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Review Article

Parasite Microorganisms: Their Pathogenesis, Biology, and Prevention Practices.

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Abstract

Parasites are those living organisms that live on some other living organisms, which are known as the hosts. Three main groups of parasites have been identified: protozoa, helminths, and arthropods. The parasite spreads directly from one host to another in this kind of lifecycle, requiring only one host and requiring no development, adaptation, or alteration. For many years, the diagnosis of parasitic disorders has been based on the morphological identification of the stages of the parasite life cycle. Antiparasitic medications work well to reduce parasitic infections. Standardized prevention and treatment of parasite infections is no longer necessary, and because of their low prevalence, screening and diagnosis are challenging. However, the native habitat of parasites may be destroyed or altered by climate change brought on by global warming. Conclusion: Parasites are living creatures that require a host in order to complete their life cycle. Numerous host types are dependent on the requirements of parasites.

Keywords: parasite; classification; life style of parasite; diagnosis; and treatment

Introduction

An organism is considered a parasite if it lives inside another creature, obtaining its resources from it and relying on it to survive. One Although the majority of parasites have the potential to be dangerous, none of them cause illness because doing so might result in the destruction of the organism and host [1]. Protozoan, helminths, and ectoparasites are the three classes of parasites that can be distinguished based on the organism and the diseases it might cause [1]. For many years to come, parasitic infections will be prevalent and have a long history in human evolution. Therefore, it is imperative to remember the harm they do on those who are afflicted with these infections. Increasing our understanding of parasite illnesses is the only way to eradicate or control them. In order to compile recent findings made by academics interested in investigating parasitic diseases despite the pandemic, this Special Issue was created [2].

The study is to give a thorough examination of parasitic germs' biology and harmful mechanisms. Investigating the different ways in which these microbes engage with their hosts, the underlying cellular and molecular mechanisms that contribute to the development of disease, and their effects on the health of humans and animals are the goals of the study. Additionally, in order to assess how well current prevention methods and practices are working to lessen the impact and spread of parasite illnesses, the study will look at them. In order to battle parasite infections, the study will help develop better diagnostic tools, therapeutic interventions, and preventive strategies by combining knowledge about the biology of these pathogens and evaluating current control techniques.

The host might be an animal, plant, or human. Researching parasites and hosts is crucial for microbiologists to comprehend many biological fields, and the information often gathered from scientists is used to address present and upcoming issues. The fact that parasites make up over 50% of biological creatures' lives explains their significance [3].

Classification of Parasite Microorganisms:

Three main groups of parasites have been identified: Protozoa, helminthes, arthropods, and It can be categorised according on the host in which the parasites reside, such as endoparasites, which reside inside the host, and ectoparasites, which reside on the host's skin. Epidemiology, entomology, and other fields will be able to study the interaction between parasites and their environment and host, as well as the large range of parasite kinds that will result from this [4].

Protozoa:

They are microscopic, single-celled, free-living organisms. They are also known as eukaryotes because of the nucleus in the middle of their cells and the outer membrane. Protozoa differ from fungi in that they are not filaments and are typically found in damp, moist environments. They can also move and swim in water and are widely divided, duplicated, and reproduced [5]. Humans receive vital nutrients from fruits and vegetables, such as a variety of vital vitamins and minerals. Consuming fresh fruits and vegetables seems to be a quick, simple, and healthful way to receive nutrients. However, if contaminated, these fresh fruits and vegetables may be a significant source of certain food-borne pathogenic bacteria [6,7]. They may result in chronic to severe diarrhoea, occasionally coupled with flatulence, nausea, vomiting, anorexia, exhaustion, lowgrade fever, and weight loss, are the hallmarks of intestinal protozoan infections. Despite the health benefits of raw fruits and vegetables in non-pharmacological disease prevention, the contamination of these foods with human parasites has lately been identified as a global issue [7].

Helminths:

"Helminths" is derived from the Greek word "worm." It is possible to classify human parasites as keepsakes or heirlooms. Heirlooms are parasites that have been passed down from African ancestors, while souvenirs are parasites that humans have picked up from animals during contact as a result of migration, evolution, and farming methods [8,9]. These helminthic infections are the most prevalent human infectious agents in poor nations. One of the biggest problems facing developing nations, particularly among children, is the helminthic parasite, which affects about 25% of the world's population, or around 2 billion people [9].

Helminthes fall into one of the following categories: Flakes or flatworms. Roundworms, Monogenans and Tapeworms. All of the varieties share the same shape and are thought to be multicellular organisms that manifest ordinarily (without a microscope) under situations of poor sanitation and hygiene [10].

Arthropods:

The class of parasites known as arthropods include a wide variety of creatures, including insects, bugs, beetles, bees, ants, mosquitoes, butterflies, and crustaceans, including prawns, crabs, crayfish, and lobsters, as well as arachnids, which include scorpions, spiders, mites, and ticks. Arthropods are mostly divided into two classes. Arachnids are creatures with eight legs. Insects are creatures with six legs [10,11].

The life style of parasite and pathogenicity:

The parasite spreads directly from one host to another in this kind of lifecycle, requiring only one host and requiring no development, adaptation, or alteration.

Host to finish the lifecycle. This life cycle include an increase in the rate of reproduction as well as phases that are thought to be relatively dormant, such eggs and cysts, during which the parasites must contend with environmental elements including desiccation, temperature, and UV light. The parasites in this life cycle only reside in one host, but their offspring will be transferred to another host. It is crucial to note that the direct life cycle of parasites lacks an intermediary stage, which makes it more imperative to depart from the host. The parasites must be able to remain at this stage [10,13].

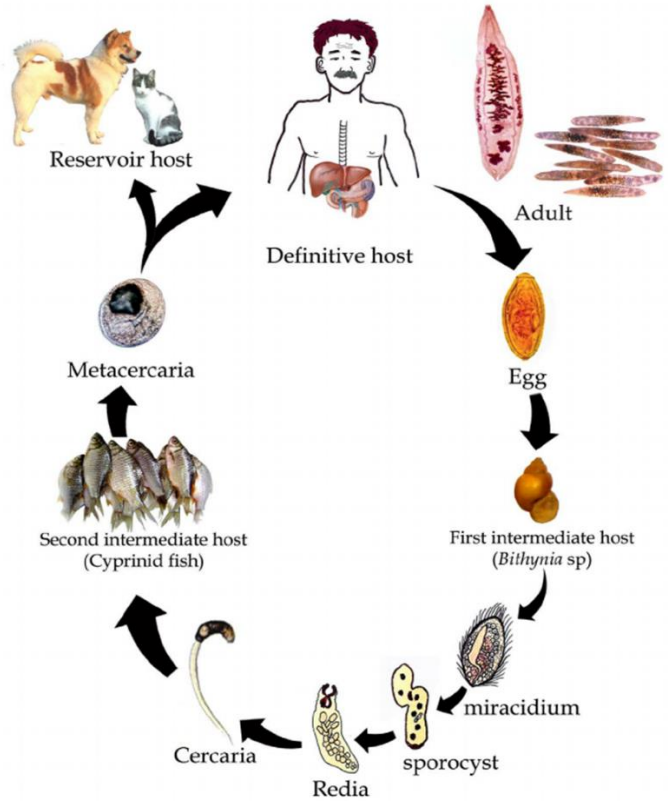

Figure 1: The life cycle of parasites [12].

Diagnosis and clinical expression:

For many years, the diagnosis of parasitic disorders has been based on the morphological identification of the stages of the parasite life cycle. Even though morphology and morphometrics are still very helpful, particularly in low-income communities and areas with a high parasite burden, the loss of the "skills" necessary to make prompt and accurate diagnoses using these methods is becoming more widespread as seasoned diagnosticians continue to leave the field, making it impossible to detect and identify disease-causing pathogens during the prepatent period [14].

The reference standard in parasitology is still using a microscope to look at biological materials for stages of the parasite life cycle. This is a reasonably inexpensive way to diagnose diseases based on morphology [15]. Serology Improved blood-borne protozoan infection diagnosis has been made possible by the advent of serology-based methods. In-depth investigation into the creation of Leishmania serological tests has revealed numerous potential diagnostic antigens. Molecular methods may improve the sensitivity and specificity of helminth infection diagnosis. Schistosomiasis can now be diagnosed using PCR procedures [14].

Treatment and Control Strategies:

The World Health Organization (WHO) estimates that more than 3 billion people worldwide are afflicted with one or more parasitic illnesses, which are common and a major contributor to population morbidity and mortality [16]. Humans have been plagued by parasites for thousands of years, and almost every known parasite unique to humans has been discovered in ancient faeces [17]. No organism is immune to parasites, in fact. Anti-parasitic medications work well to reduce parasitic infections. Standardized prevention and treatment of parasite infections is no longer necessary, and because of their low prevalence, screening and diagnosis are challenging. However, the native habitat of parasites may be destroyed or altered by climate change brought on by global warming. Therefore, in order to address parasitic dangers, long-term planning is required. In many nations in the area, the diagnosis and prevention of parasitic diseases will be enhanced by the adoption of systematic healthcare-associated infection monitoring and infection prevention and control programs in conjunction with initiatives to accurately report parasitic disorders. Furthermore, internet-based education, which is defined as using the internet to access and prevent learning resources, facilitates social interaction and improves the learning process [17]. Regardless of the parasite's class or type, it need a host to survive and finish its life cycle. As is well known, parasites reside in or on other living things.

species, the other species via which the parasite obtains its nourishment and advantages, and which may be harmful, painful, or even toxic to the host [10]. The parasite, on the other hand, made every effort to create and establish a safe environment in which to live. To do this, it displayed a variety of responses to defend itself against the host's responses, which it then resisted. In addition, an interaction and relationship were formed between the two that allowed the parasite to live there, force the host to accept it, begin its lifecycle in union with the host, and begin reproduction [10].

Scientific research on multicellular parasites has also been fuelled by contemporary techniques based on integrative approaches that blend knowledge and resources from multiple specialties; these approaches have improved diagnostic techniques and brought about the introduction of new treatments that are beneficial in both human and veterinary medicine [18].

Conclusion:

Parasites are living creatures that require a host in order to complete their life cycle. Numerous host types are dependent on the requirements of parasites.

The size and length of parasites vary, ranging from microscopic organisms to enormous species that are visible without a microscope.

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