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BUKOVINIAN STATE MEDICAL UNIVERSITY

I. HORBACHEVSKY TERNOPIIL NATIONAL MEDICAL UNIVERSITY

TROPICAL INFECTIONS

MANUAL

for English-speaking students of V-VI courses
of higher medical education institutions

**Edited by Professor Andreychyn M.A.,
Professor Moskaliuk V.D.**

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The manual covers 30 the most relevant to the tropics infectious diseases related to viroses, rickettsioses, protozoiasis and helminthiasis. The current data on their etiology, epidemiology, pathogenesis, pathological anatomy, clinical manifestations, complications, diagnosis, treatment and prevention are given. The learning of text information is facilitated by photos, charts and tables.

It is assigned for English speaking students of medical educational institutions of the III-IV levels of accreditation.

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INTRODUCTION

Since 1976, the World Health Organization (WHO) has been trying to implement a special program to eliminate malaria, trypanosomiasis, leishmaniasis, schistosomiasis, filariasis, leprosy etc. However, over 1 billion people are still infected with at least one causative agent of these tropical infections. In many residents at the same time find several diseases. Tropical diseases cause great human suffering, social exclusion and discrimination (stigmatization). In the case of untimely detection and treatment, most of these diseases cause irreversible damage to the sick body, leads to blindness, exhaustion, injury, premature death.

The natural conditions of the tropical zone, such as high temperature of the air, soil and water, high rainfall or, conversely, drought, contribute to the emergence and spread of infectious diseases. There are objective explanations for this.

Firstly, in hot humid climates, there is the greatest diversity of flora and fauna, including many blood-sucking double-winged insects and ticks that are vectors for pathogens. Some of these vectors reside only in tropical climate, such as the tsetse fly – which carries the causative agent of African trypanosomiasis or the triatomine bug – the vector of American trypanosomiasis. The carriers of other diseases, such as malaria, are common not only in the tropics but are usually the most effective carriers, in particular *Anopheles gambiae* mosquitoes, whose activity is explained by the unique combination of high susceptibility to infection with prolonged life and increased aggression. This causes very intense and stable malaria transmission.

Secondly, the fauna of parasites that are capable of infecting humans is much more numerous than in temperate latitudes. Thirdly, in the tropics the risk of infection with intestinal infections and invasions (salmonellosis, typhoid fever, cholera, shigellosis, amebiasis, etc.) is significantly increased. Fourthly, the most thermophilic pathogens – yellow fever, dengue fever virus, trypanosomes, schistosomes, filariids, etc., as well as their warm-blooded hosts – antelopes, monkeys, anteaters, armadillos, opossums, shellfish live here.

The importance of **soil** in the spread of tropical diseases is due to the fact that pathogens of many infections for a long time can maintain viability and pathogenicity in it. Contaminated soil is a factor in the transmission of many intestinal infections and invasions (typhoid fever, paratyphoid, cholera, amebiasis, giardiasis, hepatitis A, polio, etc.). The soil has particular importance in the spread of geo-helminthiasis, where worms undergo a separate stage of their development. Insects, which are

mechanical or specific vectors of some tropical diseases, also inhabit and breed (flies, mosquitoes) there.

The transmission of pathogens that is related to the soil, the most intensive in areas with developed agriculture. Contamination of the human body in the tropics is facilitated by the frequent contact of bare hands and feet with the ground and water during work, as well as the consumption of contaminated vegetables and herbs.

Water is important in the spreading of tropical diseases. Firstly, some pathogens persist and even reproduce directly in water. These include salmonellosis, typhoid bacteria, cholera, shigellosis, leptospirosis and etc. A human becomes infected while drinking unboiled water. Thus, in rural areas of the tropical and subtropical countries, infectious and parasitic diseases account for 75 % of the overall morbidity of the population, nearly half of which are related to the use of poor quality water. Secondly, certain inhabitants of reservoirs (shellfish, cyclops) are intermediate hosts of some tropical helminthoses. The person becomes infected mostly during bathing. Thirdly, in the reservoirs there is a development of larval stages of many insect vectors: mosquitoes (vector of malaria, filariasis, tularemia, yellow fever, dengue fever, West Nile fever, etc.), midges (onchocerciasis, tularemia), woodlice (some filariasis, tularemia). During tropical heavy rains with streams of water, microorganisms and helminth eggs are spread throughout the area. On the contrary, in times of drought, when the number of water sources decreases, the population is often forced to drink poor-quality contaminated water, in which the concentration of pathogens can multiply. The risk of human contamination due to the use of such water increases significantly. In addition, during the drought, a large number of puddles are formed, which are well heated. And so they become a breeding ground for malaria mosquitoes.

The most important factor in the climate of tropical countries is thermal. Under the influence of heat, mechanisms that regulate body temperature and water-electrolyte balance are often violated. Thirst significantly increases the use of water, including from open reservoirs, which causes decreasing in the acidity of gastric juice, which is normally a reliable obstacle to the path of microorganisms. Dehydration syndrome, particularly in children, is much more severe in hot climates than in temperate latitudes. Heat and insolation reduce the body's reactivity overall.

Most of the countries in the tropical and subtropical zones are undeveloped agrarian states with low levels of sanitary culture and poor medical service. Patients are more likely to live in the countryside or in the slum, in the absence of safe water, in conditions of low education, sanitation, and absence of access to medical care.

Whereas the population is usually malnourished, infectious and parasitic diseases often occur in tropical residents on the background of hypovitaminosis, protein and energy deficits, and other adverse and aggravated conditions.

Conditions of primitive agriculture contribute to the defeat by leptospirosis, schistosomiasis, ankylostomiasis. Cattle and herdsmen often suffer from anthrax, Q- fever, echinococcosis and etc. Hunters and foresters are at increased risk of yellow fever, sleeping sickness, skin leishmaniasis infection. People who carry water are more likely to be affected by dracunculiasis.

Investment in the health care of developing countries is very limited. Infectious endemic diseases in the tropics and subtropics are hardly taken into account when compiling government programs and budgets. In conditions of economic backwardness there are no material incentives for the introduction of new diagnostic, therapeutic and preventive technologies. There is a lack of health workers, and their qualification is significantly inferior to the level of doctors training in developed countries.

The major part of the hospitals is concentrated in cities, and the number of patients requiring medical assistance far exceeds the regulatory capacity; most patients are children. Therefore, the doctor is forced to work in an accelerated mode, which prevents a sufficiently complete examination of the patient. In rural areas, the diagnosis is mainly based on physical data.

Tropical populations are often affected by pathogens that develop non-sterile immunity. Such a compensated state may be mistaken for the main disease, and the true cause of the illness may remain unexplained.

In the tropics, many of the infectious diseases reported in the temperate zone have certain characteristics. For example, the inhabitants of the tropics are often infected with *Corynebacterium Diphtheriae*, not by aerosol, but by contact, and suffer from skin diphtheria. This form of the disease has a mild course and often remains undiagnosed, but ends with the formation of immunity, which reliably protects the person in the future. Therefore, until recently, doctors did not understand why the local population did not suffer from diphtheria of the oropharynx. Classical «child infections» (chicken pox, whooping cough, measles, etc.) are mostly difficult in the tropics and are characterized by very high mortality.

Thus, tropical infections require additional training of physicians in this subject, which prompted the authors to prepare this textbook. First of all it is intended for foreign students, in particular from tropical countries, which are studying in Ukrainian medical universities.

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