MODULE 5 : Musculoskeletal System

Biochemistry – Undergraduate Programme

Faculty of Medicine and Allied Sciences
Rajarata University of Sri Lanka

Broad Objectives

At the end of the module the student is expected to,

1. know the different types of muscle, their function and energy metabolism.
2. be aware of laboratory investigations to detect cardiac and skeletal muscle damage.

Specific Objectives

1. **Muscle**

1.1 State the major types of myocytes and describe the distribution of cellular organelles in each and their likely function.
1.2 State the major fuels used by the cardiac and skeletal red and white muscle, and describe the environment present in each to promote energy production.
1.3 State the proteins present in thin and thick filaments of myofibril and sketch their molecular arrangement.
1.4 Describe the molecular events that occur during muscle contraction following stimulation of a nerve ending.
1.5 List the sub units of troponin and their function during muscle contraction and relaxation.
1.6 Describe the status of ATP / ADP ratio in a myocyte when it is (a) resting, (b) active, explaining how the ratio affects energy production under aerobic and hypoxic conditions.
1.7 State the end products of glucose metabolism after (a) a sprint (b) a long distance run.
1.8 State the fuels used by (a) skeleton muscle (b) cardiac muscle in the post absorptive state and the reasons for their selection.
1.9 Describe the likely biochemical changes that could occur in the cardiac muscle, following cessation of blood supply.
1.10 Explain the biochemical changes in the muscle following muscle fatigue after exercise.
1.11 Explain what is meant by 'oxygen debt' in an exhausted sportsman and biochemical mechanisms available in the body to get rid of it.

2 Laboratory Diagnosis

2.1 Explain time wise, the changes in the serum levels of cardiac specific enzymes and other molecular markers following myocardial infarction.
2.2 Describe the changes in the blood following skeletal muscle damage, as in the case of a crush injury and after a burst of severe physical activity.

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