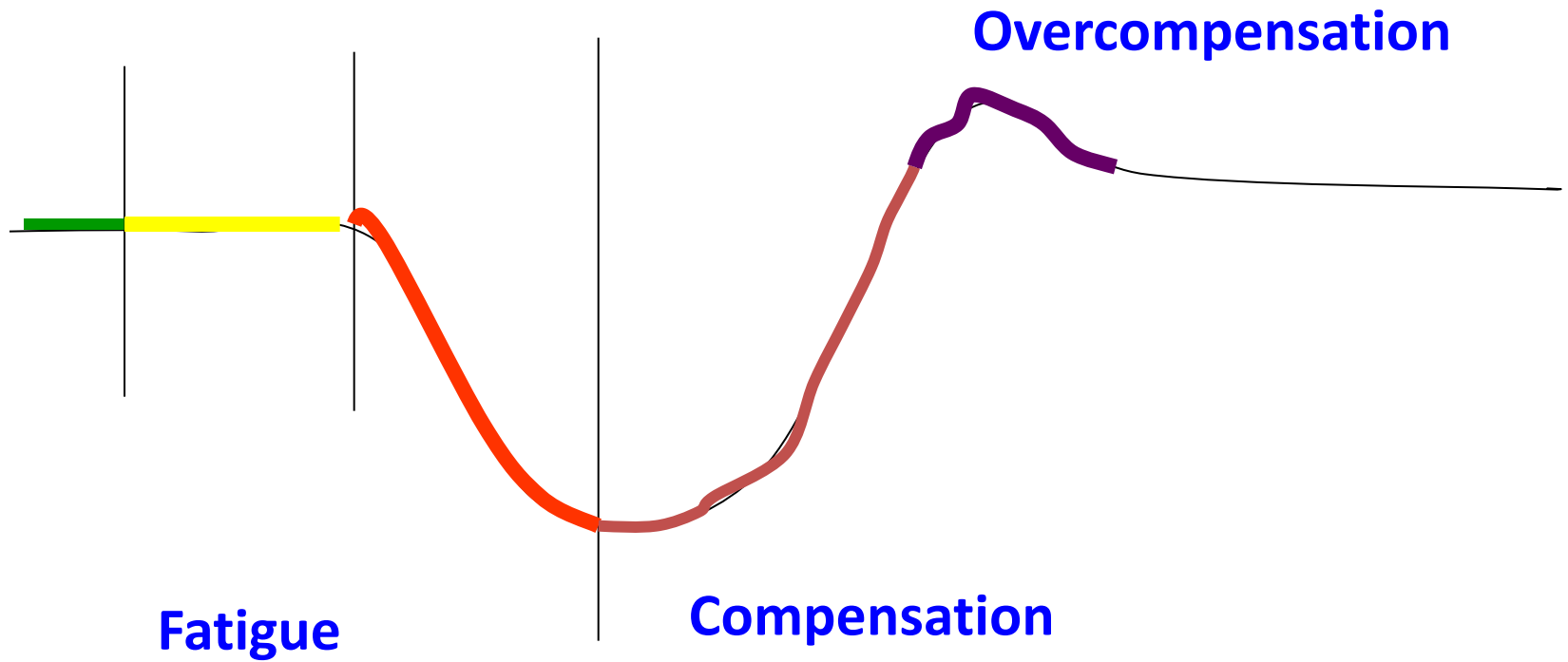


# Regeneration

Zsolt RADAK

**Loading**

**Regeneration**



# Central Fatigue

- Hypoglycemia
- Hypertermia
- Neurotransmitters (ACh, Serotonin/dopamine, 5-triptophan)
- Ammonia
- Lactate

# Muscle fatigue

- $\text{Ca}^{++}$
- pH
- $\text{P}_i$ ,
- ADP
- Glycogen
- NO
- Free radicals

# Compensation

- Loading:
- Anaerobic alactic ~ 30 sec
- Anaerobic lactic ~ 30 min
- Aerobic ~ 3 days

# Nutrient timing

- Phase 1: Optimizing the performance
- During the race, training (CH loading, CH-Pr loading, drink, etc)

# Phase 2

- Right after the race, training: Accelerating the recovery
- CH, CH-Protein, Antioxidants,

# Phase 3

- Time between training sessions: Optimizing Glycogen store, Acid-base balance, hydration, etc.,



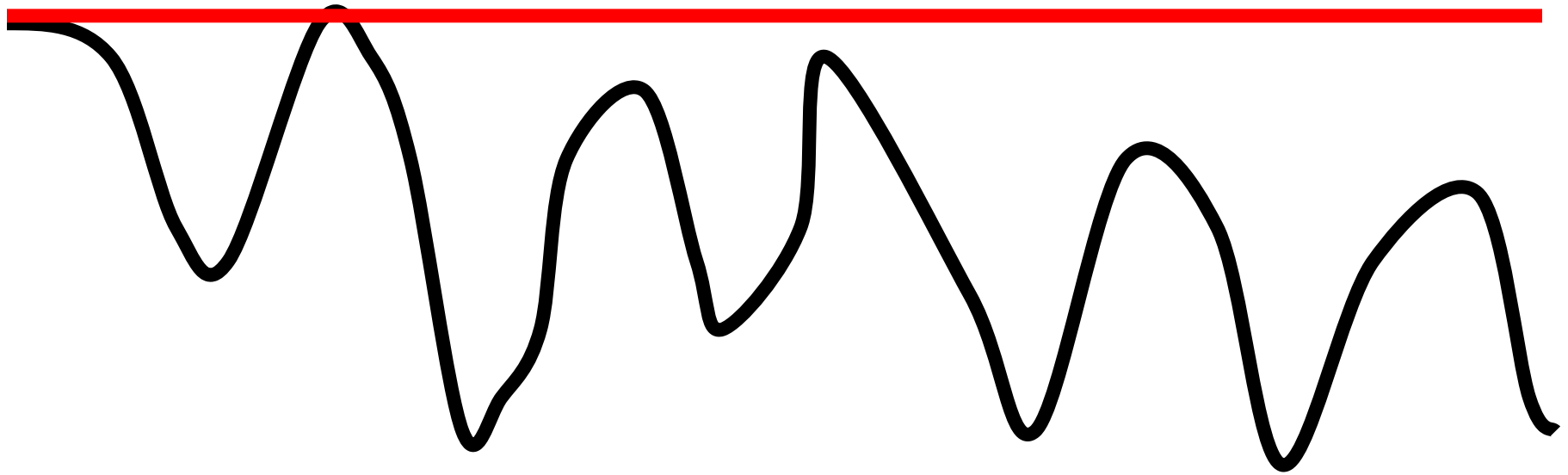
# Sleeping

- It has been shown in studies that loss of sleep can cause detrimental effects to the immune system and to your metabolism as well. Sleep abnormalities can also lead to psychological disorders such as depression, addiction and bipolar disorder. So in every way, sleep is important to the mind and body and REM sleep seems to be extremely important, especially to children and young adults. REM sleep in adult humans typically occupies 20-25% of total sleep time, or about 90 to 120 minutes of sleep each night. Vividly recalled dreams mostly occur during the REM period.
- **EXERCISE!** Implement a daily exercise routine – just be careful not to exercise too intensely, too late in the day. The increase in physical stress (yes exercise is a GOOD stressor on the body) may disrupt sleep patterns.

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Risk 1

**Maladaptation**



**Overtraining**

# Risk 2



- In both studies, the major contributor to sudden death from cardiovascular causes during sport was hypertrophic cardiomyopathy. In the study of high school and college athletes, 136 of the 160 cases had adequate information to identify cause of death. Hypertrophic cardiomyopathy was the cause in 50 of 92 males and in 1 of 8 females with cardiovascular conditions. In the other study, hypertrophic cardiomyopathy was cited in 48 of the 134 athletes. The second most common cardiovascular cause of death in the two studies was congenital abnormalities of the blood vessels servicing the heart (the coronary arteries), 16% and 13% in each study. A variety of rare cardiovascular conditions as well as several apparently "normal hearts" were represented in the remainder of the cases of sudden death. (Van Camp 1995)

# Take home

- Regeneration depends on the type of loading
- Regeneration can be influenced by nutrition
- The quality of rest modify regeneration
- Improper regeneration can cause overtraing or pathological events