

Neuronutrition for optimal brain function How to prevent burnout?

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What is burnout ?

- **Burnout** seems to have become a mass phenomenon, receiving constant media attention. More and more people are missing work due to burnout.
- The term burnout was first used by psychologist Herbert Freudenberger in the 1970s and describes **a state of exhaustion** that comes from continuous stress and exertion without a sufficient resting period for recovery

What is burn out ?

- Surprisingly, there is no clear definition of what burnout really is
- There is actually *no formal definition* or diagnostic criteria unlike mental illnesses like depression

What are the symptoms of burnout ?

- Burnout is considered to have a **wide range of symptoms**. There is no general agreement about which of those are part of burnout and which are not.
- But all definitions given so far share the idea that the **symptoms are thought to be caused by work-related stress**

What are the symptoms of burnout ?

Burnout is a state of **chronic stress** (mostly work-related) that leads to

- **Physical and emotional exhaustion**
- **Loss of enjoyment and motivation; frustration, isolation, pessimism, cynicism**
- **Lack of productivity and poor performance, increased irritability**

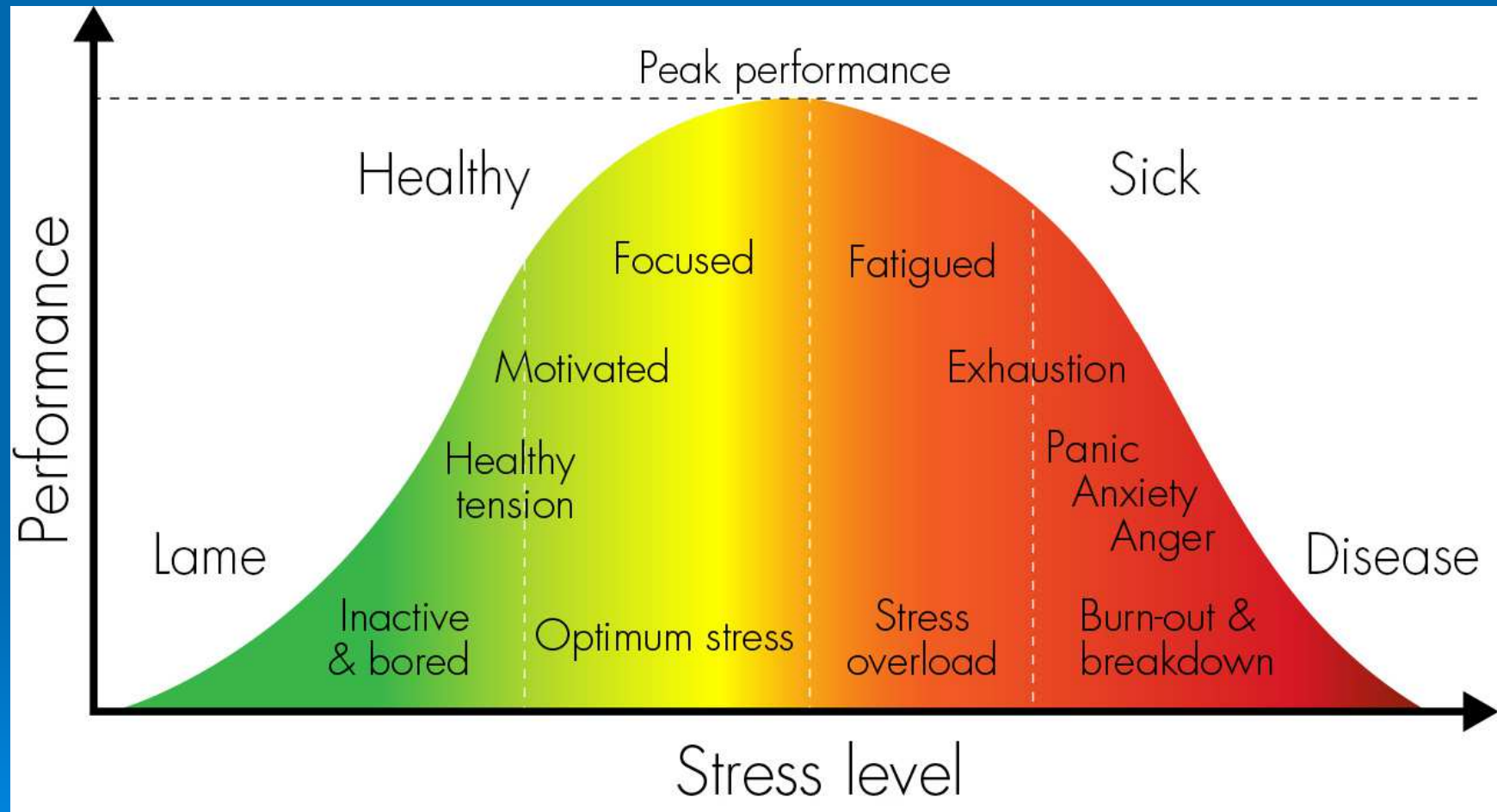
What is the difference between burnout and depression ?

- Many symptoms are **similar** : exhaustion, feeling down, reduced performance...
- In **burnout**, most of the symptoms are **work** related
- In **depression**, negative feelings and thoughts concern **all areas of life**.
- People with burnout do not always have depression. But **burnout may increase the risk of getting depression**

What is stress ?

- The process by which we perceive and respond to certain events, called **stressors**, that **WE APPRAISE** as threatening or challenging
- The human body strives to maintain a constant internal environment : homeostasis
- In presence of a **stressor**, the body reacts to return to **homeostasis**

Performance vs stress

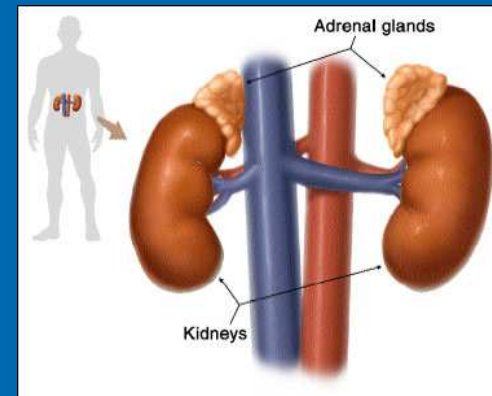


How we adapt to stress

- Body's adaptative physiological response, involving two main systems :

Adrenal hormones

Neurotransmitters



- In case of stress, our physical capacities are multiplied by 10, but our intellectual capacities are reduced

How we adapt to stress

General Adaptation Syndrome (Dr Selye)

Three stages : alarm reaction, resistance, and exhaustion

Alarm reaction :

- The immediate response to a stressor
- The body mobilizes internal systems and processes to minimize the threat to homeostasis
- Fight or flight response - Adrenaline and cortisol

How we adapt to stress

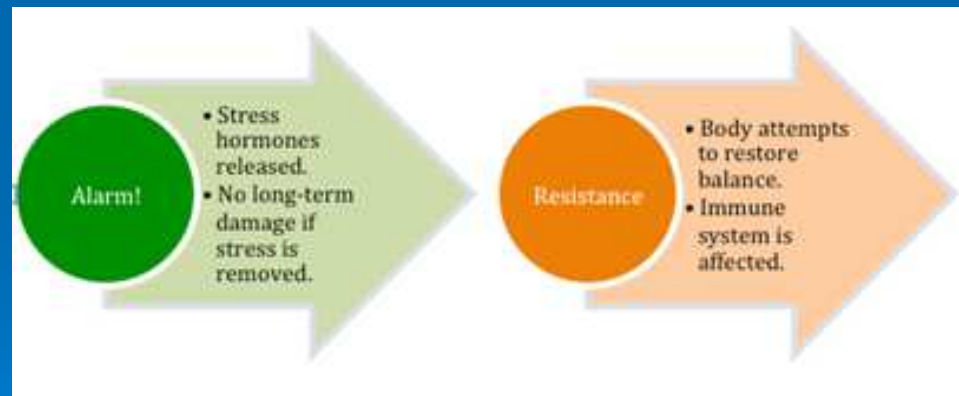
Alarm reaction :



How we adapt to stress

➤ Resistance

- As the stressor continues, the body uses reserves to maintain homeostasis



How we adapt to stress

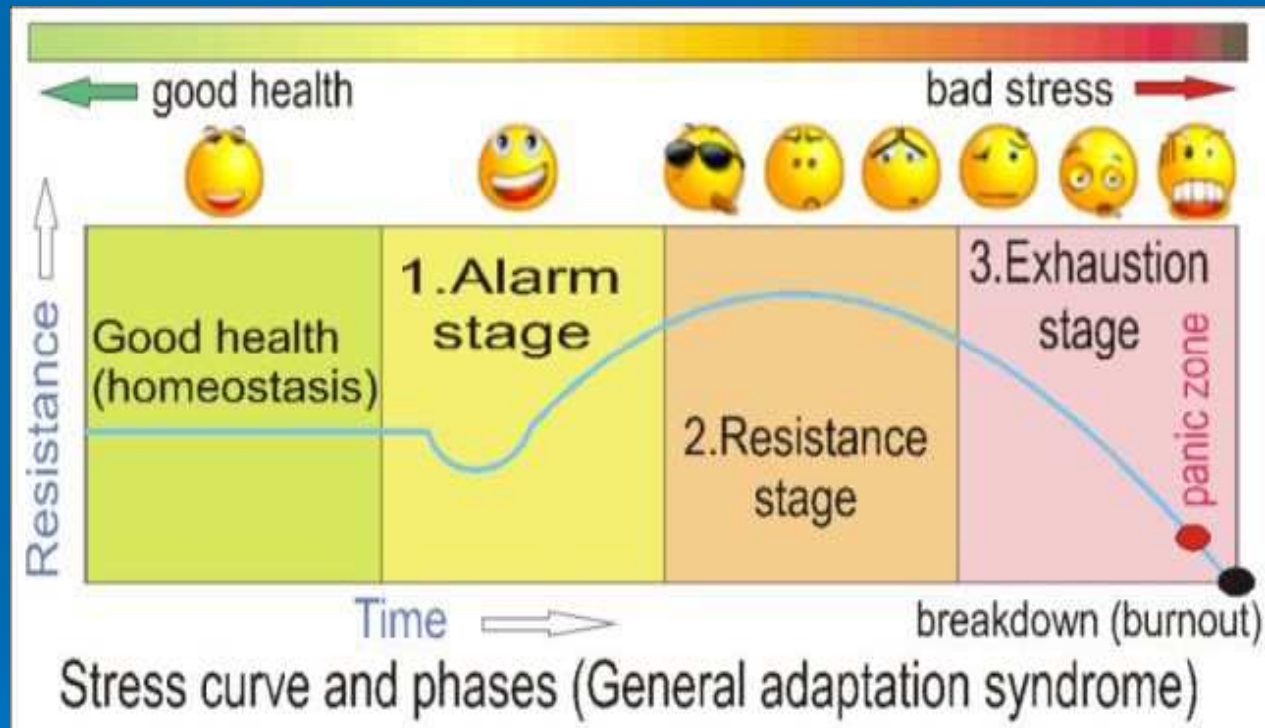
➤ Exhaustion

- The body spends its limited reserves and loses its ability to cope
- The body functions at a diminished capacity while it recovers from stress
- If chronic stress persists, immune function is compromised, tissues are damaged with health problems



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How we adapt to stress

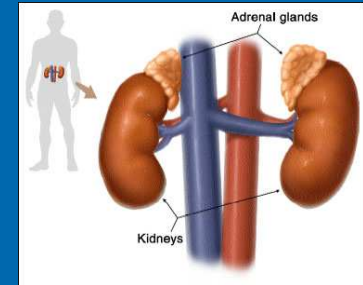


The third stage (exhaustion) = burnout and adrenal fatigue

Burnout

- Two main systems involved:
 - Cortisol
 - Neurotransmitters
- Burnout : drop of both systems
- Activity and levels of cortisol, insulin, and neurotransmitters are regulated by body clocks (chronobiology)
- The good news : these rhythms can be regulated with a **chrononutrition** menu

Cortisol

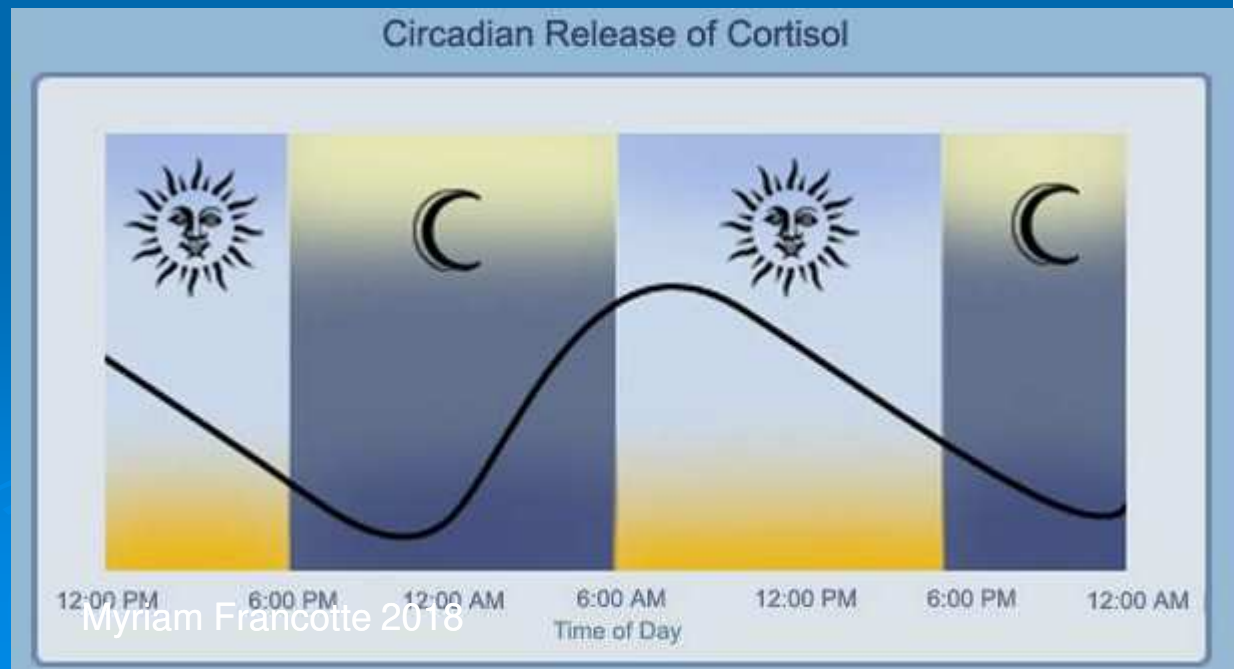


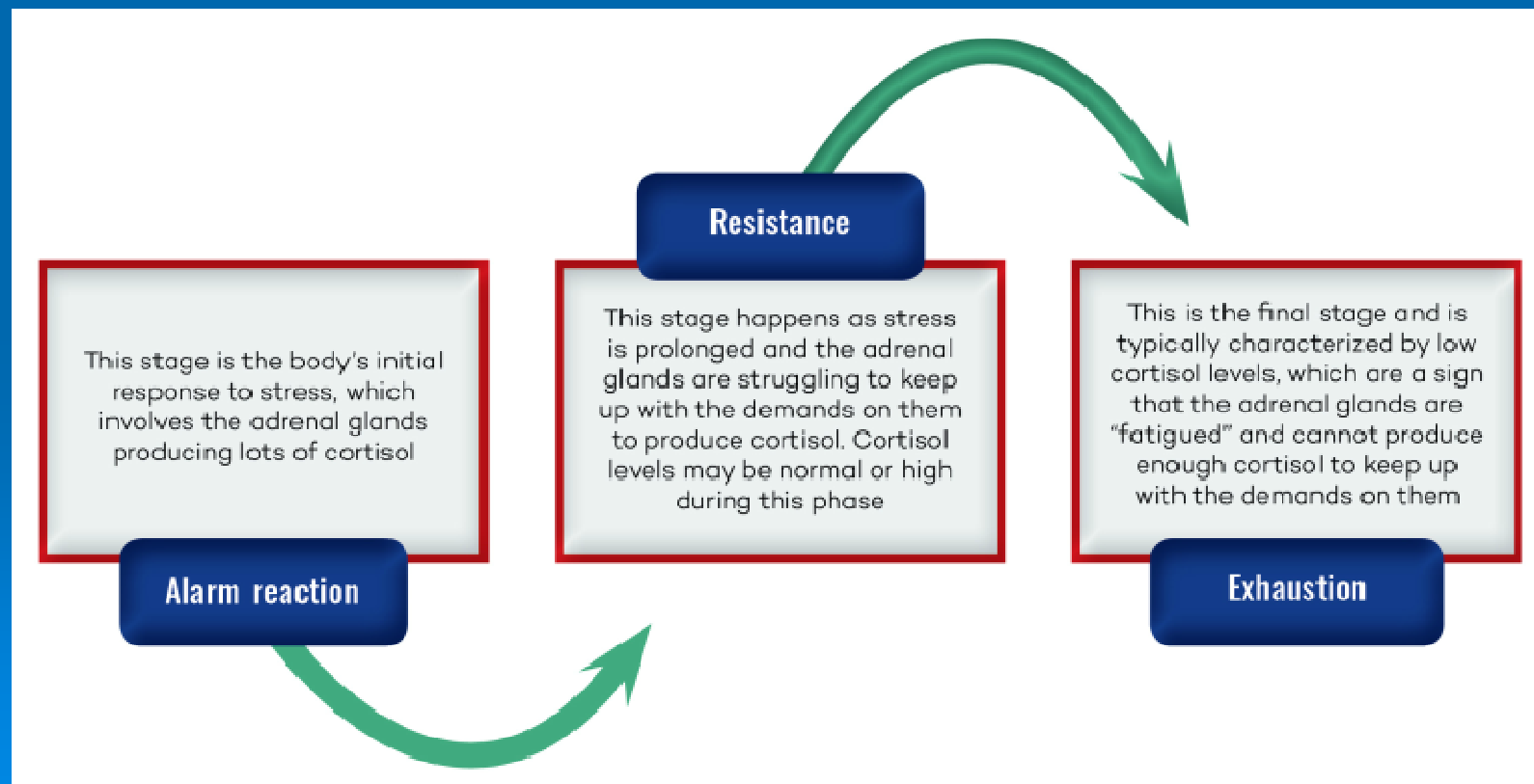
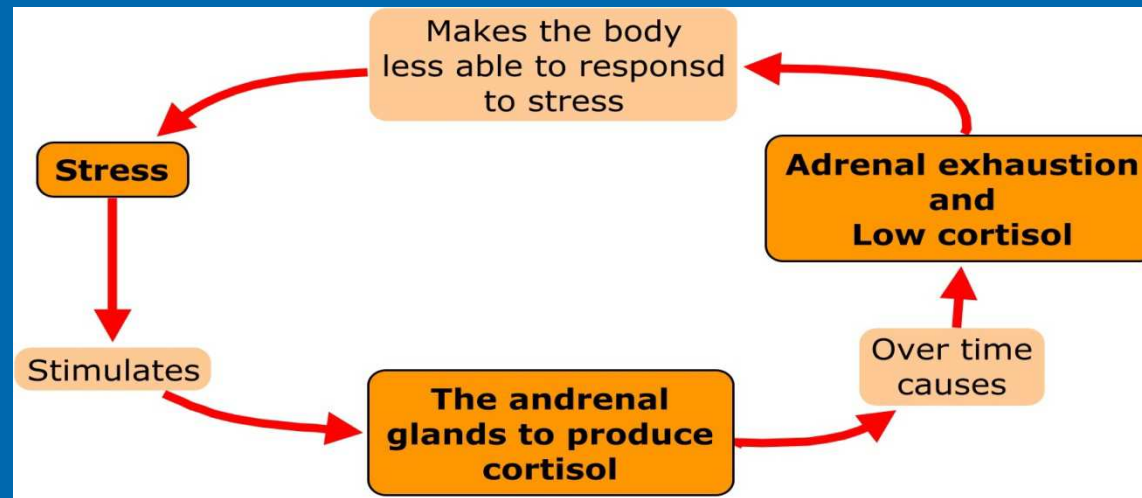
- Cortisol is a **stress hormone** released by the **adrenal** glands
- Aids metabolism of fats, proteins, carb's and increases glucose levels in the blood providing additional energy for muscles
- That is helpful in the short term (it acts to restore homeostasis)
- Harmful in the long-term (weakens the immune system)

3 properties of cortisol that keep us alive

- **Increases blood sugar**, thus energy and blood pressure
- **Neutralizes inflammation** (it's the body's strongest anti-inflammatory), thereby enhancing mood, dynamism, work capacity, stress resistance
- **Calms excessive activity** of the sympathetic nervous system that produces **adrenaline**, the stimulating neurotransmitter responsible for emotional outbursts

- The cortisol levels are **highest** in the **morning** (6 AM - 8 AM) to wake us up, so sunshine, activity and a bite of food stimulates cortisone production
- Cortisol is **lowest** in **evening** to prepare us for sleep.

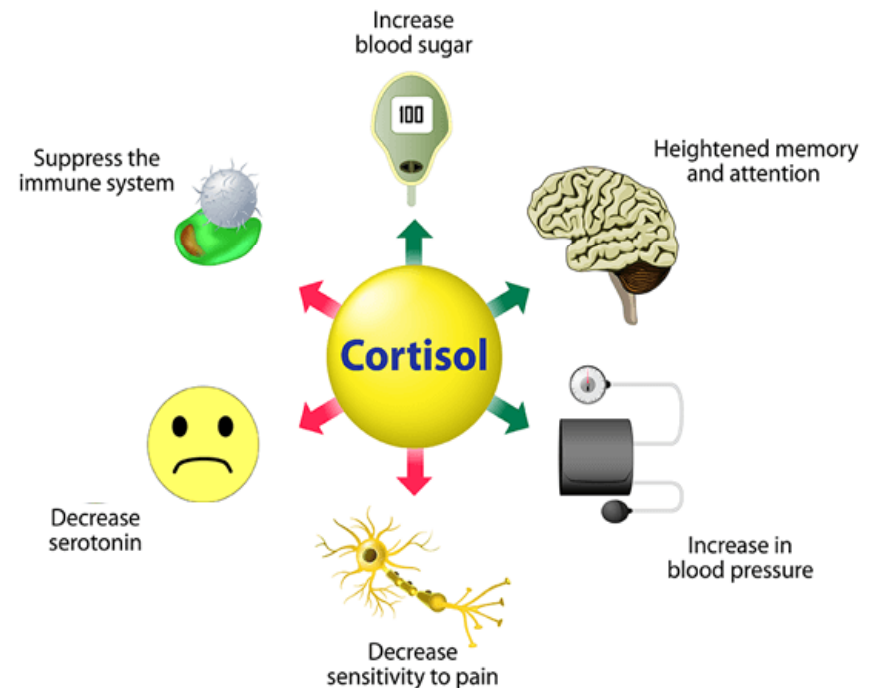




High cortisol (resistance phase)

Symptoms of High Cortisol Levels

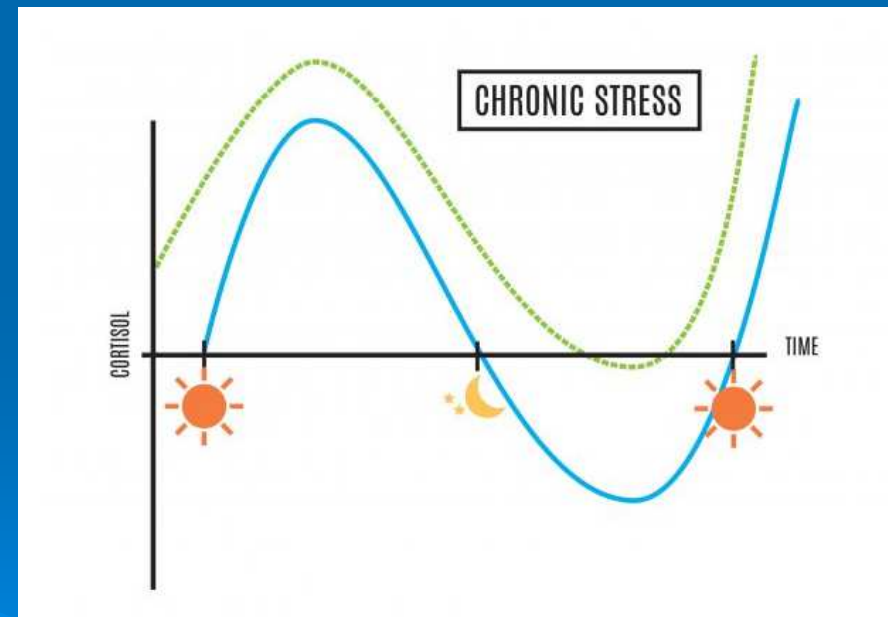
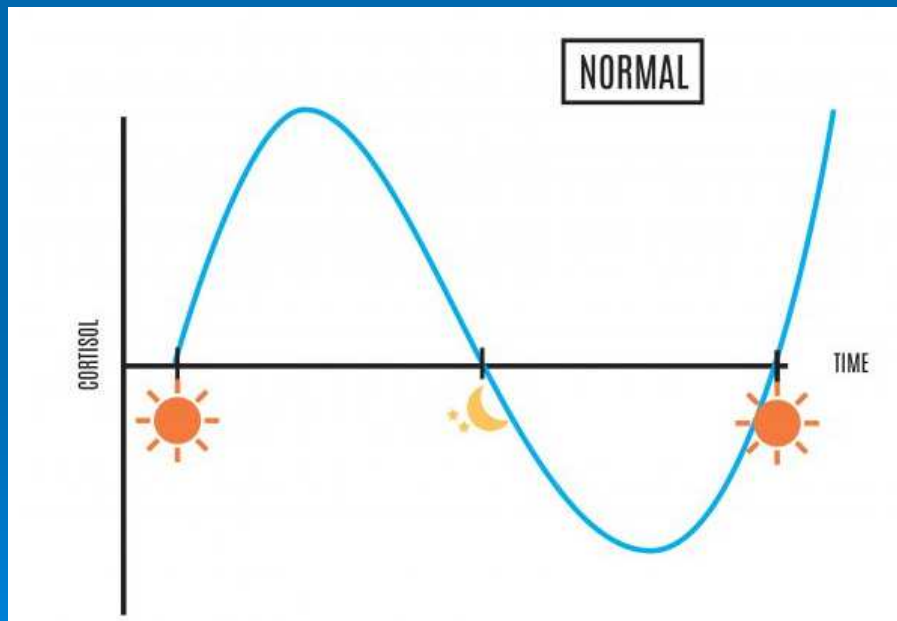
- Wired or fatigued
- High blood pressure
- Hyperglycemia
- Worsening memory and concentration
- Difficulty sleeping (insomnia)
- Decreased sex drive
- Erectile dysfunction
- Weight gain and obesity
- Weakened immune response



High cortisol

- Cortisol too high causes sleep disorders

Daily fluctuations of cortisol



High cortisol

- Cortisol too high causes weight gain (insulin resistance)



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Low cortisol (exhaustion phase)

- Anxiety, depression, confusion
- Poor resistance to stress, extreme **fatigue**
- **Excessive emotions**, panic attacks
- Thin, underweight, difficult to gain weight
- Sometimes obesity because of sugar and salt cravings
- **Inflammatory** diseases (acute-allergies, conjunctivitis, otitis, rhinitis, pharyngitis, asthma, food allergies).
- **Prone to bacterial and viral infections.**



Adrenal fatigue

Symptoms

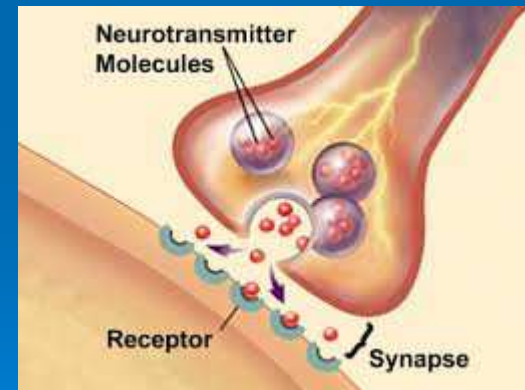


- Fatigue**
- Crash of energy**
- Reliance on caffeine**
- Frequent lengthy infections**
- Lightheadedness**
- Racing mind at bedtime**
- Waking up in the middle of the night**
- Low blood sugar**
- Craving salty foods**
- Craving carbs**
- Anxiety**
- Weight gain**
- Brain fog**
- Darkened pigmentation around the eyes**
- Joint pain**
- Constant stress**
- Hair loss**
- Depression**



Neurotransmitters

- The brain is made of 100 billion of nerve cells (neurons)
- These neurons communicate with each other via **chemical messengers** called neurotransmitters
- Neurotransmitters regulate your mood, motivation, appetite, sleep....
- Many are made from **essential amino acids from nutrients (proteins)** in our diet.



The main neurotransmitters

DOPAMINE

Initiation of action



NORADRENALINE

Continuation of action



GABA

Anti-anxiety

SEROTONIN

Brake



MELATONIN

Sleep



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ACETYLCHOLINE

Memory

Made from diet proteins

Dopamine : The motivation molecule

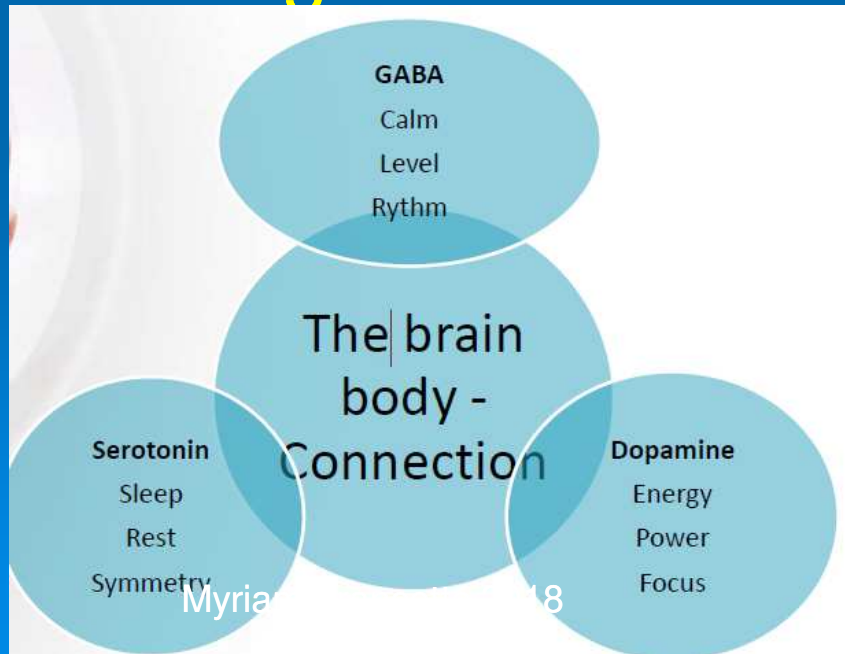
- Dopamine is pleasure and reward neurotransmitter
 - Energy, power, focus, motivation/drive
- Low levels : apathy, low energy and motivation, low libido, difficulty to wake-up, weight gain, need for carbohydrate, sugar and caffeine
- Dopamine is precursor for noradrenaline
- Synthesized from tyrosine (phenylalanine)

Serotonin : The happiness molecule

- Neurotransmitter associated with feelings of well-being and happiness
- Also regulates sleep and appetite
- Low serotonin : depression, sadness, anxiety in typical low stress situations, impatience, irritability, impulsivity, sleep disorders, eating disorders (strong sugar cravings)
- 90% serotonin located in the gut
- Synthesized from tryptophan

GABA : The zen molecule

- Associated with relaxing, anti-anxiety effects
- « nature's valium »
- Synthesized from **glutamine**



Acetylcholine : The molecule of Memory and Learning

- Important for memory and general mental ability
- Reduced levels : memory loss, decreased cognitive functions
- Deficiency : Alzheimer disease
- Synthesized from **choline** (best source : egg yolk)

Nutrition for optimal brain function

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Feeding our brain

- **Nutrient-rich food** (local, seasonal products – organic)
- **Macronutrients** : proteins, lipids, sugars : building blocks for neurons, fuel...
- **Specific micronutrients** : vitamins, minerals : cofactors, biochemical reactions
- Need for **optimal digestion** and **nutrients assimilation**

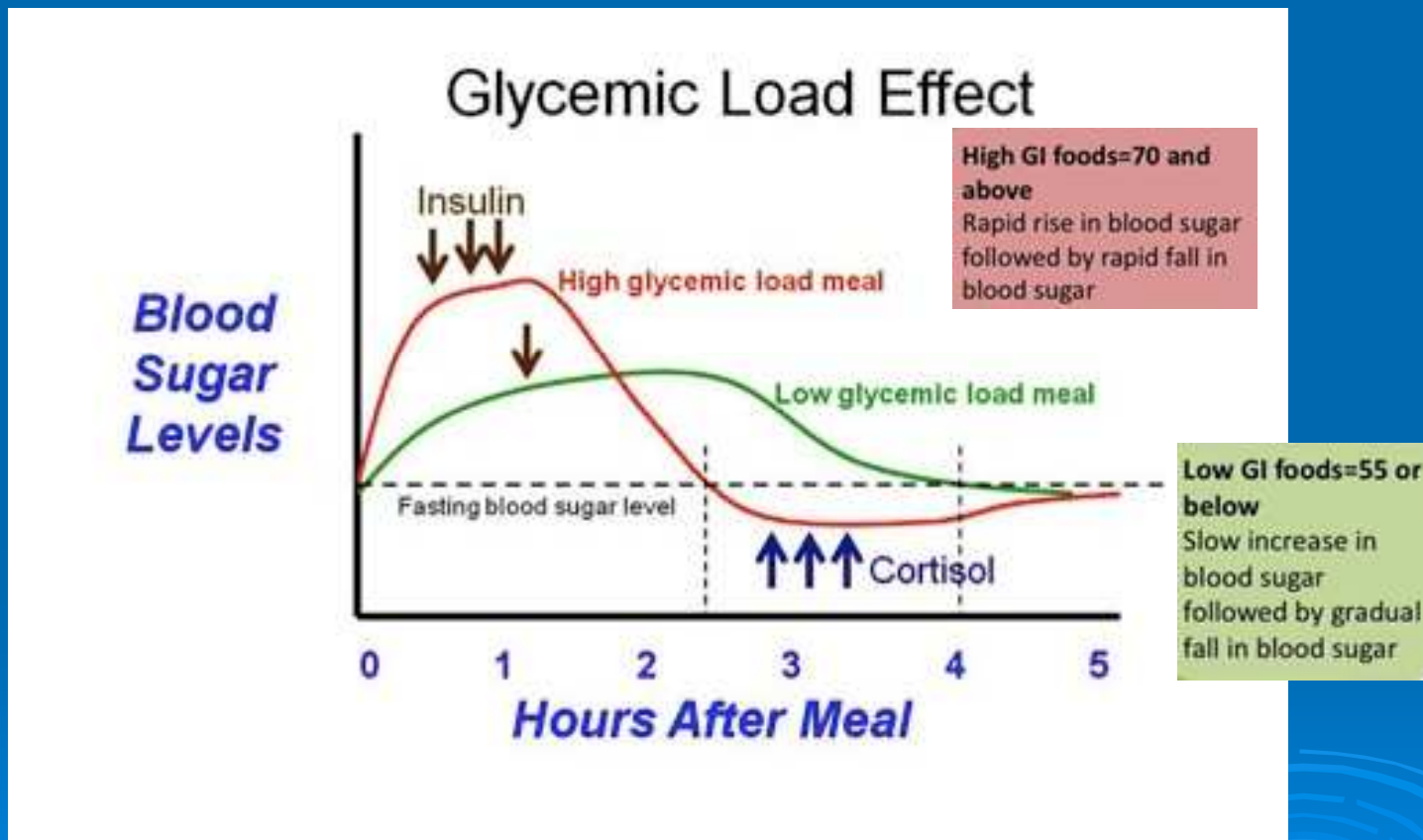
The impact of stress

- **Stress affects our diet** : increase of proinflammatory food (sugars, saturated fat, refined products....)
- **Stress alters our digestion and our intestinal barrier** (gut microbiota imbalance and leaky gut syndrom), with nutrients deficiencies
- A **dysfunctional microbiota** will promote **anxiety** and **depression**
- **Stress increases our needs in vitamins and minerals** (Magnesium+++)

Carbohydrates (sugars)

- Brain uses 25% of **glucose** that is available to body and **needs a steady supply of glucose**
- If blood glucose falls too low, mood can become impatient, irritable and aggressive
- Unbalanced blood sugar will affect your mood : **The blood sugar rollercoaster**

The blood sugar rollercoaster



Carbohydrates

- **Avoid high GI foods** : refined grains products, white flour, white sugar, sweeteners. Overcooked food, mashed food raises the GI

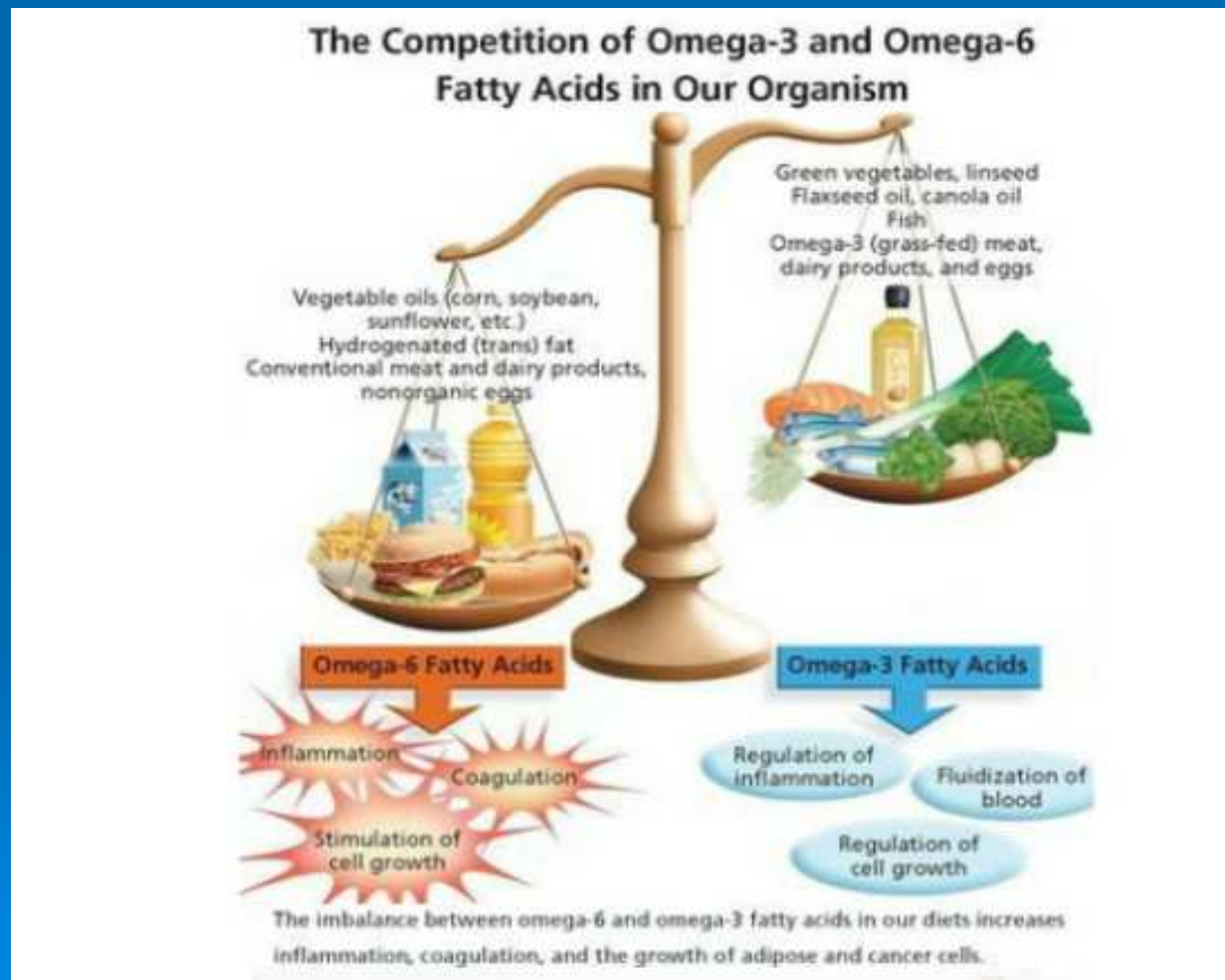
Eat carbohydrates

- With a **low GI, rich in fiber**, without added sugar, not overcooked, unrefined (brown foods)
- With adequate **proteins** and **fats**
- **Appropriate quantity**

Fats

- Fatty acids = 60% of the brain's dry weight
- Unhealthy fat = unhealthy brain
- Omega 3 : essential for cell membrane fluidity and neuronal function (DHA++), prevent inflammation and depression
- Optimal ratio of omega 6/omega 3 : 4:1 (current ratio in Europe: 15:1, and often 25:1 or greater in the USA)

A good omega 3 and 6 balance



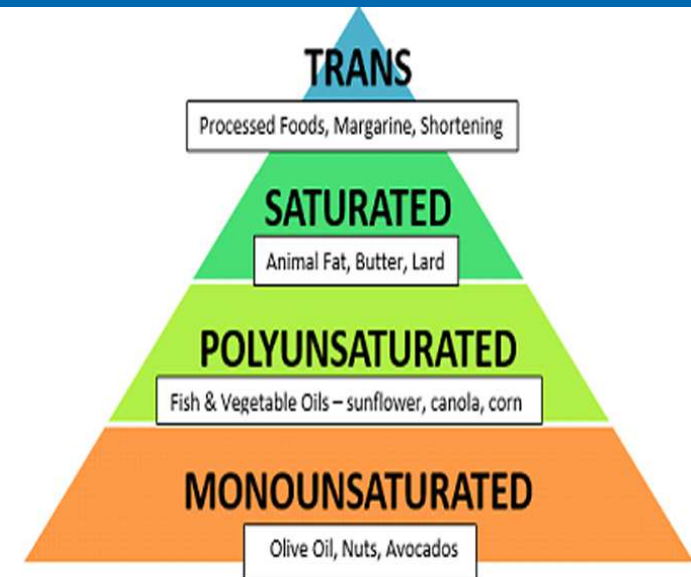
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Fats

- **Increase Omega 3 :**
 - **Oily fish** (sardines, mackerel, herring, trout...), colombus eggs, plants oils : rapeseed (colza), walnutoil, linseedoil, camelinaoil...
 - **Omega 3 rich oil** everyday
 - Fatty fish : 2-3 times/week (avoid tuna)
- **Extra virgin olive oil** for cold and hot cooking
- **Reduce satured fats and avoid trans fat**

Fats

Type of Fatty Acid	Found in
Saturated 	<i>Animal fats</i> (fatty meats, poultry fats and skins) <i>Dairy products</i> (butter, cheeses, milk, ice cream)
Trans 	<i>Fast foods</i> (deep-fried foods, margarine) <i>Processed snacks</i> (packaged cookies, sweets)
Monounsaturated 	<i>Plant-based foods</i> (avocado, olives, various nuts) <i>Oils</i> (olive oil, canola oil, safflower oils)
Polyunsaturated 	<i>Fish</i> (salmon, tuna, sardines) <i>Certain vegetables</i> (dark green, leafy vegetables)



Food and neurotransmitters

Food proteins

Digestion

Raw materials (amino acids)

Tyrosine

Tryptophan

Cofactors

Iron, Zn, Mg, Cu,
vitamins C, B2, B3, B9,
B12

Iron, Zn, Mg,
vitamins B2, B3, B6, B9,
B12

Dopamine

Serotonin

Food and neurotransmitters

- To produce serotonin : building block is tryptophan an essential amino acid, meaning it must be found in the diet
- Natural sources of tryptophan : protein-rich food such as turkey and poultry, dairy products, cottage cheese, brousse, parmesan, emmenthal, and also some legumes

Food and neurotransmitters

- To produce dopamine, building blocks are tyrosine and phenylalanine
- Natural sources : protein rich foods - meat, eggs, poultry, seafood, yogurt, soya...

Need of cofactors

- Vitamins B ++ B6, B9, B12,
- Vitamin C and vitamin D
- Minerals : iron, magnesium, zinc, copper



RICHEST FOOD SOURCES B VITAMINS

VITAMIN B1



meat, fish, poultry
milk products
whole grains
green, leafy
vegetables
legumes
orange juice
tomato juice

VITAMIN B2



milk
eggs
almonds
green vegetables
meat
fish
poultry

VITAMIN B3



poultry
fish
beef
fortified cereals
peanuts

VITAMIN B5



shiitake/portobello
mushrooms
fish, poultry, meat
avocado, eggs
legumes, leafy
green vegetables
sweet potatoes

VITAMIN B6



nuts, seeds
bell peppers
fish, poultry
meat, bananas
avocados
leafy green
vegetables

VITAMIN B7



whole grains
peanuts
cheese
egg yolks
organ meats
brewers' yeast

VITAMIN B9



legumes
leafy green
vegetables
oranges

VITAMIN B12



meat
fish
poultry
eggs
milk products

www.mengenics.com

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Chrononutrition

- Activity and levels of these neurotransmitters depend on food intake, and change in nutrient intake can significantly affect behaviour, sleep and energy level
- Moreover, the timing of eating can profoundly impact the synthesis of these neurotransmitters and have positive or negative effects on your mood

Chrononutrition

- **Chrononutrition** is more than just a diet: it's a whole new way of eating that **follows the daily body's natural rhythms and enzymatic secretions.**
- You **eat** foods at **times** of the day when they are most **useful**, to meet your body's energy requirements
- Chrononutrition will help to increase the **dopamine** and **serotonin** levels at the **right timing**

Chrononutrition

- Have breakfast like a king, have lunch like a prince and have dinner like a pauper
- Caloric breakfasts make you much less fatter than caloric dinners
- Proteins at breakfast (with some fats): satiation
- Carbohydrates at breakfast : increase of nutritional intake and sugar craving
- Too much proteins at the evening diner: bad sleep

Chrononutrition

To produce dopamine :

- Dopamine is used during the day.
Tyrosine sources (**proteins**) must be taken mostly in the morning (breakfast) and by midday, **with no or little carbohydrates** (avoid high GI sugars). Otherwise tyrosine goes into muscles instead of the brain
- Breakfast and lunch : proteins+++
- Few fast carbohydrates

Chrononutrition

To produce serotonin :

- Serotonin is used during the evening and night (melatonin). Tryptophan sources must be taken around 4 pm and in the evening with **some carbohydrates and with as few proteins as possible**. Otherwise tryptophan does not go into the brain
- Evening diner : few proteins

What should be on the menu ?

- Breakfast and midday :

Proteins >> carbs

- Snack and evening dinner :

Carbs (complex) and vegetables >> proteins

- Do not eat late and during the night

Breakfast

➤ High protein breakfast (and fat)

- Chicken or turkey filet, eggs, goat or sheep cheese (max 2 times/week), ham, prawns, fish....
- Moderate in starchy food, even if whole starch. Prefer spelt bread or bread essence
- **As few fast carbohydrates as possible** (sugar, honey, chocolate, breakfast cereals, brioches, croissants ...)

➤ Reduce coffee intake (drop of dopamine)

Breakfast : Do not eat



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Breakfast : Do eat



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Midday

➤ Lunch : proteins, vegetables and carbohydrates

- 150 gr meat (veal beef pork lamb horse rabbit poultry) or fatty fish
- 300 gr vegetables + 1 tablespoon omega 3 oil (first cold pressure)
- 1 tablespoon carbohydrates (brown rice, quinoa, millet..)

4 pm and evening dinner

➤ Light meal 4 pm

- Food rich in tryptophan associated with carbohydrates and few proteins :
- Cottage cheese + cashed nuts + fruit
- Tryptophan sources : raw dairy products, such as yogurt, cottage cheese, sesame seeds, cashews and walnuts, bananas, eggs....

➤ Evening dinner

- Food rich in tryptophan
- Complex carbohydrates, vegetables
- Few proteins (poultry, fish)

TOP TRYPTOPHAN FOODS



Cafe-free eggs



Spirulina



Wild-caught fish (cod, salmon)



Pasture-raised poultry



Organic, ideally raw dairy products (milk, yogurt, cottage cheese raw cheeses)



Sesame seeds, cashews and walnuts



Grass-fed beef or lamb



100% whole grain oats, brown rice, corn or quinoa



Beans/legumes (chickpeas, green peas)



Potatoes



Bananas

Dr. Axe
FOOD IS MEDICINE

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Key messages

Food can promote proper functioning of the brain : prevention is key !

- Balanced healthy diet rich in **nutriments**
 - fresh, not overcooked...
 - sufficient vegetables and fruits
- Eat good fats (**omega 3**, mainly from animal origin)
- Eat the **right food at the right timing** (proteins at breakfast)
- **Avoid carbohydrates with high GI**

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