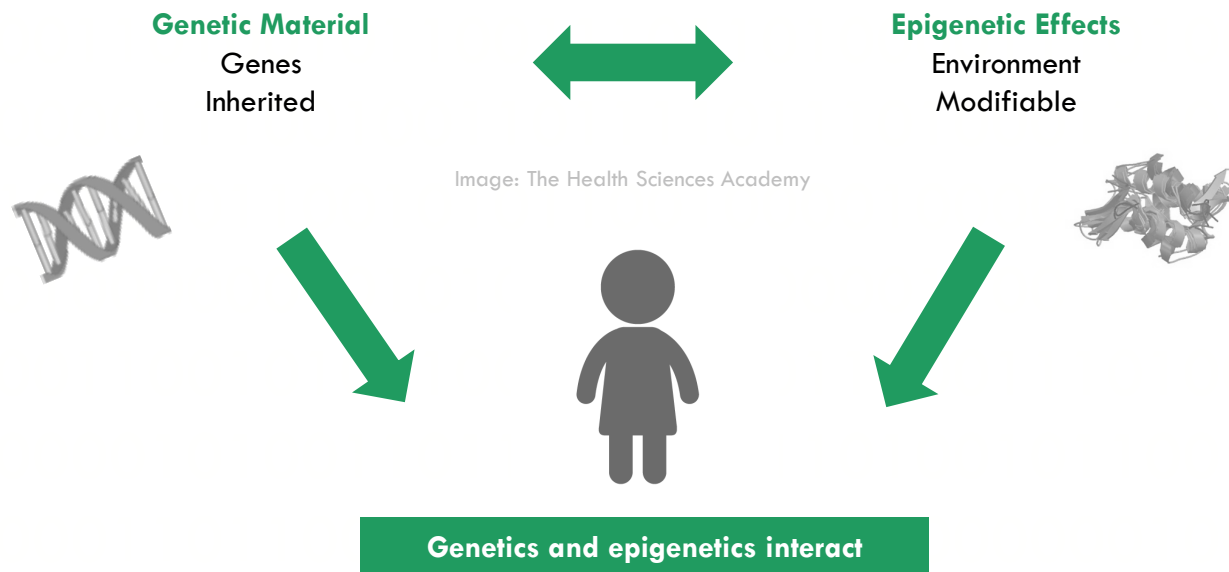
Sometimes switching genes 'on' is positive (for example, we want those anti-cancer genes active)...

But sometimes it is not (we don't want cancer-causing genes active!).

The same goes with switching genes off.

Did you notice how identical twins start to look different as they grow up and get older?

Their genetic codes are identical. But their gene expression is not.



For more than 15 years, I've been investigating how alterations in cells and DNA lead to disease.

First, my lab work at Harvard looked at how nutritional compounds changed gene expression on normal cells and on cancer cells.

During my Ph.D., I continued studying how epigenetic changes can regulate cancer.

Some changes may cause the cancer to metastasise (travel) to another site and set shop there.

Other changes may decrease the ability of a cancer cell to progress along the path from a benign cell to a malignant cell.

Malignant cancers are those which can be life-threatening, so we want to avoid them.

These days, nearly everyone knows someone who was diagnosed with cancer.

It may be a family member, a friend, or the barista at your favourite café.

It's a disease that affects everyone.

Did you know that 1 in 3 people are going to be diagnosed with cancer in their lives?

Would you like to learn how to minimise this risk? Or how to help your body fight cancer and increase your chances of being cancer-free?

This guide provides 3 steps to help with just that.

List **8** people you know (family, friends, co-workers, acquaintances):

- | | |
|----------|----------|
| 1. _____ | 5. _____ |
| 2. _____ | 6. _____ |
| 3. _____ | 7. _____ |
| 4. _____ | 8. _____ |

9. **YOU** _____

Data tells us that 1 in 3 of us will be diagnosed with cancer. So 3 of these people will possibly get cancer at some point in their life.

Who will it be? A family member? A friend? Or maybe it will be you.

(I sincerely hope none.)

90-95% of all cancers are due to diet and lifestyle factors, like poor nutrition or tobacco smoking.

These are factors that we have control over on a day to day basis.

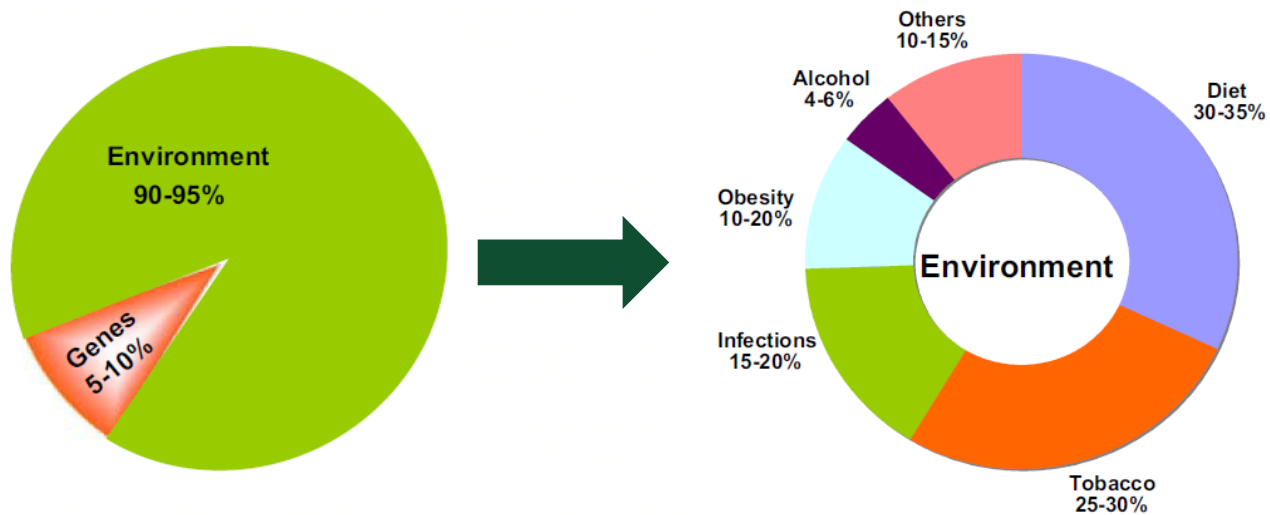


Image Data: Arand et al, 2008

There are over 200 different subtypes of cancer.

And they are not created equal in regard to what their risk factors are.

Poor diet increases risk for 75% of prostate cancers, 70% of colorectal cancers, but only 20% of lung cancers. Other factors (some lifestyle-linked, some genetic) account for the rest of the cancers.

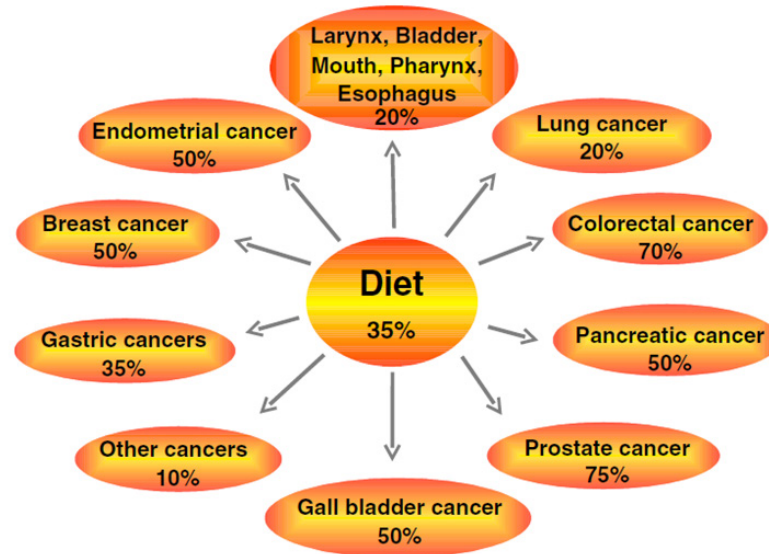


Image Data: Arand et al, 2008

Most cancers can be **PREVENTED** with diet and lifestyle changes.

This means that you can indeed reduce your risk of getting cancer through your daily habits. The earlier we make these changes, the better.

Although it's never too late to change. For example, within **JUST** one month of stopping smoking, individuals have increased lung function, improved circulation, and reduced heart-attack risk.

Dietary changes also modify how our body functions.

Some of the changes might be **visible** (like losing body fat or clearer skin), while others might only be observed with a **microscope** (like better immunity).

Think of the list of people you made.

Remember you learned that **3** of them might be diagnosed with cancer at some point in their lives?

However, with good prevention strategies, only **1** of them might be diagnosed with cancer.

So do you want to decrease your risk of being diagnosed and defy the stats?

Or have you been diagnosed and want to help your body fight those cancer cells?

There are ways to do this through diet and lifestyle habits. I'll teach you some of the main steps in this guide.

Then, as you help yourself, **help others around you to also decrease their risk of cancer.** Promise?

I want to share with you some things I've discovered that will open your eyes. And how even small tweaks in your life can have a huge impact on your health.

The goals are...

- ❖ **For those who have not been diagnosed with cancer:** minimise your risk of being diagnosed with cancer
- ❖ **For those diagnosed with cancer:** work alongside with therapies to increase their efficacy
- ❖ **For those in remission:** help your body to keep healthy and cancer-free
- ❖ **For everyone:** build resilience and slow down the ageing process so you can enjoy a long, youthful life

You have far more control than you imagine over your gene expression and your health destiny.

You can **use your diet** as a means to prevent disease, become healthier, increase your lifespan, and feel better.

And even in the rare case where you do inherit an unwanted gene variation that predisposes you to a disease like cancer, it does not necessarily mean that this gene will be switched on.

Many people carry an adverse gene mutation all their lives without it ever being activated!

That's why protective tools like your diet can literally save you.

So even if you have genes that predispose you to cancer, you can keep them inactive or counteract their activity by improving your nutrition, your habits, and how you live.

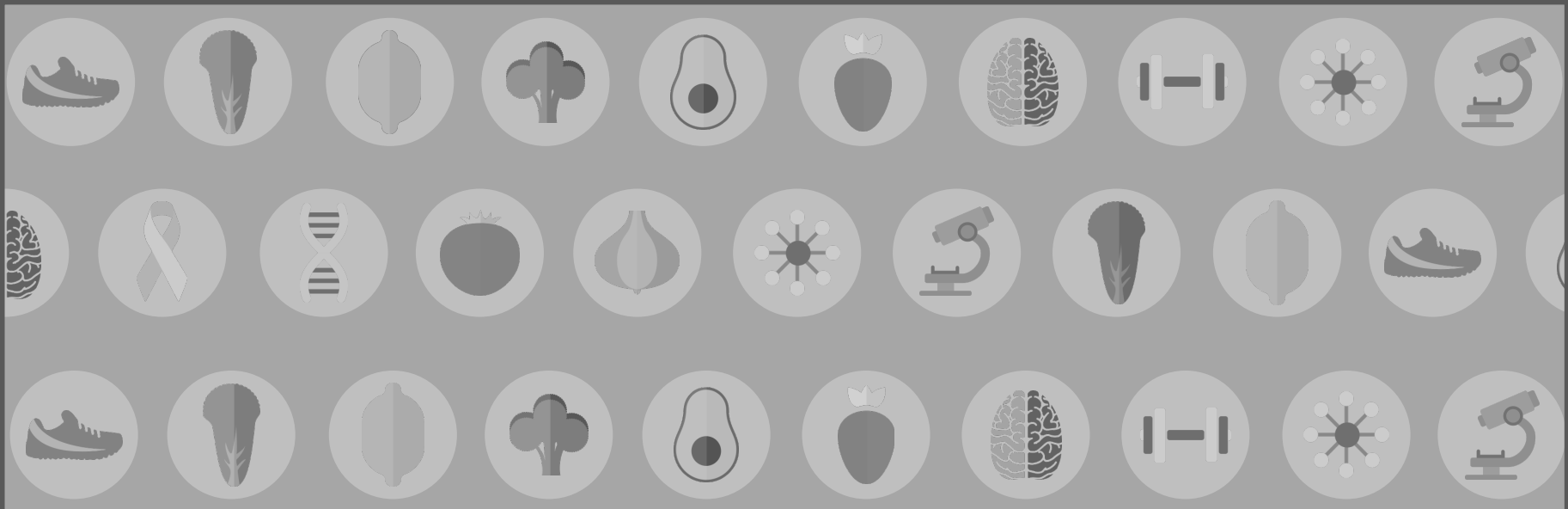
To see how, here are some key practices you can implement starting today.

The 3 steps I'll share with you in this guide are nothing new and nothing profound.

They are easy, simple steps that everyone can take.

But, surprisingly, they are not things that you will routinely hear from your doctors.

Let's begin...



Step 1

FOOD TO GENES

Cancer cells tend to have certain epigenetic changes that aren't present in normal cells.

These changes may:

- ❖ turn a normal cell into a cancer cell
- ❖ increase the progression of the disease
- ❖ help cancer cells to spread to a new location

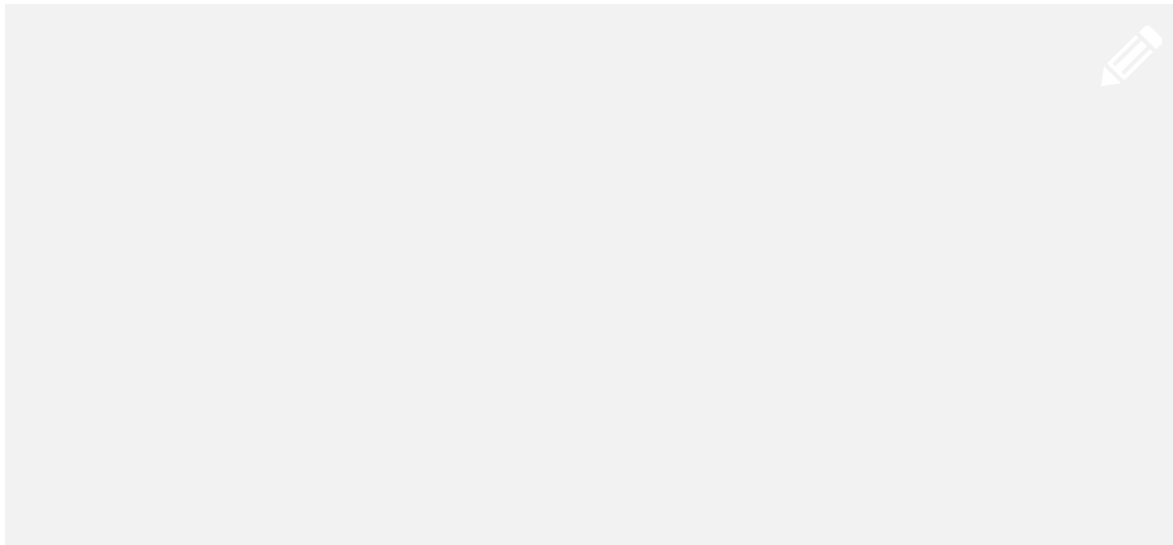
Did you know that certain foods, like highly-processed fatty meats, contain chemicals that **alter our DNA and cause mutations**, speeding up the process that leads to cancer?

Or that green leafy vegetables (like spinach) can help **amplify favourable epigenetic changes** that decrease your cancer risk?

Plant foods are high in phytochemicals that help repair damaged DNA and promote desirable epigenetic changes inside your cells.

A healthy diet should contain at least 5 portions of fruits and vegetables each day. But **more is better!**

Which fruits and vegetables have you consumed in the last 24 hours? List them here:



10 epigenetic fruits and vegetables to include in your next shopping trip:

1. Spinach
2. Kale
3. Bok choy
4. Broccoli
5. Watercress
6. Pumpkin
7. Blackberries
8. Strawberries
9. Oranges
10. Grapefruit

Additional ideas:

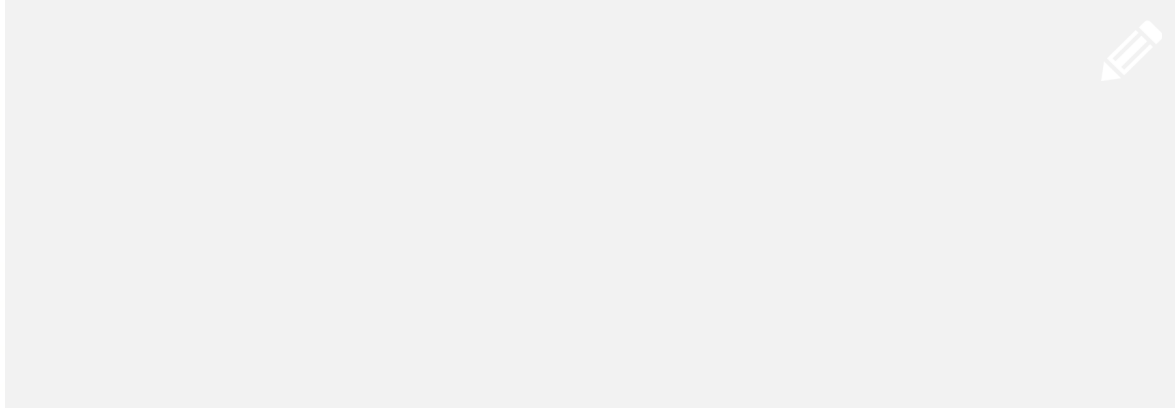
Add garlic and turmeric (also called curcumin) to your meals when cooking.

Garlic compounds are known to switch on certain genes called “tumour suppressor genes”, which help to stop cancer cells from growing – and tell them to die instead!

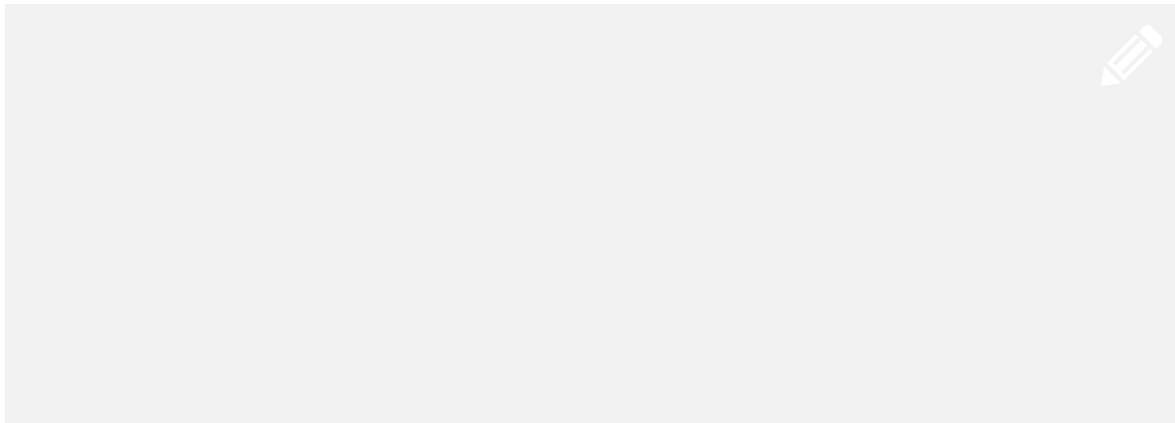
The spice **turmeric**, which I’ve extensively studied in the lab at the Harvard Cancer Center, gives your immune system an extra boost, helping it to fight off potential cancer cells and genotoxins in your body.

When cooking with turmeric, mix it with **black pepper** or a little bit of **olive oil** to help your body best use it.

Which of your meals could you add garlic to?

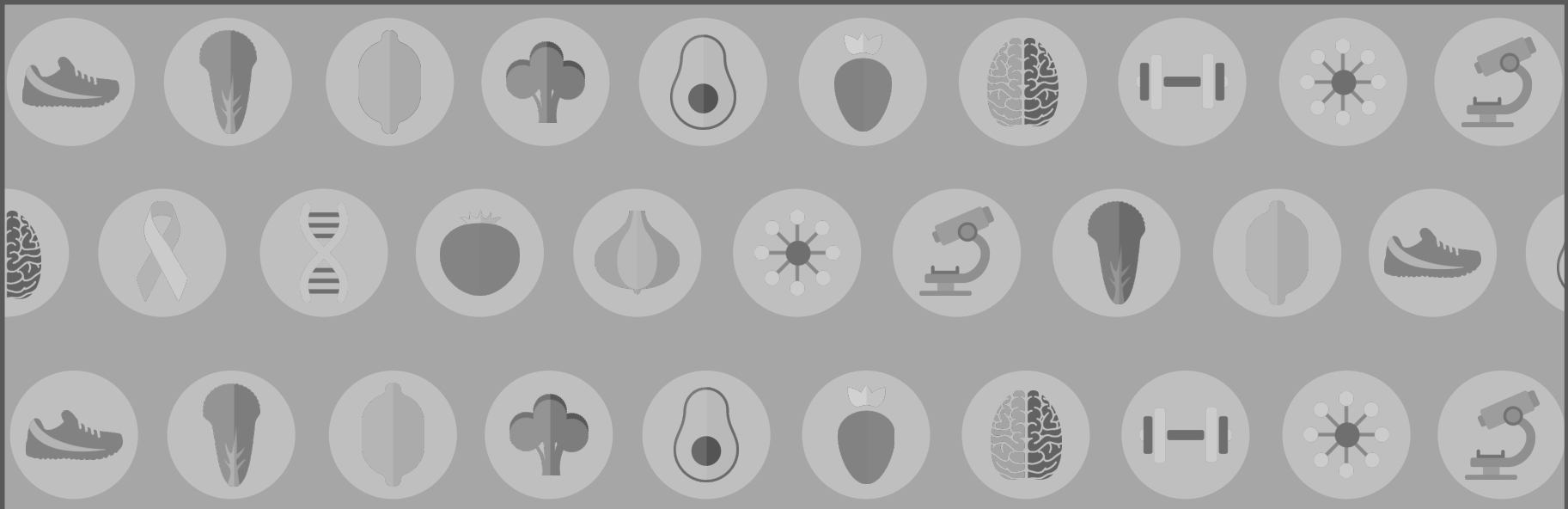


Which of your meals could you add turmeric to?



10 more epigenetic foods to include in your next shopping trip:

1. Garlic
2. Turmeric
3. Ginseng
4. Cayenne pepper
5. Carrots
6. Red grapes
7. Sunflower seeds
8. Kidney beans
9. Tomatoes
10. Olive oil



Step 2

SWEAT TO GENES

I'm sure you have noticed that your heart rate goes up when you exercise.

Even just getting out of bed and walking to the bathroom to brush your teeth increases your pulse a bit.

This is because exercise and motion increases blood flow through your muscles.

Your muscles are made up of cells. And these cells are changing and working differently when you exercise compared to when you are relaxing or reading a book.

But it is not just the muscle cells that are changing: **most cells in your body are affected in some way when you exercise!**

Just like with food, exercise also regulates epigenetic changes in your body.

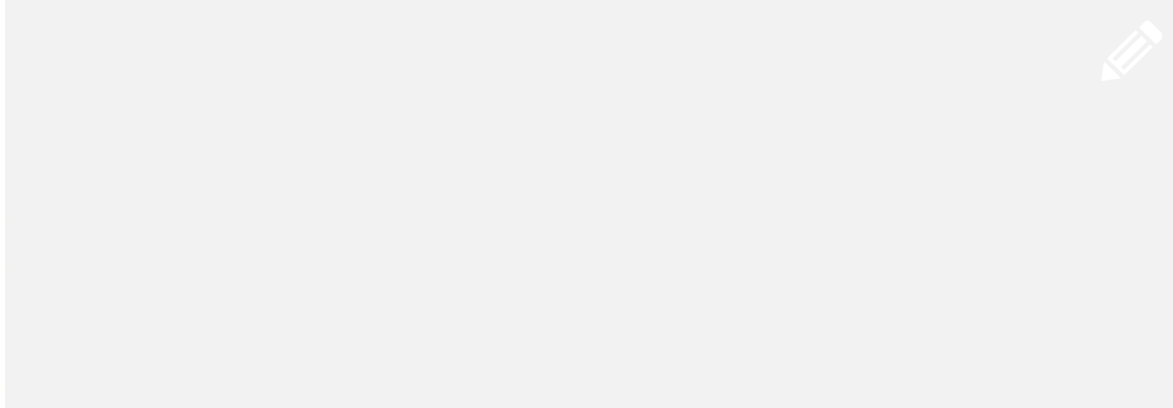
In normal cells, exercise keeps these changes in check, making sure the right changes happen at the right time.

In addition, physical activity can reduce and even reverse some of the epigenetic changes that occur in cancer cells!

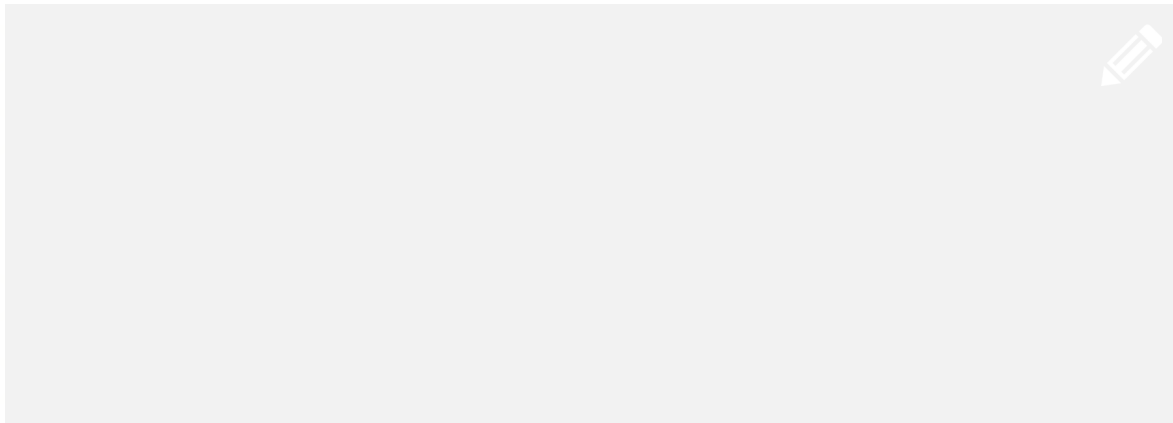
Guidelines suggest that adults get 150 minutes per week of moderate exercise PLUS strengthening exercise on 2 or more days a week.

An alternative is to perform 75 minutes per week of intensive exercise PLUS strengthening exercise on 2 or more days a week.

How much exercise do you currently do in a week?



How much exercise should you be doing in a week?



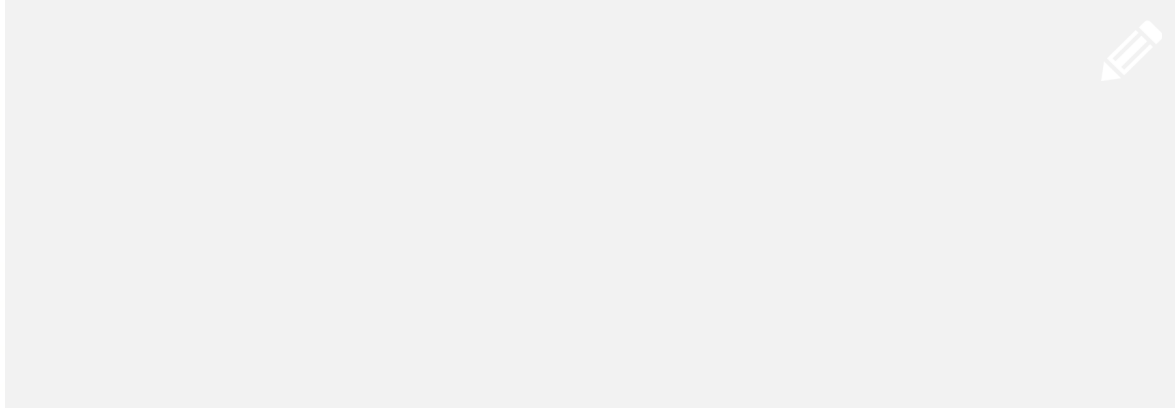
Which types of physical activity do you do, how many times per week, and for how long?

Activity	Times per week	Duration

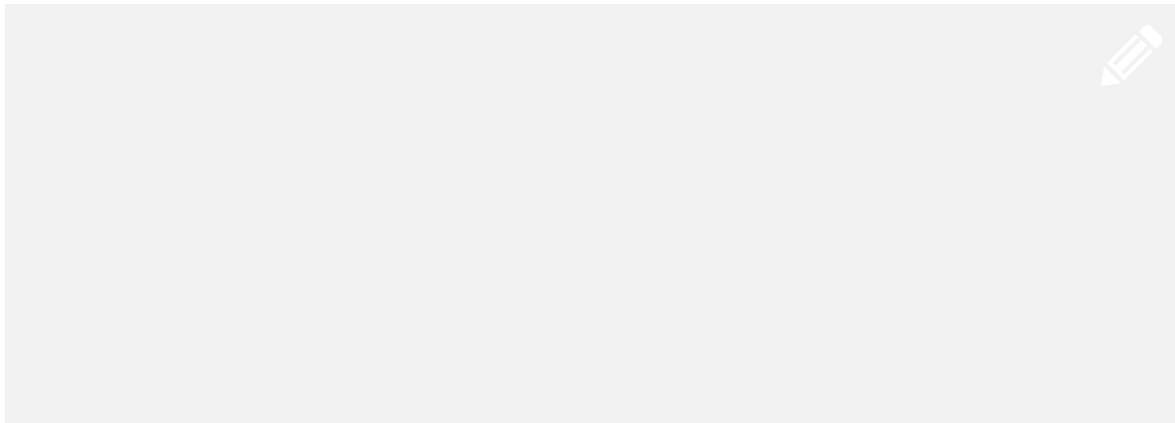
Here are 10 fun activities to try (we're leaving out common ones like running, biking, and weights):

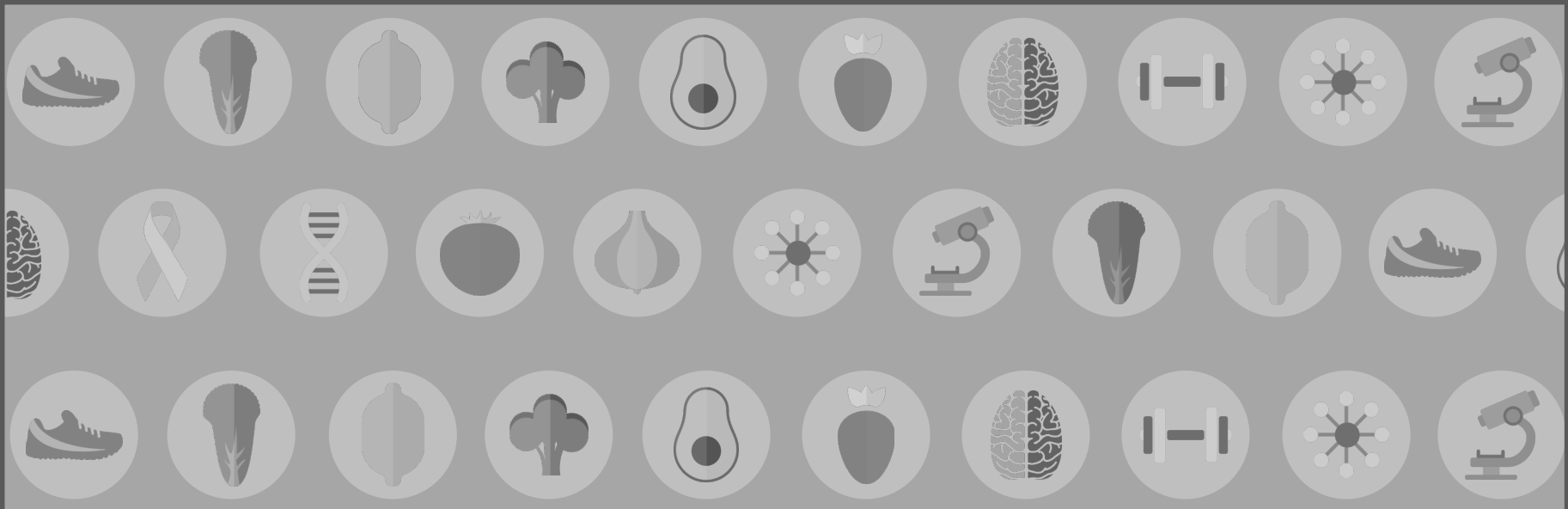
1. Hiking/geocaching
2. Roller blading
3. Skate boarding
4. Swimming
5. Gardening
6. Martial arts
7. Dancing
8. Parkour
9. Trampoline jumping
10. Rock climbing

Which new activities would you like to try?



What other fun ways to exercise can you think of?





Step 3

MIND TO GENES

Stress, especially chronic stress, can speed up the rate at which your cells divide. This means that there may be more mutations in the DNA leading to cancer.

Think of this as typing faster on your phone where you might make more mistakes.

However, by relaxing your mind, you can help reduce stress, promote positive epigenetic changes, and decrease your cancer risk.

In a pioneering Harvard experiment conducted a while ago, participants did relaxation activities like yoga, meditation, prayer, or mindful breathing for just 20 minutes a day (Dusek et al., 2008).

The researchers took blood samples before and after 8 weeks, and compared them to those who didn't do any of the relaxation activities.

They noticed that 2,209 genes responsible for the ageing process were switched on or off.

Specifically, 1,561 genes were expressed differently in the group who did the 8-week meditation training.

Some of these 'deactivated' genes are the same genes that may increase cancer risk.

This means that for just 20 minutes a day, across 8 weeks, you can decrease your cancer risk by relaxing the mind.

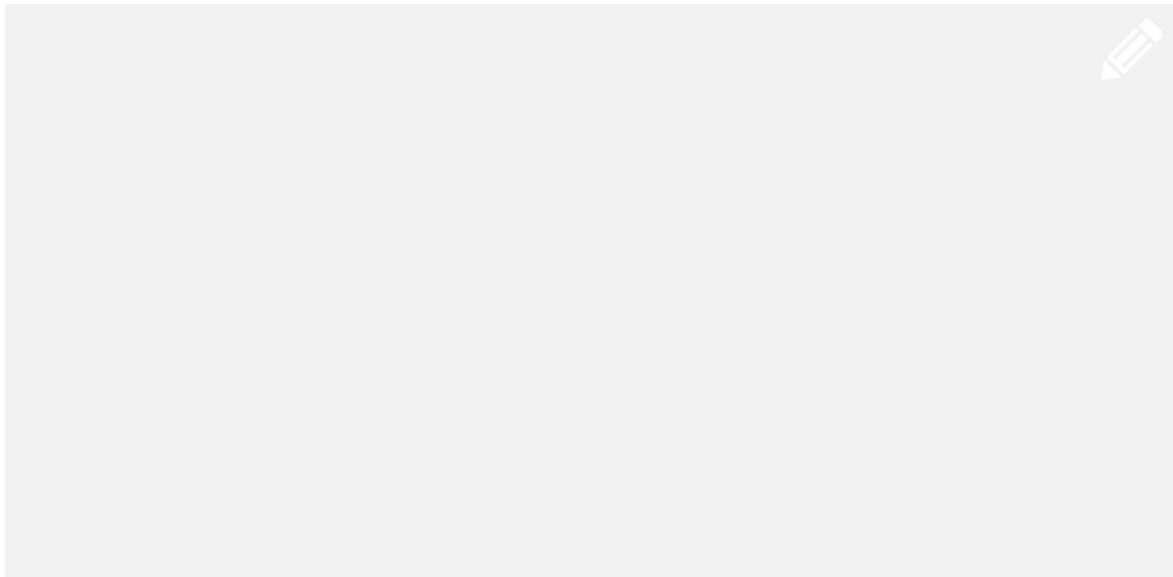
I think that it's worth the time.

How about you?

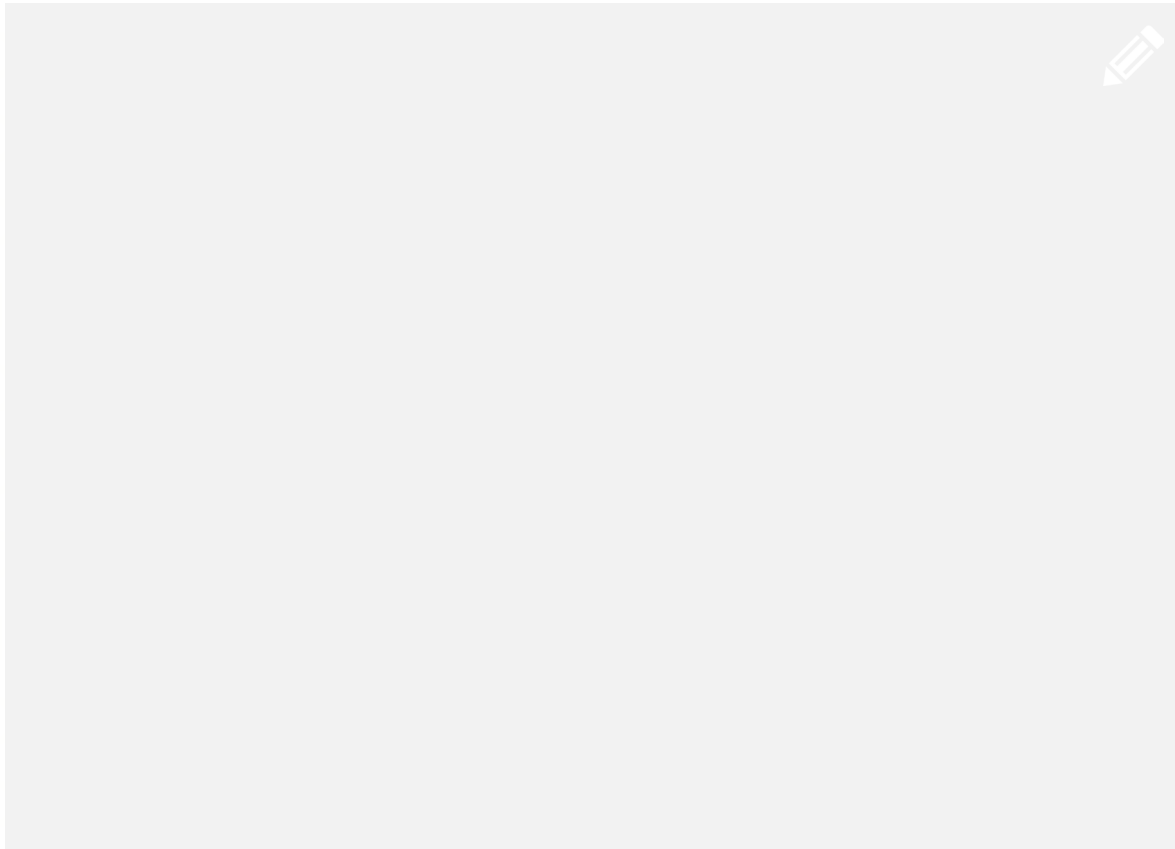
On a scale of 1 to 10 (1 being the lowest and 10 the highest), how stressed are you?

1 2 3 4 5 6 7 8 9 10

What are some of your main sources of stress?



Can you think of any ways to decrease how much stress you have in your life? List everything you can think of:



There are many way to decrease your stress levels.

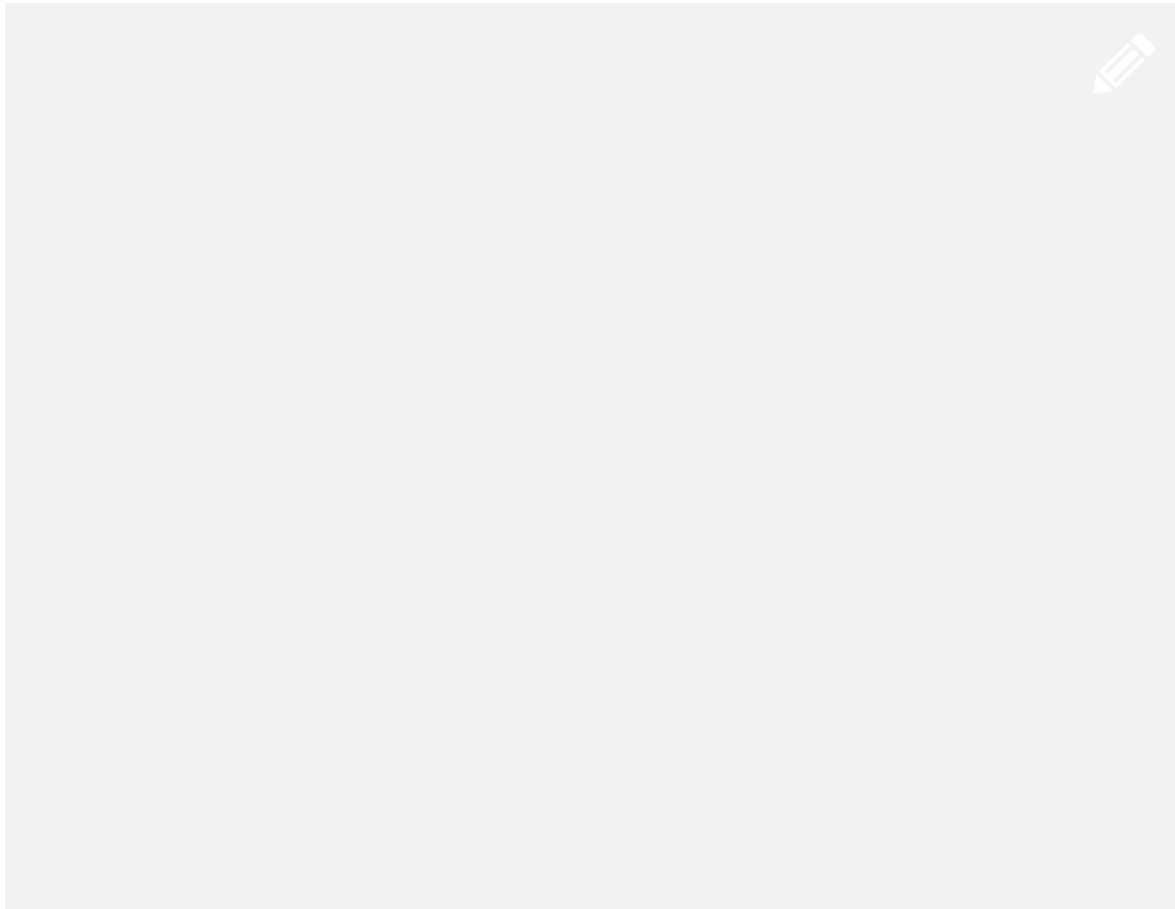
The next time you feel yourself getting overwhelmed with worry or fear, try one of these methods:

- ❖ **Breathe in for a count of 4** and then breathe out for a count of 4. Repeat this 10 times (or more if needed).
- ❖ **Place a hand on your belly** (right below your ribs) and take a deep breath making sure that your diaphragm (where your hand is located) is inflating and emptying. Continue doing this for a couple of minutes (or longer if you need to).
- ❖ **Inhale for 4 seconds**, hold your breath for 7 seconds, exhale for 8 seconds. Repeat this 10 times (or more if needed).

In which situations do you think you could use these relaxation methods?

- Before a work meeting
- Your commute to/from your work place
- Trying to meet a deadline
- Running errands
- Waiting in line
- At the start of (or anytime during) an argument
- Losing patience with children
- Receiving bad news
- Making a large purchase (like buying a house)
- Going to the doctor

Can you think of other times when you might want to try these methods? List any you can think of:



Did you know that foods can help lower oxidative stress in your body?

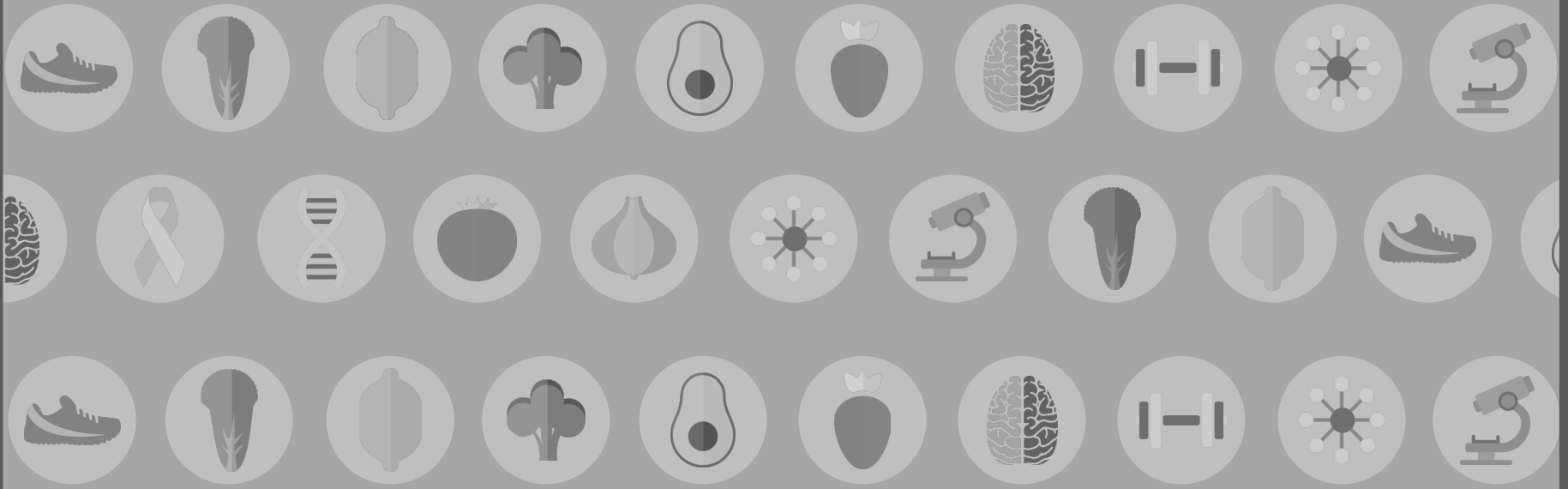
Add these foods to your shopping cart!

1. Kiwi
2. Grapefruit
3. Tangerine
4. Lemon
5. Asparagus
6. Avocado
7. Cantaloupe melon
8. Blueberries
9. Dark chocolate
10. Green tea

STILL READING?

Since you're reading all the way to the end, let me share with you my **bonus tip**, which has helped me, my family and my friends.

I know that if you do this, then you're on your way to helping yourself **become healthier and happier**.



BONUS

TIP

Bonus tip: Mix and match.

You need to combine these different epigenetic steps and personalise things.

Each body is different. Explore what works best for yours.

Find what you enjoy.

Whether it's new foods, a different activity, or stress-reduction techniques.

Eat your fruits and vegetables. Work up a sweat every now and then. And remember to breathe.

Use this guide to plan your next action steps!

Conclusion.

Starting today, you can concentrate on improving these 3 types of epigenetic signals: the foods that you eat, moving your body, and relaxing your mind.

When others notice the changes you are making, tell them why.

You now know that thanks to beneficial epigenetic adaptations it is possible to help prevent, speed recovery, or stay in remission of cancer.

But just be warned...

Once those around you start seeing your changes, they will start asking for advice... and **you might just become their source of inspiration!**

STUDY ONLINE

Nutrition for Cancer Prevention and Longevity™ course

The science-based course to increasing
your chances of preventing cancer and
slowing down the ageing process.

Taught by our own scientists.

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