



Research Progress on Trypanosomiasis in China

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Abstract

In this paper, the research on biological characteristics, the immunological antigens of trypanosomes, the molecular biological researches on the mechanism of trypanosomiasis, and the study of chemotherapy on trypanosomiasis have been summarized. The prospects of trypanosome and trypanosomiasis have been provided.

Subject Areas

Infectious Diseases, Public Health

Keywords

Trypanosomiasis, Immunology, Molecular Biology, Chemotherapy

1. Introduction

Trypanosome is a class of protozoa with flagella, belonging to the movement matrix, such as trypanosome and trypanosomiidae. Trypanosomiasis is common in the blood and cells of mammals, birds, fish and amphibians. It is mainly transmitted through various blood-sucking insects [1]. So far, there are two types of trypanosomes, one of which is the development of salivary trypanosoma in the front of the digestive tract, which is usually pathogenic. The other is the faecal parasite, which develops at the back of the alimentary canal, in which all except the dead trypanosomiasis [2]. Trypanosomiasis has not been developed successfully in the host body by continuously changing surface antigens to avoid host immunity. Control of Trypanosomiasis can only rely on drugs. Due to the frequent use of a resistant mechanism of the same class of drugs, in order to prevent the formation of cone insect resistance, the insect body to the drug re-

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sistance could use biochemistry, molecular biology and gene engineering technology research trypanosome resistance mechanism. Although these studies has obtained certain achievements, there are still many details are not clear, so the resistance mechanism of trypan has much difficulty.

2. The Morphological Study of Trypanosomes

Most trypanosomes tapering at both ends, and has developed the volatility of the membrane and a long-standing free flagella, of course, there are the kinds of short-term exist flagella, and some species have an obvious ovoid nuclei and a vacuolated cytoplasm [3].

2.1. Surface Membrane

The trypanosoma is a protozoan, composed of individual cells. The membrane is a layer of protoplasm wrapped in the surface of the cone, and the outer layer of the membrane is covered by a coat membrane that protects the body from the immune function of the host.

2.2. Surface Variation Glycoprotein

Trypan chronic infection in the host usually can last for years, changing its rely on surface cover coat membrane antigen, so as to achieve the aim of avoiding host immune function, this kind of antigen variation phenomenon is an important biological characteristics, trypanosome coat layer covering the surface of the film is actually surface glycoprotein.

2.3. The Nucleus

Trypanosoma usually has only one nucleus, in the cytoplasm, usually round or oval. Nuclear membrane can be divided into two layers of nuclear membrane and nuclear membrane, nuclear membrane on the nuclear pore, as small molecules and ions free through the channel, there are many free ribosomes under nuclear membrane, the cell nucleus contains a central nucleoli. After the nucleus of the nucleus was stained by Jim sa, it was observed in dark purple.

2.4. The Moving Substrate

The moving matrix is a special structure in the mitochondria of trypanosome, also known as the active nucleus, usually short, round, or elliptical. The moving matrix contains self-replicating DNA, which is surrounded by large circular DNA and small circular DNA molecules. Due to the dynamic matrix is located in the mitochondria, but store the rich can staining DNA structure, dynamic matrix is peculiar to the parasite structure, dynamic matrix, however, its function has not been elucidated in trypanosome body.

2.5. The Flagellum

The flagellum protrudes from the posterior extremity of the body of the body in

the back end of the body, extending from the back end of the body to the front end of the body. Trypanosome flagella outsourcing one layer of coat film, outer ring for 9 group of duplex microtubules, package within a pair of central microtubules, is a typical structure of 9 + 2 microtubules, have a lattice of balance beam at the same time, between the tubes and balance beam inside also has a lot of empty area. The flagella can be continuously contracted through the thread structure in the central microtube, which can promote the movement of trypanosome.

2.6. Undulating Membrane

The undulating membrane is a unique structure of trypanosome, and most of them have obvious undulating membrane structures, usually wavy or finned. Vickerman observes via ultrastructure that the wave membrane is derived from the membrane of the membrane, rather than a part of the flagellum [4].

3. Immunological Research

Since trypanosome has strong surface antigenic ability to mutate and evade the host immune attack, there is no ideal vaccine for practical application. Tabular mutated glycoprotein (VSG) is a recognized strong immunogen, which can stimulate the host to produce cell and humoral immune response, and the elimination of trypanosomiasis is mainly dependent on VSG antibody mediated. The immunological prevention of trypanosomiasis has been the focus of scholars in China.

Studies showed ShTat1.1 VSG + ShTat1.2 VSG compound antigen immunizing mice can avoid the interference of trypanosome antigen variation to obtain good immune protection effect, and with ShTat1.1 VSG immune mice can only get part of the immune protection, cannot overcome the interference of trypanosome antigen mutation, immune rat on the top by trypanosome ShTat1.1 VSG stimulate immunity can only kill most take corresponding variant trypanosoma, in a short period of time had failed to kill a few variation for trypan ShTat1.2 trypan, evade the host immune, and multiply, and kill the rat [5].

There are also studies showing that trypanosomal multiple miRNA families can regulate the variable surface glycoprotein antigen mRNA of trypanosomiasis [6]. TongXinXin found that IL 27 can direct inhibition of CD4 + T cell proliferation and Th2 cytokines, that IL - 27 - WSX - 1 type of mucosal sites II has inhibitory effect on the inherent immunity and adaptive immunity, and WSX - 1 for *t. cruzi* parasites Th1 response during the period of infection is very important to start [7]. There are also some scholars who use the surface antigen specificity of trypanosomiasis to develop monoclonal antibody against the VSG antigens of the ichis, and develop the immune-colloidal gold test paper with the positive coincidence rate of 88.2%. The rapid, sensitive and specific detection of the water buffalo's trypanosomiasis is an effective method for the detection and pre-control of the detection and precontrol of ichistrypanosomiasis of buffalo [8].

4. Molecular Biology Research

Trypanosoma is susceptible to drug resistance, and the resistance of trypanosomiasis has been documented in 1908. It is the first class of parasite to detect drug resistance [9]. In order to guide the proper use of drugs and explore prevent cone insect resistance and remove the existing drug resistance, many scholars of developed countries and developing countries, the cone insect resistance mechanism of biochemical research. The study mainly has three directions, the enzyme activity changes of drug resistant trypanosomiasis [10]; Adenosine transporters [11]; Genetic changes [12].

El-Sayed [13] in 400 cDNAs and random of genome DNA chip to display brinell trypanosome gene expression in the process of development, for the trypanosome infection, the discovery of new drug targets and the mechanism of host candidate vaccine development provides the basis. Subsequently, a number of researchers used gene chip technology to study the specific gene expression in different developmental periods, such as upper flagellum, and late cone flagellates. [14] [15] [16] [17] [18]. Study shows that the trypanosome mitochondria may play an important role in regulating its life cycle [19].

Researchers found brinelltrypan natural trans transcribed sequence in different life period expression differences and mitochondrial RNA editing the phenomenon to appear in the blood type, as well as explore the brinelltrypan differentiation mechanism provides a new theoretical basis [20].

5. Research on Chemotherapy for Parasites

Because of the antigenic mutation of trypanosome, a better vaccine cannot be developed. So far, the prevention and control of trypanosomiasis has mostly relied on drugs. Although some progresses have been made in molecular biology research on the mechanism of trypanosomiasis resistance, it is still very limited. To break the limitation of conifer resistance, drug resistance is also needed to design the drug.

Myocardial histopathological observation results showed that the injection growth hormone could reduce the load without flagella and reduce the inflammatory infiltration and tissue structure destruction. The results showed that the growth hormone could be used as an immune regulator to control the cone-worm replication, and could be used in combination with the present drug to reduce the harm [21].

The research results show that with trypan bright ammonia acyl tRNAsynthetase for target drug trypan filter system can effectively screen trypan resistant compound, selected compounds have certain resistance trypan specificity, and can be used to compound further optimized and measure its half inhibitory concentration. Filter to use this system to the of trypan has good inhibition, but less poisonous to the cells of the human a series of new compounds, thus trypan bright ammonia acyl tRNAsynthetase is likely to become the new targets for the development of effective drug trypan [22].

6. Prospects

Trypanosome parasite and trypanosomiasis is common in tropical and sub-tropical areas. In China, there are rarely endemic. The accident rate and mechanism of this disease should be investigated in the future.

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