

PHYSIOLOGY



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Office hours:

Tuesday: 14.00 – 16.00

Friday: 10.00 – 11.00

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LESSONS

Wednesday

Time:

11.15 – 12.45

Classroom 225

Conditions for completing:

- Attendance (max. 3 absence)
- Protokols
- Written test

Content of lessons

- 1 21.9. Introduction to physiology of exercise
- 28.9. HOLIDAY
- 2 5.10. Body composition
- 3 12.10. Muscles under workload
- 4 19.10. Metabolism, Energy output (BMR, RMR)
- 5 26.10. Circulatory system
- 6 2.11. Circulatory system
- 7 9.11. Respiratory system
- 8 16.11. Morphological and functional adaptation of an organism to workload
- 9 23.11. Anaerobic stress tests
- 10 30.11. Aerobic stress tests
- 11 7.12. Spiroergometry
- 12 14.12. Written test

Introduction to physiology of man and physiology of exercise

The physiology of man is concerned with the study of functions of the organ systems.

The physiology of exercise deals with the study of an organism in the course of a movement activity. It studies functional changes taking place during the physical exercise.

FACTORS OF ATHLETIC PERFORMANCE

PSYCHE

- Motivation
- Emotion
- Adaptation

TECHNIQUE

- Special Skills
- Movement Skills



SOMATIC FACTORS

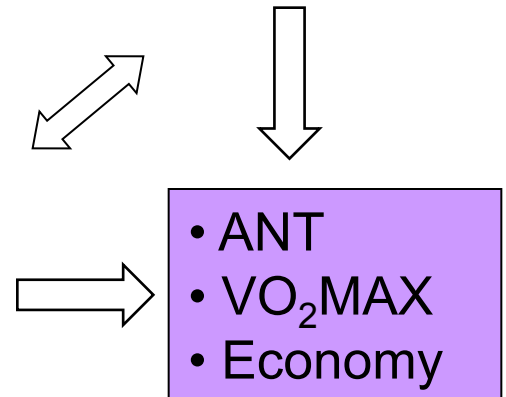
- Somatotype
- Height, weight, %fat
- Muscle fibers (SO, FG)

TACTIC

- Analytic Abilities
- Tactical Thinking
- Foresight

MOTOR ABILITIES

- Speed (max. speed, reaction, ...)
- Strength (max. strength, isometric, ...)
- Endurance (speed, strength endurance, ...)
- Coordination
- Flexibility



- ANT
- VO₂MAX
- Economy

FACTORS OF SPRINT

PSYCHE

- Motivation
- Emotion
- Hothead

TECHNIQUE

- start from starting blocks
- sprint step (frequency, length)



TACTIC

- concentration before race

SOMATIC FACTORS

- Somatotype: mesomorph
- Tall, no fat
- Muscle fibers (FG, FOG)

MOTOR ABILITIES

- Speed (maximal speed, reaction speed)
- Strength (dynamic strength)
- Coordination
- Flexibility of joints

FACTORS OF DISTANCE and MARATHON RUNING

PSYCHE

- Motivation
- Emotion
- Active phlegmatic

TECHNIQUE

- Running step



TACTIC

- Tactical Thinking
- Distribution of power

SOMATIC FACTORS

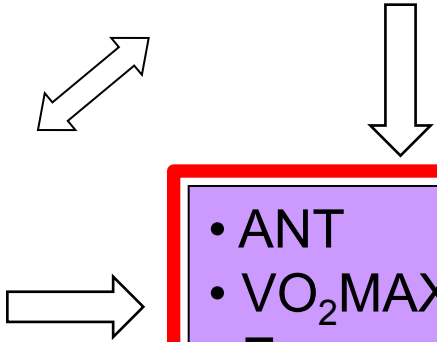
- Somatotype: ectomorph
- no fat
- Muscle fibers (SO, FOG)

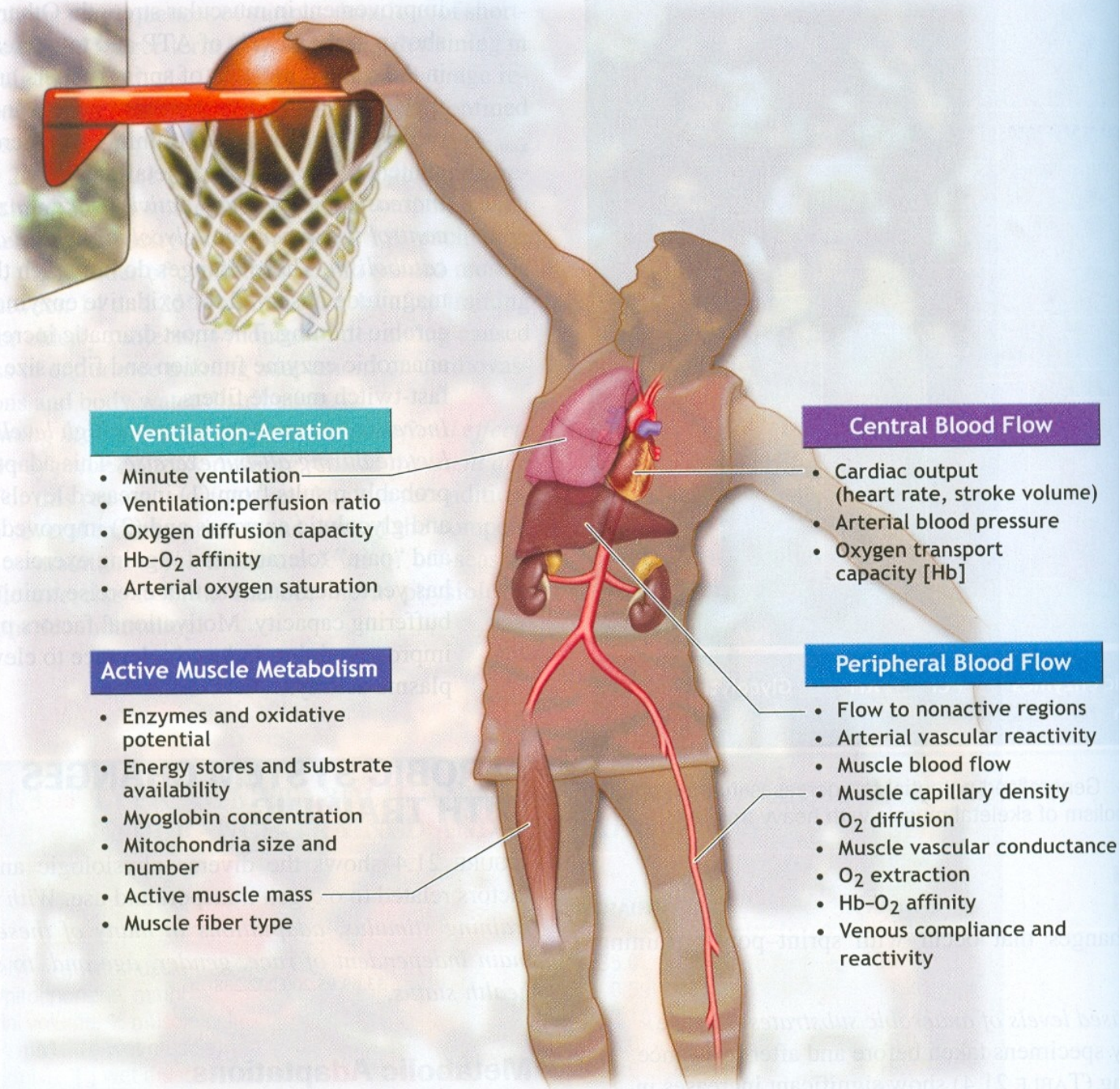
MOTOR ABILITIES

- Endurance (special endurance, speed endurance, strenght endurance)
- Coordination

ANT

- VO₂MAX
- Economy





Ventilation-Aeration

- Minute ventilation
- Ventilation:perfusion ratio
- Oxygen diffusion capacity
- Hb-O₂ affinity
- Arterial oxygen saturation

Active Muscle Metabolism

- Enzymes and oxidative potential
- Energy stores and substrate availability
- Myoglobin concentration
- Mitochondria size and number
- Active muscle mass
- Muscle fiber type

Central Blood Flow

- Cardiac output (heart rate, stroke volume)
- Arterial blood pressure
- Oxygen transport capacity [Hb]

Peripheral Blood Flow

- Flow to nonactive regions
- Arterial vascular reactivity
- Muscle blood flow
- Muscle capillary density
- O₂ diffusion
- Muscle vascular conductance
- O₂ extraction
- Hb-O₂ affinity
- Venous compliance and reactivity

What is Exercise Training?

The repeated use of exercise to improve physical fitness.

Adaptations to Exercise

Acute adaptations

The changes in human physiology that occur during exercise or physical activity.

Chronic Adaptations

The alterations in the structure and functions of the body that occur in response to the regular completion of physical activity and exercise.