



The Nature of Stress

basic information, sources, links

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STRESS - Psychophysiology

basic information, sources, links

short version

Stress Definition

Stress is a state of psychological and physical tension produced when an individual perceives that they are unable to cope with the demands imposed on them by a stressor.

The consequent state of tension can be adaptive (eustress) or maladaptive (distress)

STRESS

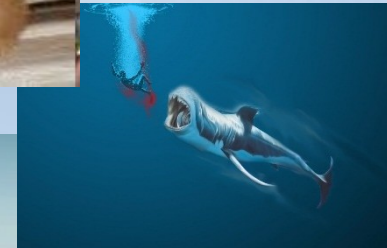
STRESS

EU x DI

ACUTE x CHRONIC

HYPER x HYPO

Acute Stress(ors)

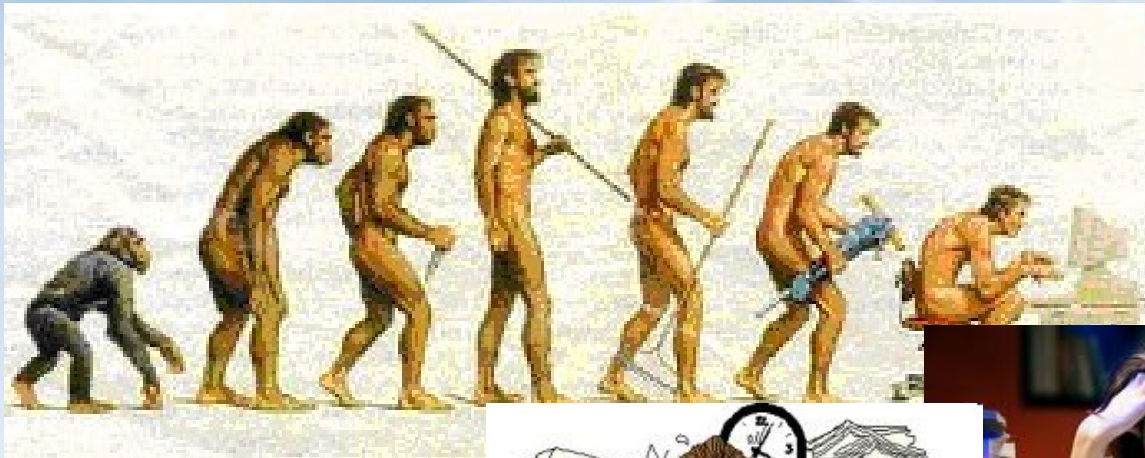


Short-Term; quick decisive action required for survival

Chronic Stress(ors) = Long term, Persistent

Physical, Emotional, Sexual Abuse
Poverty, Malnourishment

Demanding Job
Depression, Anxiety



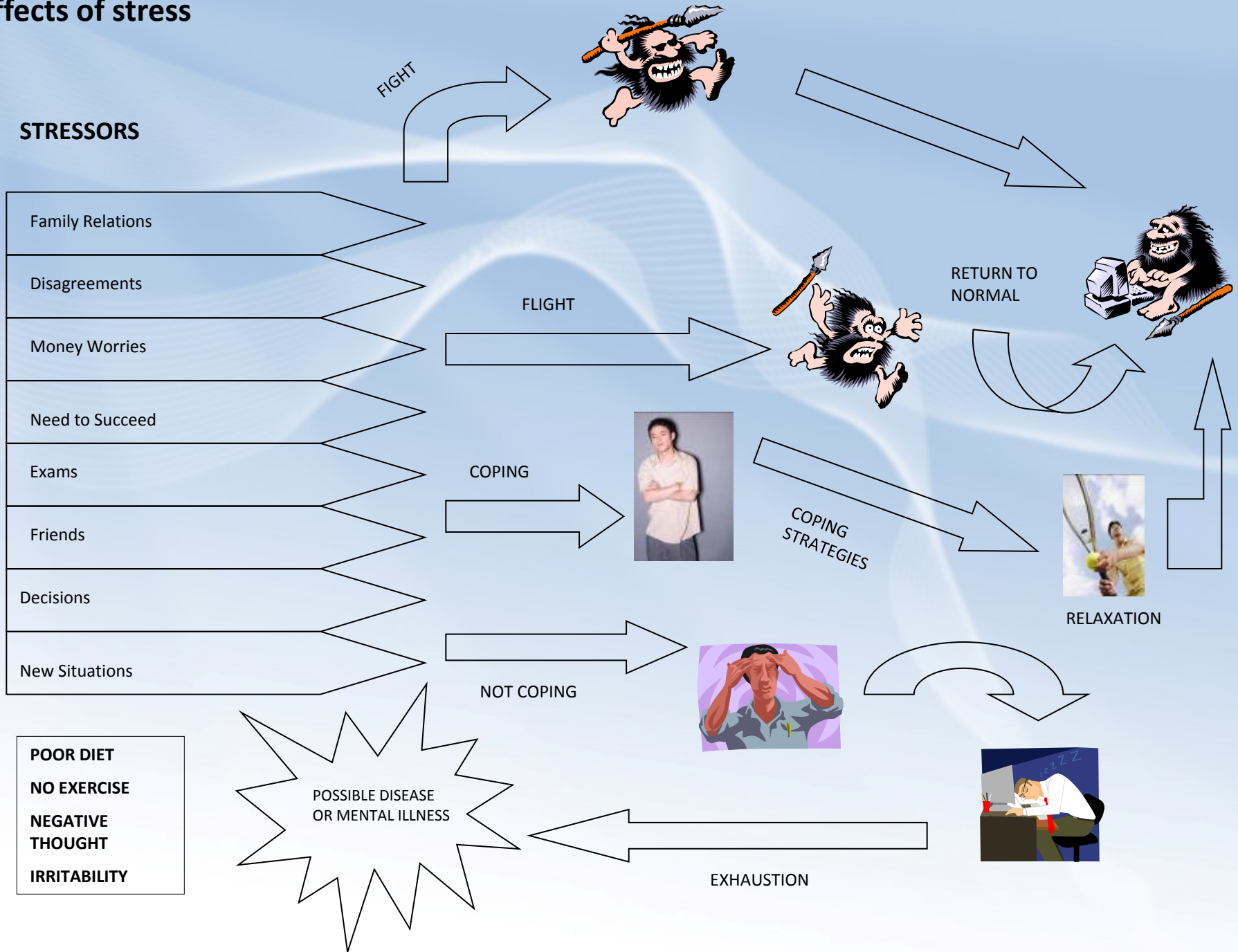
THERE ARE ONLY
TWO TIMES
I FEEL STRESS:
 
DAY AND NIGHT.

Fight or Flight

In the 1915, **Walter Cannon** recognized that the autonomic nervous system is activated in response to stress and suggested that stress mobilizes the body's responses in readiness for either attacking (**fight**) or flying (**flight**) an enemy or threatening situation.

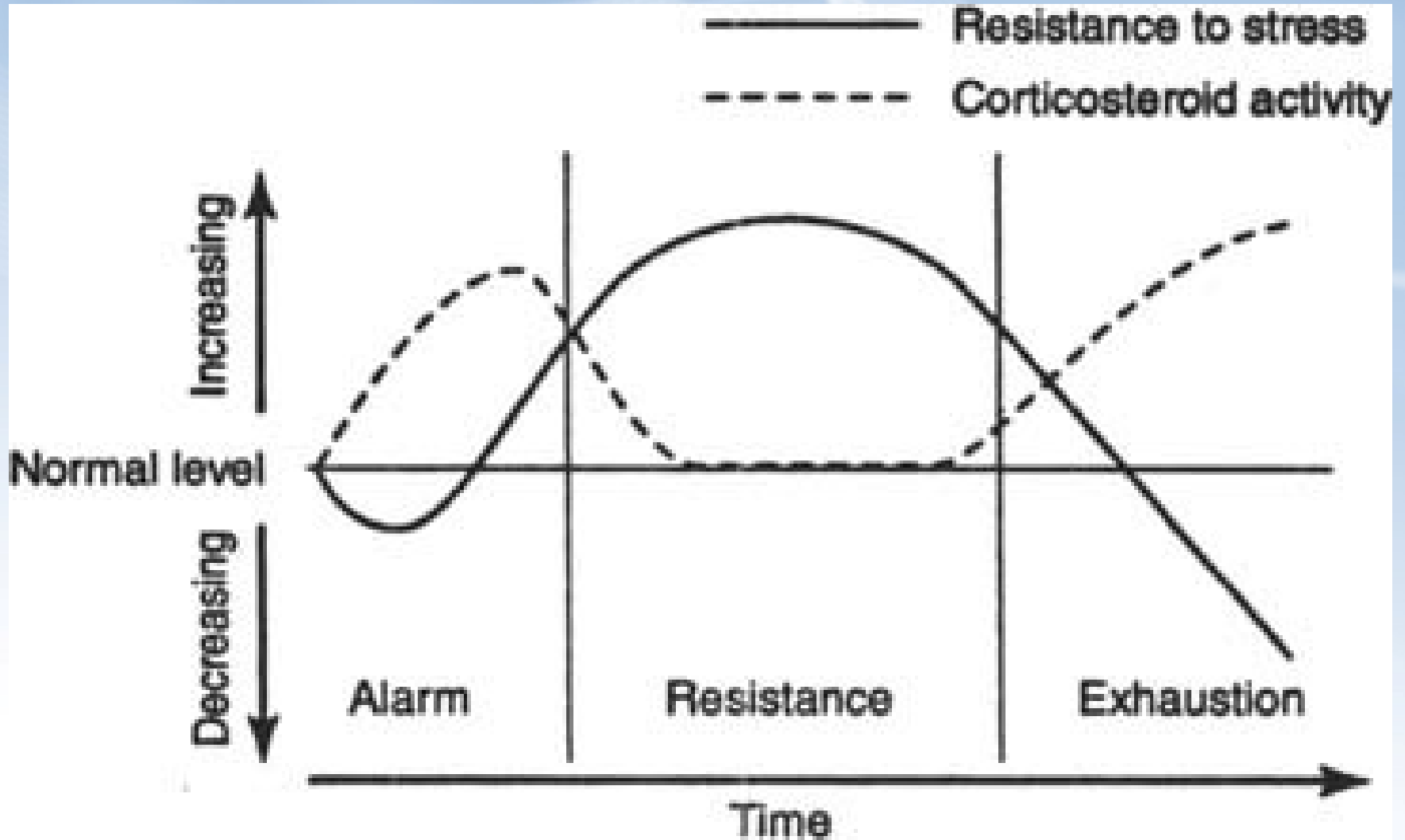
Although such responses may have promoted survival when they evolved in human history, they are not productive given the longer periods of stress exposure common in modern life. Such enterprises as keeping a job, going to school, and playing on the soccer team require more complex responses.

Effects of stress



GAS

The general adaptation syndrome. Hans Selye

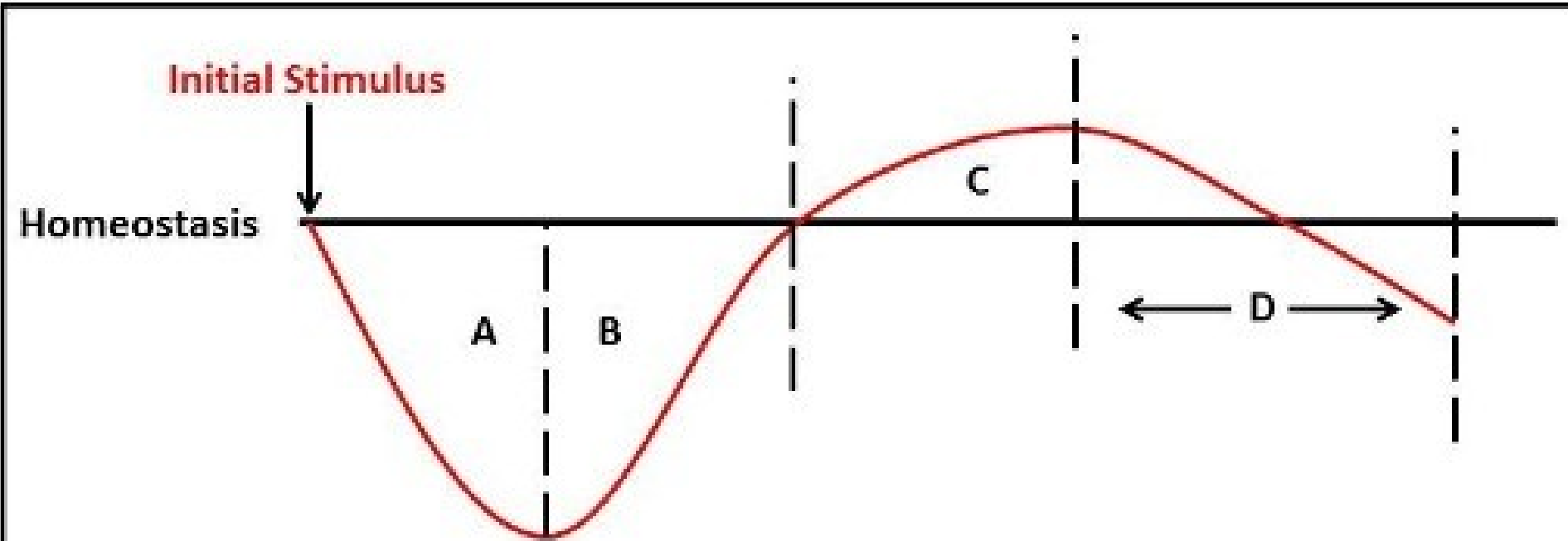


GAS

Alarm: The body first organizes physiological responses (similar to fight/flight resp.) to threat.

Resistance: Stress-activated responses continue, stabilizing the body's adaptations to stress.

Exhaustion: The body has depleted its reserves and can no longer maintain responses to the stressors.



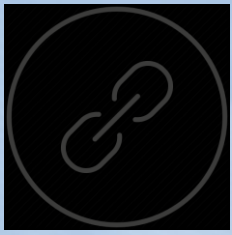
Legend:

A = Alarm Phase

B = Resistance Phase

C = Supercompensation Phase

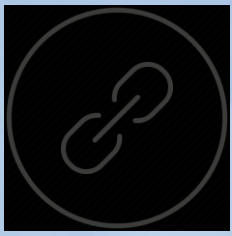
D = Exhaustion or Detraining Phase



Short info video

<http://www.youtube.com/watch?v=BIfKOL8xDPO>





Links – text (CZE/ENG)




CZE

<http://www.wikiskripta.eu/index.php/Port%C3%A1l:Fyziologie>

[http://fyziologie.lf2.cuni.cz/uceni/stress WEB.pdf](http://fyziologie.lf2.cuni.cz/uceni/stress_WEB.pdf)

ENG

[http://en.wikipedia.org/wiki/Stress_\(biology\)#Nervous system](http://en.wikipedia.org/wiki/Stress_(biology)#Nervous_system)

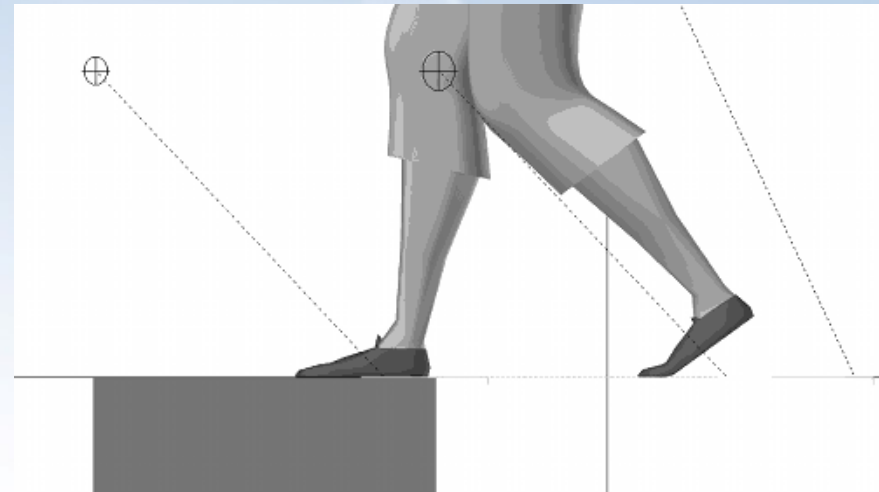
The background is a light blue gradient with several white, wavy, semi-transparent lines that create a sense of movement and depth. The lines are most prominent in the upper half of the image and fade towards the bottom.

What is the most important
to stay healthy
or for recovery



Just a few „things“

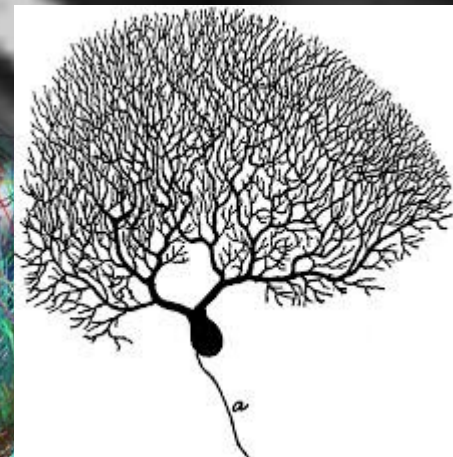
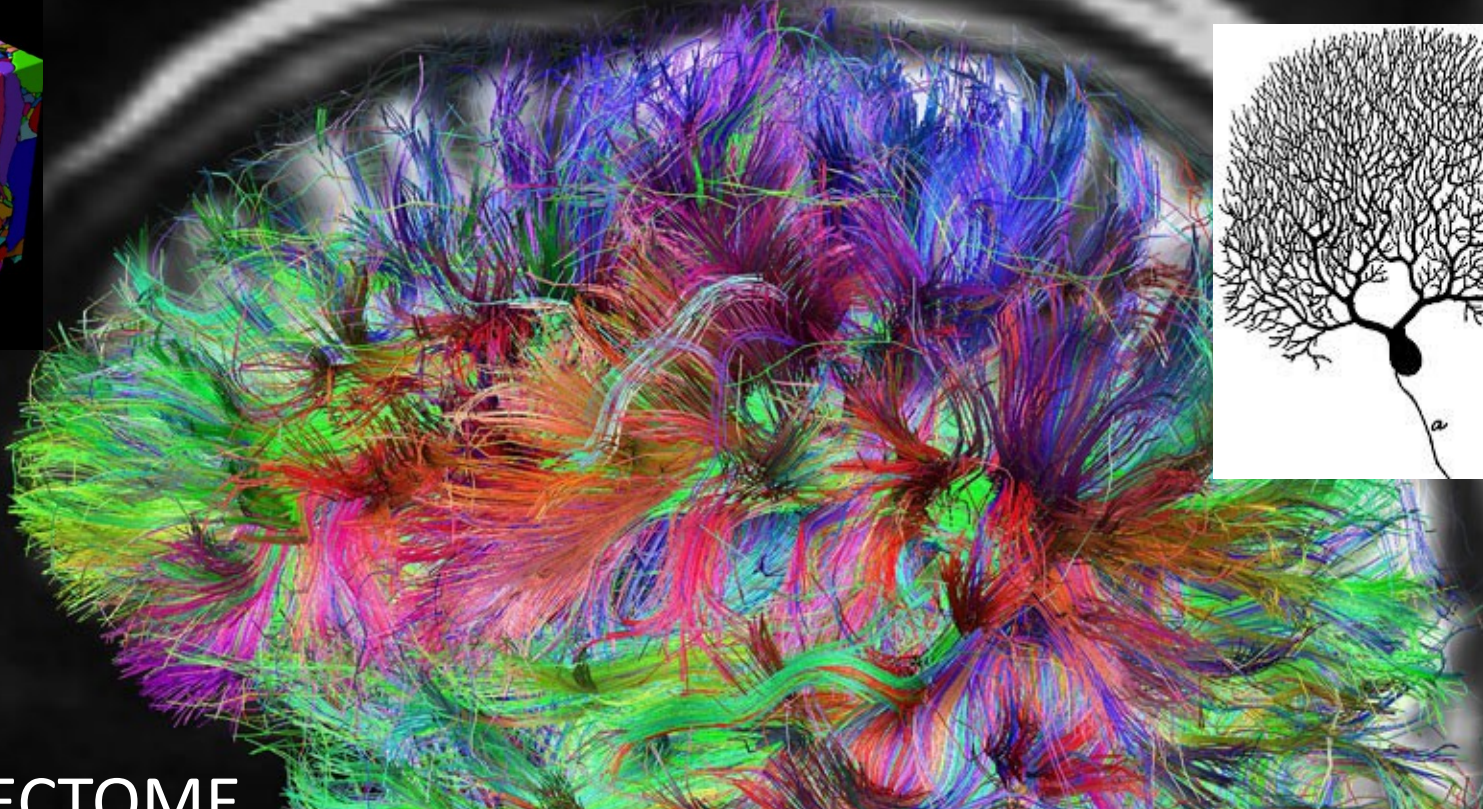
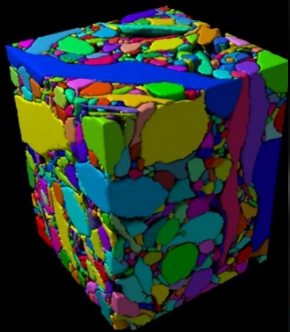
in good order, regularity, regime



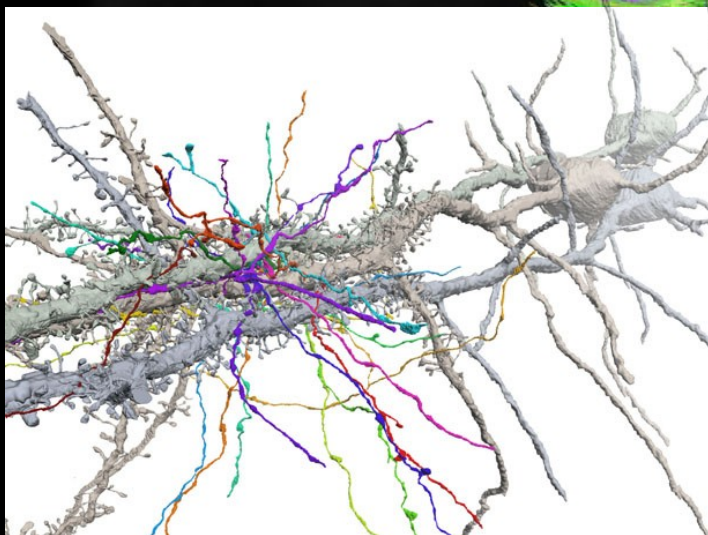


The Stress Response

Stress Psychophysiology



CONNECTOME

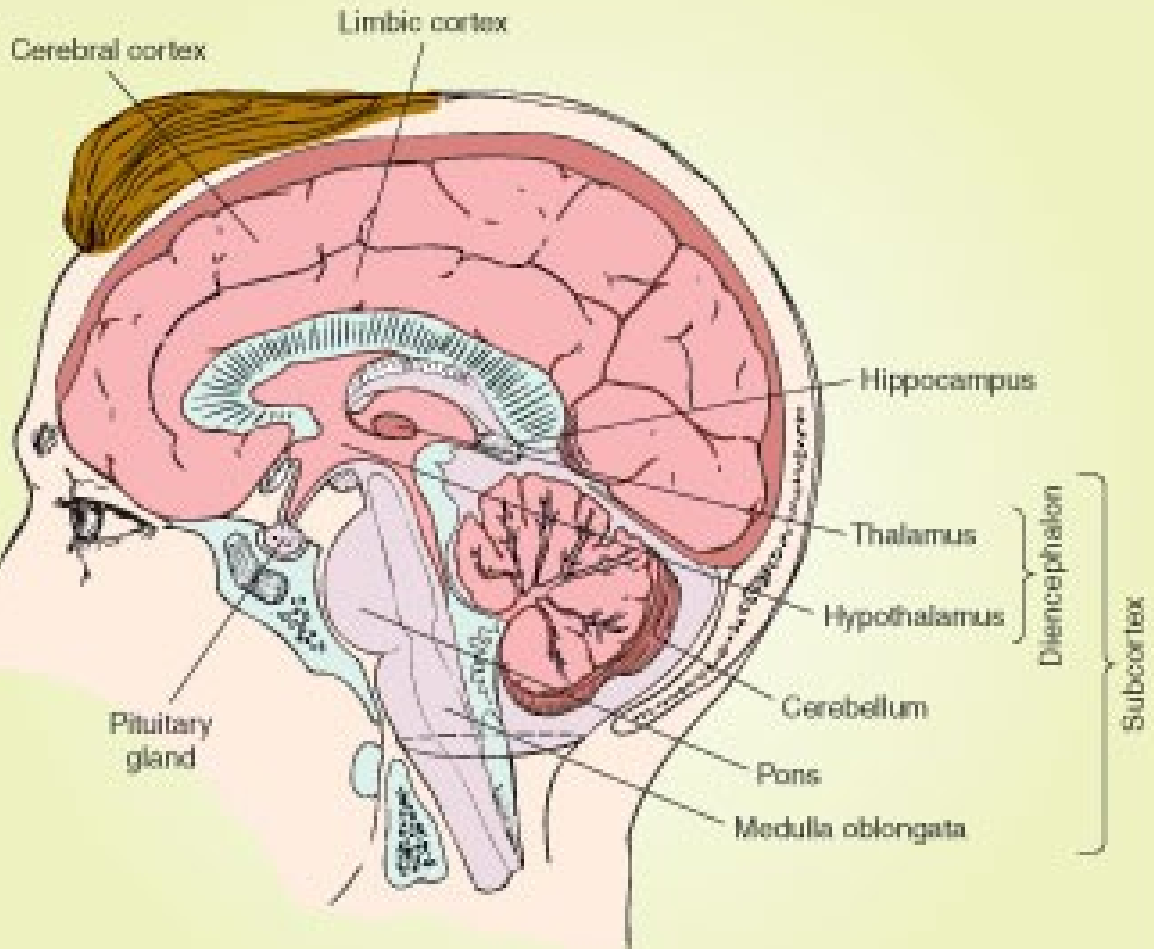


The Brain

Two major components

- Upper part: Cerebral cortex
(thinking functions)
- Lower part: Subcortex
(physiological processes)
 - Includes the Limbic System (“seat of emotions”)
 - Thalamus
 - Hypothalamus

The Brain



- Hippocampus
(sounds the stress alarm)
- Cerebellum
(coordinates body movement)
- Pons (regulates sleep)
- Medulla oblongata
(heart beat, respiration)

Stress and Its Pathways

The hypothalamus activates the following under a stress response:

- Autonomic nervous system
 - Immediate fight-or-flight response
 - Hormone balance/body temperature/blood vessel width
- Endocrine system
 - Short-term and long-term stress response
 - Hormones that regulate physiological functions

Autonomic Nervous System

Two systems working together during immediate stress:

- Sympathetic
 - (responsible for expending energy)
- Parasympathetic
 - (responsible for conserving energy)

Endocrine System

- Includes glands that secrete hormones
- Hormones travel through the blood stream
- These hormones change function of bodily tissues
- Specific hormones
 - Epinephrine, norepinephrine, Corticoids, Thyroxin, Vasopressin, Oxytocin

The “Response” Flow Chart

- Life
- A Perceived threat
- Hippocampus (Alarm)
 - Alarm, you will have an emotion
- Limbic System (Seat of Emotions)
 - Emotional response will lead to a physical one
- Reticular Activating System
 - Connection between mind/body
- Hypothalamus (Supervisor)
 - Turns on Endocrine and Autonomic systems

The “Response” Flow Chart (cont.)

- Endocrine System (Hormones)
 - Vasopressin-helps move blood through by increasing water in the blood
 - Cortisol-increases blood glucose for battle. Also suppressed T-Cells, more likely to become ill.
- Autonomic Nervous System
 - Sympathetic System- “ON” switch, increases energy level
 - Parasympathetic System- “OFF” switch, decreases energy level

Endocrine System

- **Vasopressin** (pituitary gland)
 - Increases blood permeability to water
 - Increases blood volume
 - Increases blood pressure
- **Cortisol**- primary glucocorticoid (adrenal gland)
 - Increases blood sugar/ gluconeogenesis (mobilizes free fatty acids)
 - Decreases T-lymphocyte production
- **Thyroxin**(hypothalamus)
 - Accelerates heart rate
 - Increases gastrointestinal motility
 - Increases anxiety
 - Increases blood pressure

Microbiome

Diabetes

Nutrition

Rob Knight:

How our microbes make us who we are

http://www.ted.com/talks/rob_knight_how_our_microbes_make_us_who_we_are

Obesity

Chronic
Inflammation

Cancer

THE HUMAN MICROBIOME PROJECT SAYS THE HUMAN BODY HAS 100 TRILLION MICROSCOPIC LIFE FORMS LIVING IN IT.

YOU CALL THIS LIVING?

Tom Maltby
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The Body As A System



Fight or Flight

- Walter B. Cannon (1915)
- Four stages:
 - Stage one: Stimulus
 - Stage two: Threat determination
 - Stage three: Arousal
 - Stage four: Return to homeostasis



Bodily Systems Activated By Stressors

- Autonomic nervous system
- Endocrine system

Autonomic Nervous System

- Stressor → Adrenal glands secrete adrenaline
- Sympathetic vs. Parasympathetic
- Sympathetic Physiological response
 - Heart rate increases
 - Muscles tense
 - Blood pressure rises
 - Pupils dilate
 - Breathing increases
 - Perspiration



Endocrine System

Stressor → Hypothalamus → CRF released →
Pituitary gland → ACTH → Bloodstream →
Adrenal glands → Produce adrenaline and
glucocorticoids → Physiological response



General Adaptation Syndrome

- Hans Selye
- Three stages
 - Stage one: Alarm
 - Stage two: Resistance
 - Stage three: Exhaustion



Systems Affected By Stress

- Immune system
- Cardiovascular system
- Gastrointestinal system
 - Muscles
 - Skin
- Sexual reproduction

Immune System

- Immediate, very brief enhancement of immunity
- Prolonged stress → Immunity suppression



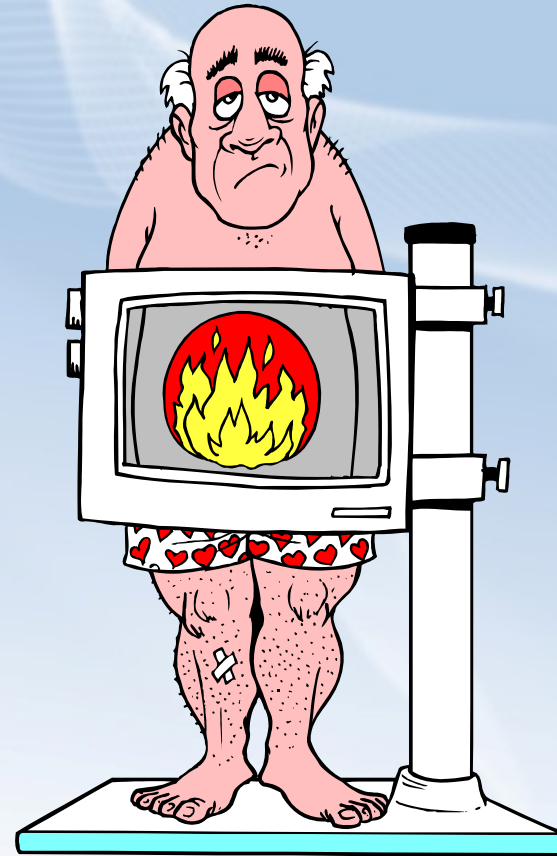
Cardiovascular System



- Increased blood pressure
- Cumulative effects

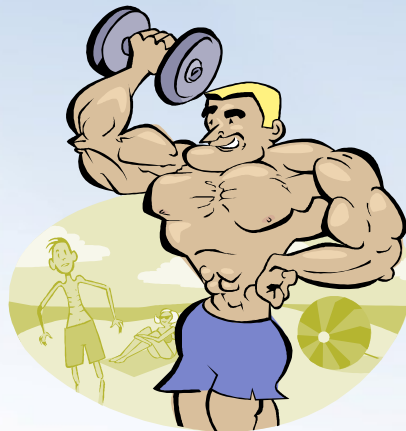
Gastrointestinal System

- Ulcers
- Diarrhea and Constipation
- IBS
- Appetite
 - Decreases w/ one long, continual stressor
 - Increases w/ lots of short stressors



Muscles

- Tension
- Bracing
- Orthopedic problems



Skin

- Perspiration
 - Acne



Sexual Reproduction

- Males

- Decreased testosterone production
- Difficulty achieving and maintaining an erection
- Decreased sex drive
- Impotency and Premature ejaculation associated with stress

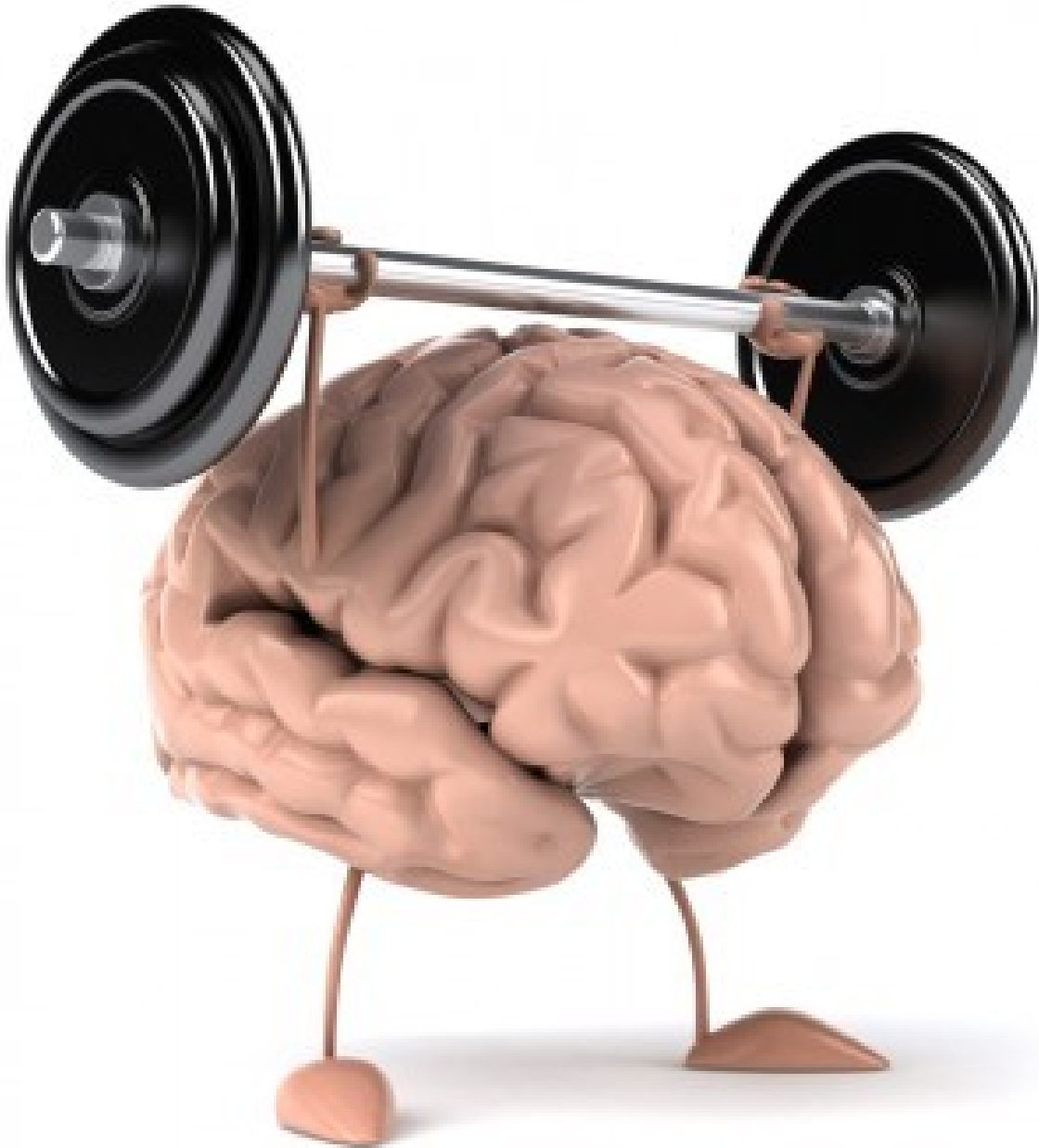
- Females

- Decreased estrogen production
- Disrupted menstrual cycle
- Disrupted libido
- Possibly less likely to conceive
- Increased rate of miscarriage

Diseases Related to Stress

- Hypertension
- Stroke
- Coronary Heart Disease
- Ulcers
- Migraine Headaches
- Tension Headaches
- Allergies
- Rheumatoid Arthritis
- Backache
- TMJ Syndrome







COPING - Strategies

basic information, sources, links

9.4.2015



Psychosomatics and Mental health. Introduction to Relaxation techniques.

basic information, sources, links

23.4.2015