International Journal of Physical Education, Sports and Health 2024; 11(2): 30-34

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2024; 11(2): 30-34

www.kheljournal.com
Received: 24-01-2024
Accepted: 24-02-2024

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Sports and health science: Introspective view for enlightens global arena (Biochemical aspect)

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Abstract
In many sports, the participation of women on a competitive basis is a recent phenomenon and female standards continue to rise rapidly as women catch up with their male counterparts. There are many different factors that may contribute to success in sport, and the components of success will vary depending on the particular sport. Scientists, coaches, and athletes may argue about the terminology used, but some of the key characteristics that contribute to success in all sports are:1 and other psychological characteristics; 6 Resistance to injury; 7 Nutritional status; and 8 Skill, technique, and related motor control and biomechanical considerations. Sport occupies a prominent place in modern society and successful athletes enjoy a high level of financial and social reward, so there are considerable incentives to succeed. There are also many obstacles to success: the sportsman or woman who succeeds at the highest level faces bigger challenges than ever before. Although the falling rate of participation in sport and physical activity has been a major factor in the epidemic of obesity and related lifestyle diseases that has afflicted many countries in the last couple of decades, more people than ever before are participating in organized sport. This has brought a greater part of the human gene pool into play than was the case a century ago when the luxury of participating in sport was open to only a privileged few from a small number of countries. As the rewards in sport have increased, an industry has grown up to provide support for participants. The elite athlete is only one member of a team that will include a coach, fitness specialists, advisers on tactics and technique, a medical doctor, and a physiotherapist, and perhaps also a physiologist, psychologist, nutritionist/dietitian, biomechanics, and a performance analyst, as well as several others. Each of these professionals plays - or at least should play - a vital role in ensuring that the athlete can undertake the rigorous training that is a prerequisite of success. They will also ensure that the athlete is prepared for competition by addressing all of the problems that may prevent optimum performance.
Physical activity is not a fad, rather it is part of our evolutionary way of living - the kind for which our bodies are engineered and which facilitates proper function of our anatomy, biochemistry and physiology. Sedentary life habits result in maladaptive changes in our constitution and increase the likelihood of disease and premature death. Fitness and good health are not destinations, but rather a lifelong journey. A major vehicle for travel along this journey is regular physical activity.

Keywords: Talent, training trainability physicaldimensions, body composition, motivation, tactical awareness

Introduction
In the present scenario of 21st century we can see the difference changes in the sports field as well as the normal daily life activity. Normal people are much more concerned about their health body and very much consist of knowing people about different kinds of facts which affect the human body. From the development of use knowledge regarding health and daily life activity sports field also develop information to maintain sports performance as well as improve the athletic performance. Sports people are very much concerned about the bio mechanics structure of muscle type of muscle different kind of minerals which helps to improve the body function, different kind of sports training and specially in the diet or biochemical molecules which enhance the performance level. This biochemical molecule are act in study or in molecular level and helps to understood the real phenomenon and find out the Lucknow which create hindrance for athletic performance. In the study author mein concerned about the biochemical changes and different kind of minerals which helps to maintain the human body and also improve the sports performance.

In the study author introduce so many biometrical parameters and its effect in the athletic performance.

What are Biomolecules: Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot soldiers in the battle for the sustenance of life. They range from small molecules such as primary and secondary metabolites and hormones to large macromolecules like proteins, nucleic acids, carbohydrates, lipids, etc.

Exercise Biochemistry

It is a branch of science that deals with the structure functions and metabolism of the molecules of life i.e. Bio-molecules. Macro molecules.

Carbohydrates, lipids, protein, and nucleic acid Micro molecules: Vitamins and minerals.

Biological sample, The most suitable tissue for the biochemical assessment of exercise persons is the blood because it is easy to sample with a satisfactory amount of information.

 Muscle tissue can provide more information since muscle is the primary setting for energy metabolism. We can measure in muscle several substances that do not appear in the Blood (for example ATP, CP & glycogen). However, muscle biopsy is painful. Urine is another sample for the biochemical assessment of an exercise person. It is collected painlessly but contains few substances.

Aims and scope of biochemical assessment: Good health is the sound foundation on which sports performance depends. Therefore the aims of exercise biochemistry are as follows:

1. To protect athlete's health
2. To improve athlete's health and
3. To increase athlete's performance

Samples collected at rest: In this case we examine what the basal state of the body is or what adaptations the previous exercise has caused.

Samples collected during exercise: Such samples inform us about acute biochemical changes caused by physical activity.

Samples collected after exercise-After, can range from a few seconds to hours or even days from the end of exercise.

Biochemical markers provide information about the athlete

- Health status
- Oxidative capacity (Iron status)
- Training load and recovery status
- Integrity of the organs
- Bone and Muscle health
- Fluid balance
- Inflammation
- Cardiovascular risk
- Cognitive ability

Complete Blood Count (CBC)

Abbreviation	Test Name	Definition	Associated Disorders
WBC WBC Diff	White blood cells WBC differential Neutrophils Lymphocytes Monocytes Eosinophils Basophils	WBCs fight infection. The 5 different types of WBCs are listed to the left.	Infection, leukemia
RBC	Red blood cells	RBCs (with the help of hemoglobin) carry oxygen throughout the body	↓ Anemia, bleeding, malnutrition, kidney disease ↑ Polycythemia, heart and lung disease, dehydration
Hb or Hgb	Hemoglobin	Protein that carries oxygen	↓ Anemia, bleeding, malnutrition, cirrhosis, cancer ↑ Dehydration, polycythemia
Hct	Hematocrit	Amount of space in the blood that is occupied by RBCs	↓ Anemia, bleeding, malnutrition, cirrhosis, cancer ↑ Dehydration, polycythemia, hemochromatosis
MCV	Mean corpuscle volume	Average size of the RBCs	Anemia, thalassemia, malnutrition
MCH	Mean corpuscle hemoglobin	Average amount of Hb in each RBC	Anemia, thalassemia, malnutrition
MCHC	Mean corpuscle hemoglobin concentration	Average amount of Hb in the RBCs compared to the average size of the RBCs	Anemia, thalassemia, malnutrition
RDW	Red cell distribution width	Amount of variation in size of the RBCs	Anemia, thalassemia, malnutrition
Plt	Platelet count	Platelets are sticky cells that help to form blood clots	Bleeding and clotting disorders
MPV	Mean platelet volume	Average size of the platelets	Bleeding and clotting disorders

Cholesterol: Cholesterol is the waxy substance that forms naturally in our body. Cholesterol is carried in blood bound to some proteins as carriers**.**

Causes of High Cholesterol (CH)	Causes of Low Cholesterol (CH)
Food intake with high CH, hereditary high CH, fatty liver, nephritis, hypothyroidism, stress, diabetes, etc.	Low CH causes is poor absorption, indigestion, hyperthyroidism, liver disease, etc.

Functions

1. Cholesterol is involved in the making of cell membranes,
2. Cholesterol is involved in production of certain hormones (Steroidal hormones)
3. Cholesterol is involved in production of vitamin D
4. Cholesterol is involved in the formation of bile acids, which are necessary for the digestion of fats Desirable Range: 150 to 220 mg/dl

Triglycerides: Triglycerides are the most common type of fat found in our body. It stored in adipose Tissues and circulates in the blood. Cause of high triglycerides. Obesity, Kidney disease, regularly eating more calories than burn, uncontrolled diabetes, They are a major source of energy. Stored fat is used more during activity while circulating fat is more important for recovery after the workout. Desirable Range:

For Male - 60 to 160 mg/dl

For Female - 40 to 140 mg/dl

HDL: HDL cholesterol, or "good" cholesterol, appears to clean the walls of blood vessels, by cleaning out excess cholesterol. It then carries that excess cholesterol to the liver for processing. Desirable Range: In Male 35 to 55 mg/dl In Female 45 to 65 mg/dl

How can we increase our hdl levels?

- Aerobic exercise
- Lose weight
- Stop smoking & alcohol intake
- Increase the monounsaturated fats in your diet.
- Add soluble fiber to your diet- Soluble fibers are found in oats, fruits, vegetables, and legumes.
- Other dietary means to increasing HDL. Cranberry juice has been shown to increase HDL levels. Fish, ginger, garlic and other foods containing omega-3 fatty acids can also increase HDL levels.

Fatty acids: Fats are used as a primary energy source in endurance events or when carbohydrate availability is low. In addition to providing energy, some types of fats play important roles in recovery.

Omega-3 fatty acids eicosa pentaenoic acid (EPA) and docosahexaenoic acid (DHA) reduce inflammation, muscle soreness, and the perception of pain from exercise.

In addition, omega-3 fatty acids may support increased training volume and support adaptations to exercise training.

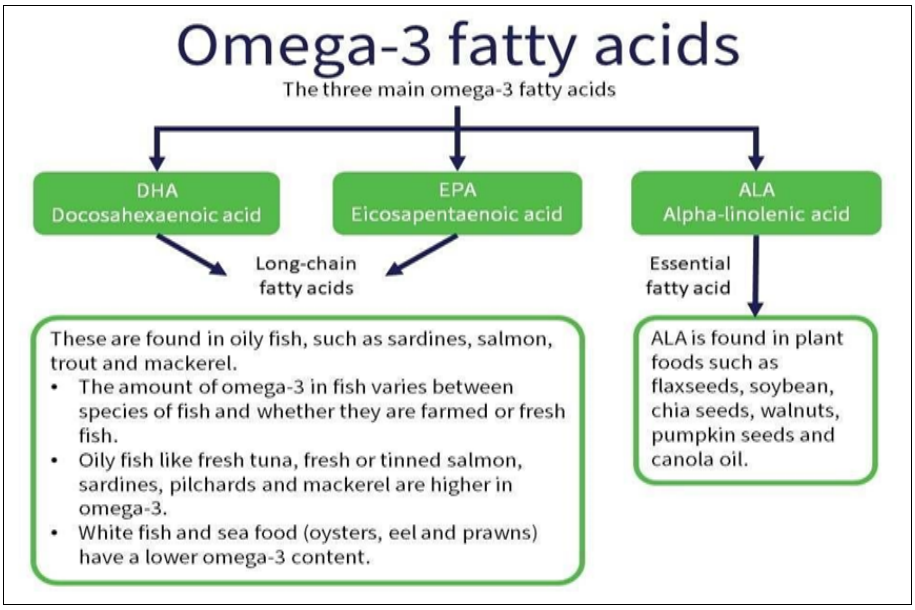

Fig 1: Animal and Plants source of Omega Three Fatty Acids

Fig 2: Serum iron transferrin saturation total iron-binding capacity (TIBC) soluble transferrin receptors

Iron Status

Iron holds a central position in oxygen transport, storage and utilization for aerobic energy production; it is part of heme, the prosthetic group of myoglobin and hemoglobin. Iron is the element that bind O2. In addition, iron is part of several proteins in electron transport chain. The iron content of tissues is one of the factors determining the aerobic capacity of an individual. Adequacy of iron in the body is closely linked to health, fitness and sports performance, given the great importance of aerobic metabolism during exercise. Iron is an important mineral in oxygen transport and oxidative phosphorylation which are fundamental physiological process required for aerobic metabolism and cardiovascular endurance performance. Hb concentration shows the capacity of blood to absorb atmospheric oxygen in the lungs & carry it to the tissues. Hemoglobin is the oxygen-carrying protein in the blood. It transport oxygen to the different parts of the body & It act as buffer. The blood Hb conc. Increases during leaving at high altitude because of the low O2 conc. in the air. As the O2 in the air drop, so does the O2 in the blood, and promotes erythropoietin production by the kidney. This is a protein hormone causing erythrocyte formation (hemopoiesis) in the bone marrow. In general dietary iron is absorbed poorly. Animal sources of iron are about 10 - 25% absorbed. Plant sources are only 2 - 5% absorbed. Ascorbic acid (Vitamin C) increases iron absorption, whereas tannic acid, found in tea and coffee, decreases it. Desirable Range: For male 12 to 18 gm/dl For female 12 to 16 gm/dl. The iron concentration (in the serum) informs us about the amount that is available for uptake by the tissues. Serum iron is mainly influenced by food iron content, intestine absorption and iron loss. Consistent low serum iron suggests iron deficiency. Transient decrease in serum iron can be acute response to bacterial infection. The norm of serum iron for male is 65-170 µg/dl. The norm of serum iron for Female is 50-170 µg/dl. Transferrin combines to iron molecules and transport iron from sites of absorption to sites of utilization. Serum transferrin concentration is reversely proportional to the iron status. TIBC refers to the maximum capacity of binding iron by transferrin found in the blood. It is an indicator of transferrin content in the blood. Individual suffering from the iron deficiency anemia will have their TIBC and transferrin increased. An increase in TIBC may also indicate acute hepatitis and polycythaemia, chronic infection, renopathy and certain cancer will reduce TIBC. The norms of TIBC is 230-450 µg/dl. TIBC µg/dl = Transferrin (mg/dl) X 1.27 Transferrin saturation refers to the percentage of serum iron in compare to the TIBC. At times of iron deficiency, transferrin saturation decreases. Excessive iron will accompany with high transferrin saturation. The norms of Transferrin saturation is 15-50%. The transferrin receptors is an integral protein of the plasma membrane of almost all cells, consisting of two identical 95 kDa polypeptide chains. The function of transferrin receptors is to carry iron and transferrin into cells. It is found on the surface of all cells, especially for those require a high iron supply (e.g RBC that produce hemoglobin). The measurement of transferrin receptors provides useful information before development of anemia and at times of iron deficiency transferrin receptors increase. Its norms is 0.8- 2.3 mg/dl.

Ferritin: Ferritin molecule is made up of iron molecule and transferrin. It is present in most cells and its major roll is iron storage. In the liver and bone marrow, ferritin supplies iron for the production of hemoglobin. The major purpose of measuring ferritin is to monitor iron status. It is particularly useful for early phase of iron deficiency anemia. A low level ferritin level suggests reduction in iron store that may lead to anemia. Excess iron store will increase ferritin. High ferritin may also suggest infection, inflammation and damage to the liver, spleen or bone marrow.

The norm of ferritin for male is 20-250 µg/L

Conclusion

Health and sports science depends upon the so many factors biochemical point of view is one of them. If we know the biochemical or molecular level phenomenon in the cellular level we can clear the real fact or real story about the feature of sports performance depending factors.

From the introspective view we can learn or we can understood the importance of blood or specifically iron protein carbohydrate fat minerals if you want to maintain our daily life activity and increase our physical fitness level we must concentrate by molecular levels or contents of the different molecules in optimum level.

They study mein beneficial for the student coaches athlete and also all general people who are avoid or prevent from the different kinds of disease and try to maintain or leave the healthy life.

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