



Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Study on the Application of Technology Biochemical and Chemical in Sports

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ABSTRACT

All of the human activities undergo a series of chemical changes in the body. So the sports biochemical reveals the essence of human life activities in sports activities, can be more scientifically carry out physical education and sports training. Exercise biochemistry is a young discipline, plays an important role in theory and reality in the human sports. Through the application of biochemical technology in sports, can greatly accelerate the development of sports science, promote people's physical health, and improve the competitive ability and level of the athletes.

Key words: biochemistry; technology; sports; movement; application

INTRODUCTION

In recent years, with the Chinese athletes get good results in all kinds of sports, especially in the 2008 Beijing Olympic Games, China "harvested" gold medal, science and technology is no longer a slogan of the Olympic Games, it has been the "blood" of the coaches and athletes. It can be said that each of the Olympic Games gold medal, not only embodies the athletes of hard sweat, also embodies the painstaking effort of the coaches and the research achievements of scientific research personnel. In sports training, sports biochemistry more and more shows its unprecedented application value and potential. Selection, training plan formulation and modification, load intensity and volume of objective evaluation, diagnosis and prevention of fatigue, reasonable nutrition and other athletes, are closely related with sports biochemistry. As you see, exercise biochemistry has become an indispensable basic knowledge of sports training, and an important subject sports coaches must be familiar with.[1]

BIOCHEMISTRY AND SPORTS SCIENCE

In practical applications, it is often encountered in multi-criteria or objectives, design and decision-making problems, such as securities investment issues, investors in order to get higher returns, you need to select the best stocks to invest in, in general, a outstanding shares have the following characteristics: good performance, low price-earnings ratio, growth higher, but usually these goals are in conflict, such as the current domestic steel industry generally better performance of listed companies, earnings are relatively low, but the steel industry is not sunrise industry, the company's growth is not high; while some small and medium sized companies although growth is high, but the performance is poor[9]. The high price-earnings ratio, and thus to be able to choose a good stock, you need to make investment decisions among these goals a balanced approach that more than a numerical target in a given region of the optimization problem is known as multi-objective optimization.[2]

Biochemistry is the study of life material chemical composition, structure and life activities in the process of chemical change the foundation of life science. The main task is to know the biological chemical composition, structure and various chemical changes in the process of life.

Sports in the sports science are the study of human social activity and its law of development of a science, its main body is a person. Sports science should not only study the sports in biological process, and human's social and psychological process, is the natural attribute, social attribute, the unity of the properties of thinking.

Exercise biochemistry is a branch of biological chemistry, one of sports science disciplines, and application in sports science basic disciplines, is the method of applied physics, chemistry and biology, from molecular level to study the chemical composition of the body movement, chemical change, energy transformation and the change and development of the sports ability, serve for sports practice and apply the law of a science. All the life activities of the human body is based on the implemented a series of chemical changes in the body and the sports biochemistry can reveal the human body in sports activities and sports training in the nature of life activity, and thus more scientifically carry out physical education and sports training.[3]

THE DEVELOPMENT OF SPORTS BIOCHEMISTRY

Yakovlev N 1955 wrote the book *Introduction to Exercise Biochemistry*, is the first treatise of exercise biochemistry, illustrates the exercise biochemistry research has basic size, marked the sports biochemistry became an independent discipline. In 1968 in the international sports and sports federation (ISPE, now renamed the international federation of sports science and sports, ICSSPE) initiative, was held in Brussels, Belgium, the first international conference of Exercise Biochemistry, was established in the conference "sports Biochemistry research organization" (Research Group on Biochemistry of Exercise), affiliated to the ISPE, Exercise Biochemistry research organization, is Belgium j. Poortmans.[4]

Research and teaching work of exercise biochemistry in China began in the '50 s, the biochemical workers into motion, do a lot of work, with the urine protein, urine bravery former, hemoglobin, serum creation kinase and blood urea on athletes body function were assessed in the great physiological load of exercise training; Application of blood lactate and blood glucose on certain biochemical characteristics of sports, training methods and exercise intensity grasp scientific arguments are put forward.1956 courses in exercise biochemistry in China. In 1960, Professor Feng Huiquan published the first exercise biochemistry notes. Therefore, we can think exercise biochemistry in the 60 s of this century mature as an independent discipline, and with the progress of era of science and technology rapid development. After the middle of the 20th century, with the natural sciences, the rapid development of sports science includes chemical principle and experimental method to the field of sports science constantly infiltration. Currently, continuously expand sports biochemistry frontier, which pitted against such as life science, material science, neuroscience and sports science is closely related to the field, for the development of sports science provides new opportunities.[5]

BIOCHEMICAL EFFECTS ON SPORTS

Currently, scientists are molecular biochemistry, gene technology was used to mainly reflects in the profound influence of the sports science promote the functional gene research. Human genome preliminary analysis results show that there are about 30000 human genes, so in theory there will be 30000 to control the chemical small molecular interaction of these genes control the life process. Research achievements of biochemistry, gene technology can make people further understand the inner link of the human body movement ability and the genetic, determine the genes associated with athletic ability protein and nucleic acid molecules, reveal the gene regulation of metabolism of the body movement to clarify exercise fatigue and recovery. The molecular mechanism of muscle strength increases thereby at the molecular level as to provide theoretical basis for selection and scientific training and rational guidance. In addition, you can more clearly elucidated from the molecular level exercise its relationship with cardiovascular disease, obesity, diabetes and its prevention mechanism, provide the guidance of the prescription sex for the national fitness.[6]

Molecular behavior research on the neurobiology of synapses will unlock the secret of the human brain and nervous system. Doping, drug addiction, tension, fear, nerve repair, sleep will be actively intervene. Such as simulating the human brain function, according to the working principle of the neural network, chemists will be sent to you by pure chemical processes in the production of small circuit, make up a large number of electronic circuits are arranged in massive storage system, preparation of bimolecular computers, used for monitoring in sports training and body function assessment, control of sports training and competition athletes physiological, Biochemical indicators, prevent sports injuries, quickly to restore exercise fatigue, can be observed athletes body function anytime and anywhere, Thought condition, Psychological mood, raise the level of sports training and forecasting performance.

Material innovation is the sign of human social civilization development stage. Emerging biological materials has opened up a new field for life science. Research shows that people's physical quality and development potential of many aspects has a very high degree of genetic, their adjustment and the control of one or a few genes. Such as fullerenes class material provides the new tools of molecular for life science research, can be used as a DNA sequence specificity to cut off the reagent. Fullerenes tools at the same time, the molecules can also provide reliable material support for the genes that make use of gene scientific selection and the athletes body function evaluation is likely to become a reality.[7]

With the development of biotechnology, the use of biological chemistry and other related research results, from an organism, biological tissues, cells, organs, body fluids, etc., comprehensive utilization of microbiology, biochemistry, biotechnology, pharmaceutical, etc. The principle and method of science can produce for prevention, treatment and diagnosis of sports medicine, here also contains like "doping" and other types of illicit drugs. "Doping" means to stimulate the human nervous system, make the person produces excitement to improve function of the state of the drug. After referring to work on human body's enginery and help athletes' performance enhancing drugs. Use "doping" not only damages the Olympic spirit, the equity principle of sports competition, and cause serious damage to the athletes in good health. Many harmful effects only in a few years later, and even the doctors could not tell the difference between what athletes are in critical condition, which will not be a problem for the time being. Chairman of the world anti-doping agency (WADA), dick pound claims, to prevent the athletes using illegal technology to improve performance, sports must pay attention to the development of the human genome. Once the United States of the human genome project is complete, the athlete may change their bodies, human movement ability to improve to unthinkable levels, sports records will all be changed. This is a serious fact, should actively respond to, and should not be negative to wait. In addition, gene therapy is an emerging discipline in the field of medical research, gene is mainly used to treat some difficult to deal with human diseases, including heart disease, such as muscular dystrophy and hemophilia, by injecting the genes into the body to correct some illness. At the university of Sydney Australia and its affiliated hospital of lascar, according to prof athletes may genes by means of single injection preparation injected into the body, the gene can stay for a long time in the body, and to produce a protein of excitement, and the protein cannot be found in the routine blood test and urine test.[8]

THE APPLICATION OF BIOCHEMICAL TECHNOLOGY IN SPORTS

In athletes selecting work, the traditional way is to the coaches according to the experience in factory first screening, again through the observation, training, testing and simulation match in selection. Along with the development of the sports biochemistry technology, entered the stage of scientific selection, coaches, sports biochemistry knowledge, can be applied to objectively from gene, body shape, biochemical indicators, a comprehensive evaluation, body function, such as surface will have the potential to athletic talent, has selected, for the future sports training, competition also has a promoting effect.[9]

Due to the characteristics of sports, the body's metabolism and energy metabolism characteristics are also different. Choose reasonable training methods based on the characteristics of power project, is a key to improve the sports ability of athletes. In for a short time, big intensity exercise (100 m run, 50 m swimming, weight lifting, judo, wrestling, etc), the energy mainly comes from the original phosphate supply system, so to improve the athletes' speed, strength, quality, first of all should develop phosphate original power system of power capacity. Anaerobic endurance quality depends on sugar anaerobic glycolysis ability, because the original phosphate metabolic system time is short, so the anaerobic endurance ability of anaerobic glycolysis is based on sugar for energy. Anaerobic endurance, therefore, to improve anaerobic glycolysis system must develop sugar supply ability, such as the 200 m run, 200 m, 100 m swimming marathon distance aerobic endurance sports, such as athlete's power depends on their aerobic capacity, through training to improve its sugar, protein, fat of aerobic metabolism ability together. Therefore, coaches should according to project power characteristic, the reasonable training plan, improve the corresponding power supply capacity of the system. If use anaerobic - low lactate training method can develop the original phosphate supply ability of power system; The biggest lactic acid intermittent method is adopted, lactate tolerance training method, can improve the anaerobic glycolysis sugar supply ability of power system; By the methods of lactate threshold intensity training, aerobic metabolism of intermittent training method and so on, can improve the aerobic capacity.

In China, "re-understanding the" has been a sports training guidelines, but long-term great physiological load of exercise training, athletes prone to exercise fatigue; Incubation period and exercise-induced fatigue to a certain extent, it is difficult to use general method to assess the incubation period of the body change certain chemicals, lead to decreased immunity levels and hormone levels, etc. Through biochemical index test, therefore, to assess whether the athletes are in a state of fatigue. Coaches to use biological chemistry knowledge, combined with their own experience, can quickly diagnosed whether athletes at the exercise fatigue stage then adjust the training plan according to the circumstance, avoid injury by fatigue cumulative. If use blood lactic acid, urinary protein, serum creation kinase and biochemical indexes such as evaluation of sports load intensity; Using blood urea, hemoglobin, blood testosterone and uric bravery former load indicators to assess these indicators of evaluation is simple, the coach is fully capable of according to the test results, adjust training plan.

Usually, coaches often, according to the athletes' physical quality test and performance evaluation of a period of training effect; Performance, however, influenced by many factors, so, the above all can't objectively and truly reflect their sports level. Exercise biochemistry from molecular level analysis to motion adaptive response, so using biochemical index to evaluate the training effect is more objective and effective. Such as coefficient of urine

creatinine can assess phosphate original power system power capability, through a period of training, according to the index to assess athletes' phosphate original power ability is improved. In addition, the coaches, biochemistry knowledge can be applied to real-time monitoring the functioning and nutritional status of athletes. Big load of exercise training causes the body to appear "unbalanced" state, sugar, protein, fat and other nutrients is a large amount of consumption, through relevant biochemical index can understand the body's nutrition level athletes, in training and after training in a timely manner nutritional supplements, to help its fitness, reduce the degree of fatigue.[10]

At present, there are two main types of international against doping detection, a urine test, is a blood test. Regardless of the kind of test needed to use biochemical technology. Chairman of the world anti-doping agency (WADA), Dick Pound claims, to prevent the athletes using illegal technology to improve performance, sports must pay attention to the development of the human genome. Once the United States of the human genome project is complete, the athlete may change their bodies, human movement ability to improve to unthinkable levels, sports records will all be changed. The international Olympic committee (IOC) and anti-doping expert are Yang Ge professor west says, although the genetic engineering for the treatment of some diseases such as cancer revolutionary significance, but in competitive sports, gene doping detection should be mentioned the agenda. Gene doping is available in two areas: aerobic ability and physical strength. In theory, people can control muscle strength, muscle volume and how can change the composition of muscle. The medical are very interested in community to explore a method of gene therapy for people to monitor the.

CONCLUSION

Exercise biochemistry is a young discipline. Through the application of biochemical technology in sports, can greatly accelerate the development of sports science, promote people's physical health, better help coaches to athletes selecting work, perfect the training plan, the scientific evaluation of training effect, real-time monitoring of training intensity and volume, the comprehensive evaluation function of the athletes and the nutritional status, so as to better improve the athletes' competitive ability and level.

Acknowledgments

Natural Science and Technology Research of Foundation Project of Henan Province Department of Science under Grant Nos. 132102310470.

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