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PARASITES GENERAL CHARACTERISTICS SIGNIFICANCE FOR HUMANS

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Abstract

Moreover, all of them are hermaphrodite, and both asexual reproduction (mostly paratomy) and sexual reproduction are present. Bilateral symmetry, multiciliated epidermis, absence of an accessory centriolus at the ciliary roots, more than one cilia in the terminal cell of the protonephridia, stem cells as differentiation cells, presence of a male porus and male copulatory organ, and dorsoventral and anteroposterior polarity are the classical characteristics that define the phylum Platyhelminthes (Ehlers, 1985; Ax, 1995). Along the primary axis of the body, the pharynx may be found in a variety of positions, depending on whether it is simplex, plicatus, or rosulatus. The oral opening is usually found in the central region of the animal, and the intestine is a blind sac that does not have an anus. The protonephridial system is the route that waste products take out of the body. Hermaphrodites are referred to as turbellarians. The many elements of the male copulatory organ that combine to generate stylets may vary in terms of their intricacy and shape, but they are the reproductive structures that stand out the most.

keywords: Parasites, Characteristics, Humans

INTRODUCTION

Historically, the Platyhelminthes comprise creatures that may be categorised into three primary clades known as the Acoelomorpha, Catenulida, and Rhabditophora. These clades also contain the Neodermata. The group of parasitic Platyhelminthes known as Neodermata (Ehlers, 1985) includes the following orders: Monogenea (Monopisthocotylea and Polyopisthocotylea), Trematoda (Aspidogastrea and Digenea), and Cestoda (Amphilinidea, Gyrocotylidea, and Eucestoda) (Littelwood et al., 1999). The presence of a neodermis, which is a specialised epidermis created by a peripheral syncytium with cytoplasmic elongations and is responsible for giving this parasitic clade its name, is one of the defining characteristics of these parasites. In contrast, trematodes and cestodes are always found inside of their hosts, which are always vertebrates. Monogenea, on the other hand, are always seen externally parasitizing aquatic vertebrates like fish. Both parasitic and free-living taxa of Platyhelminthes share a set of characteristics, including the following: they are nonsegmented acolomates without an anus; they do not have respiratory or circulatory systems; however, they do have an excretory system. Moreover, all of them are hermaphrodite, and both asexual reproduction (mostly paratomy) and sexual reproduction are present. Bilateral symmetry, multiciliated epidermis, absence of an accessory centriolus at the ciliary roots, more than one cilia in the terminal cell of the protonephridia, stem cells as differentiation cells, presence of a male porus and male copulatory organ, and dorsoventral and anteroposterior polarity are the classical characteristics that define the phylum Platyhelminthes (Ehlers, 1985; Ax, 1995). These are characteristics that are shared by all of the many groups that make up this phylum, with the exception of the epidermis that has several cilia. This trait, which is unique to the larval stages of Neodermata, disappears during the adult stages as a result of the formation of the neodermal syncytium. Platyhelminthes may be divided into two distinct taxonomic groups: those that are parasitic and those that are free-living. These two groups are distinguished from one another by a sequence of adaptations that occurred during the transition from a free-living to a parasitic life form. The formation of the neodermis with perikarya under the surface, which serves to effectively protect the external body layer from abrasions or immune reactions of the host, is particularly notable among the various morphological and physiological changes that take place during this stage of development. In free-living turbellarians, which keep their ciliated epidermis throughout their lives, epidermal ciliary rootlets are another remarkable trait that may be important for anchoring cilia in the epidermis. These rootlets may be seen on the epidermis. On the other hand, it's possible that neodermatan larvae that have been infected and have lost their cilia do not need rootlets. In addition, the neodermis plays a vital part in the process of nutrient acquisition by expanding the surface area of exchange The parasitic classes originated from a primordial free-living flatworm, particularly from Rhabdocoelida (Rieger et

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al., 1991), or Fecampiida/Urastomidae (symbiotic taxa), or from Neoophora (Rhabdocela+Prolecithophora), according to the theory of evolution. There are no apomorphies seen in free-living Platyhelminthes, also known as "Turbellaria," such as the neodermis that is found in parasitic groups. Due to the fact that this taxon is regarded to be either paraphyletic or polyphyletic its name is often put behind quotation marks (usually dispensed with later in this manuscript for convenience).

Yet, a grouping of free-living species (including Acoelomorpha) is produced within the Turbellaria due to the singular combination of various features, the majority of which are based on the properties of the body wall as well as the location and function of stem cells Because of their uncomplicated body plans (also known as "Bauplans"), Turbellaria are regarded to be among the most fundamental of the bilaterians (Littlewood and Bray, 2001). Recent molecular phylogenetic investigations lend credence to this idea and provide evidence in its favour. In spite of this, "Turbellaria" has historically been understood to refer to a class that is comprised of a diverse collection of orders. They may be found in the interstitium of marine, brackish, and freshwater habitats, such as gliding on coral reefs, in the water column, or between the roots and leaves of aquatic plants. Their range is global, and they are found in all aquatic environments. The majority of turbellarians have a body length of less than one millimetre, however other orders, such as Tricladida and Polycladida (the so-called macroturbellaria), may have body lengths ranging from 0.2 to 10 centimetres. The body might have a spindle-like, vermiform, or leaf-like shape, and it is coated with the distinctive multiciliated epithelium. The anterior region is home to the majority of the organism's sensory cells (such as eyes, ciliated pits, and rhabdite rods), as well as the central nervous system, whilst the reproductive organs are found in the region's posterior region. Along the primary axis of the body, the pharynx may be found in a variety of positions, depending on whether it is simple, plicatus, or rosulatus. The oral opening is usually found in the central region of the animal, and the intestine is a blind sac that does not have an anus. The protonephridial system is the route that waste products take out of the body. Hermaphrodites are referred to as turbellarians. The many elements of the male copulatory organ that combine to generate stylets may vary in terms of their intricacy and shape, but they are the reproductive structures that stand out the most. The female gonads may either be paired or unpaired, and the eggs can either be endolecithal or ectolecithal (for a more in-depth account of the organisation of Turbellaria, see here).

LITERATURE REVIEW

Irene Patricia del Arenal Mena (2022) In the course of the development of the Earth, an increase in the amount of oxygen in the atmosphere led to the development of organisms that have an aerobic metabolism. These organisms utilised this molecule as the ultimate electron acceptor, whereas other organisms continued to use an anaerobic metabolism. Platyhelminthes are able to switch between an aerobic and an anaerobic metabolic state based on the amount of oxygen that is present in their surrounding environment and/or as a result of the fluctuating oxygen tensions that occur throughout various phases of their life cycle. Because to the absence of a circulatory system in these species, the process of gas exchange takes place through the process of passive diffusion through the body wall. As a consequence of this, the flatworms acquired a number of adaptations that are connected to the oxygen gradient that is generated between the mostly anaerobic cellular parenchyma and the aerobic tegument. The aerobic metabolism results in the production of a significant amount of hydrogen peroxide (H2O2). Catalase is an enzyme that normally removes hydrogen peroxide from the environment in humans; however, parasite platyhelminths do not have catalase. However, the design of the antioxidant systems is distinct, and it is mostly dependant on the enzymes known as superoxide dismutase, glutathione peroxidase, and peroxiredoxin, which are predominantly found in the tegument. In this article, we will describe the adaptations that parasitic flatworms have acquired so that they are able to transition from the various metabolic circumstances to which they are subjected throughout the course of their life cycle.

Yayoi M. Hirano (2020) In Japan, an endoparasitic platyhelminth was obtained from six different species of sacoglossan opisthobranchs at various different locales with waters ranging from temperate to subtropical. Poecilostomatoid copepods, including all species of the family Splanchnotrophidae and many species of the family Philoblennidae, plus a few digenean flukes were the only endoparasitic metazoans known for opisthobranch hosts until recently. The recently found parasite ranged in length from one to fifteen millimetres and lacked eyes, a mouth, a pharynx, and an intestine. It lived within the haemocoel of its host and did not possess any exterior organs that are necessary for parasitic life (such as attachment organs). At reaching maturity, it emerged from the host and formed a cocoon around itself by secreting a silky substance around itself. Egg capsules with 19–42 eggs each were found inside the cocoon. After emerging from their egg capsules, the larvae possessed a ciliated body and a pair of eye spots on each of their segments. They responded unfavourably to light and were able to invade hosts that were appropriate for their presence. Because of these physical and life history characteristics, it is possible that this parasitic worm belongs to the family Fecampiidae (Platyhelminthes: Turbellaria). This family is one of the rare obligate parasite species found in the Turbellaria phylum. Molluscan hosts, which are generally thought to be frequent for parasitic Platyhelminthes, have not been reported to be associated with this family in the past. It's possible that the newly found parasite will be crucial to understanding how parasitism evolved in platyhelminthes.

RESEARCH MYTHOLOGY

The research project was started. In seven tribal villages located in the district of North 24-Parganas under the block Barrackpore in West Bengal, India at 88°21.5' East longitude and 22°47.5' North latitude, one tribal village located in the district of South 24-Parganas under the block Basanti at 88°42' East longitude and 22°12.38' North latitude, and two nontribal muslim villages located in the district of North 24-Parganas under the block Habra in West Bengal (Fig. 6). The factors that led to the selection of these areas included a preliminary base line information indicating a high prevalence of intestinal parasites including a new trematode in man, the cooperation of the villagers, a high prevalence of operculated trematode eggs, and especially cooperation from the people of the administration and the District Health Officer and his staff.

STUDY DESIGN

A discussion with the residents of the area, representatives of the local panchayat (government), and medical authorities from the District was the impetus for starting the research. We spoke about the concerns that might arise with your health if you have intestinal parasites. The next day, the field crew went house to home and took down the names, ages, and genders of the individuals living there. After that, they mapped out the households, animal shelters, and water reservoirs in the area (Fig. 7,8,9). At each visit, 75 participants were given two precoded plastic containers, one of which contained 10 ml of 10% formal saline solution and the other of which was empty, so order to collect new stool samples (Fig. 10). The next day, containers containing stool samples were collected and taken to the laboratory at the division of parasitology, where they were analysed.

METHODS OF LABORATORY DIAGNOSIS OF INTESTINAL PARASITIC INFECTION

After properly mixing, about 8.9 ml of 10% formal-saline solution was added to 1 gramme of faces, and the mixture was then filtered straight into the centrifuge tube. After 1-2 minutes, the volume was brought up to 10 ml with the formal saline solution. After adding 3 ml of solvent ether via a rubber stopper, the tube was forcefully shaken for a total of 1.5 minutes before being centrifuged at a speed of 1000 rpm for a total of 2-3 minutes. Following centrifugation, there were four layers, starting from the top and working their way down to the bottom: the ether layer, the fluffy layer, the formal-saline layer, and the sedimented deposit. The fluffy layer was removed with a stick, and everything else was thrown away save for the deposit. The sediment, which had previously been transferred to a glass slide, was analysed using a research microscope.

DATA ANALYSIS

The well-known nematode parasite of humans is called Ascarls lumbricoides, and it is only one of the 134 species of helminths that are said to be able to infect humans (Crompton, 1988). It is generally agreed upon that information regarding the distribution and prevalence of the parasitic disease is a fundamental component in the debate regarding the significance of the disease to public health and in the discussion regarding whether or not to allocate limited and already stressed resources towards the disease's prevention and control (Walsh and Warren,1979; Morrow,1984; Walsh,1984). (Walsh and Warren,1979; Morrow,1984; Walsh,1984). In the case of ascariasis, its distribution is thought to be worldwide, and "the global prevalence statistic is frequently cited as approximately a billion," which is about equivalent to one-fourth of the world's total population. The frequency and distribution of ascarls around the globe are summarised in table 1, which can be seen below. The current research was carried out in West Bengal's three distinct socio-cultural regions as part of its overall scope. In the study region I, the incidence of ascarls is very high (66.8%), followed by the study area II (55.8%), and then the research area III (6.8%). The trend of change in prevalence of Ascarls with hosts' age that was documented in this research is typical for intestinal helminth parasites in populations with stable endemic infection. [Citation needed] [Citation needed] It has previously been hypothesised that the age-prevalence distribution of A. lumbricoides takes on two distinct forms: one in which the prevalence of the disease decreases in maturity, and another in which the prevalence of the disease maintains a high level throughout all age groups (Feachem et al., 1983). Ascaris infection is acquired in the early age group of 0-5 years in the current research, in study area-I. By the age of 10 years, the prevalence reaches a peak with a value of 81%, and then it drops to roughly 60% in later age groups.

This is an example of the first kind that Feachem ert aU describes (1983). A significant amount of evidence suggests that the prevalence of ascariasis is low in infants under the age of one year but that it rises and reaches a plateau after that (which may remain reasonably stable throughout life) after that. There are certain populations in which this is not always the case. acquired data to indicate that the prevalence decreased and stayed steady in significantly lower levels in maturity. In neighbourhoods hailing from both all documented a pattern of prevalence that was similar to what was seen in the current research in three locations of West Bengal. The reason for this differential age prevalence could be due to the age-related changes in contact with infective stages due to food behaviour, hygiene, physical activity, and other factors; resistance to helminth 'invasion and immunites acquired by exposure in the childhood or adolescent years; or a combination of both of these mechanisms (Elkins al., 1986). Children who are not allowed to leave the study villages have an increased risk of exposure to highly polluted soil that may contain an infectious form of Ascaris, which may be a contributing factor to the disease's high incidence among these children. In Study area I, the prevalence of Ascaris does not change substantially with hosts' sex up to the age range of 1-25 years, but the prevalence among older females is greater than in males. This is because older females are more likely to have older children. In study area II, the prevalence of Ascaris is almost the same in males and females. The only exception to this is in the age group 11-15 years, where infection is significantly higher in males than in females. In study area III, on the other hand, females have a much higher infection rate than males do.

In a number of countries, including Tanzania (McCullough, 1974), Indonesia (Cross et al., 1975; Higgins et al., 1984), Iran (Arfaa and Ghadirian, 1977), Papua New Guinea (Shield eb al., 1980), the Philippines (Cabrera and Valeza, 1980), and Thailand, it has been observed that the prevalence of ascariasis is generally higher in females than (Harinasura and Charoenlarp, 1980). Crompton and Robb from India in 1989 described a pattern that was quite similar to the one that was seen in the current observation, which was carried out in study area-III. It is possible that the high incidence of ascaris in females is due to the fact that the culture demands women to labour in the fields, which in turn increases their likelihood of coming into contact with contaminated soil (WHO, 1967). In contrast, there is not always an association between the prevalence of ascarls and the sex of the host (Annan et al., 1986; Elkins e£ al., 1986; Bundy et al., 1987, '88; Kan, 1988 and Chandiwana et al., 1989), and a higher prevalence of ascariasis among boys than girls has been found among the children in Uttar Pradesh, India (Prakash jrt al It is possible that the high prevalence of ascariasis in females is due to the fact that older females in the study area-I remained confined with in the houses while males remained engaged in different fields for occupational practise. This is in contrast to the males, who remained in different fields for occupational practise. Because of cultural practises and habits around defecation, females in population n have the least amount of interaction with soil that is polluted. As a result, they have an extremely low prevalence. It is generally considered that the climate of a place has a significant role in the distribution and frequency of ascariasis in that location. Warmth and moisture are both required for the embryonation process that ultimately results in the development of the infective larval stages. The embryonation process is facilitated by warmth. In arid nations throughout Africa, the frequency of the disease is typically low (WHO, 1967; Crompton and Tulley, 1987 and Prost, 1987). It was estimated that 72.8% of people in equatorial Congo were infected with the disease, whereas just 3.8% of those in Chad were affected (Crompton and Tulley, 1987). The incidence of ascarls in Cameroon's humid zones is sixty percent, while it did not surpass ten percent in the dry parts (Carrie, 1982). It is important to keep in mind, however, that the accessibility of water will also have an effect on the density of the host population, as well as perhaps the chances of effective transmission of A. lumbricoidea and survival of the infective eggs (Crompton, 1989). In the current investigation, the research areas I and II have an environment that is damp, cool, and shady, and it also has a significant amount of water present in the subsoil. These factors have an effect on the spread of ascaris, in contrast to the dry environment of the area ni. All of the research sites for this examination took place in rural settings. Areas I and II are encircled by fields that are irrigated, but Area III is encircled by rivers and is located closer to the Gulf of Bengal. Communities in rural areas often have a greater prevalence of ascariasis compared to populations in metropolitan settings. This finding is consistent across several countries, including Africa in general (Crompton and Tulley, 1987), India (Crompton and Robb, as quoted in Crompton, 1989), Korea (Seo, 1980), and Panama (Crompton, 1989). (Holland ert al., 1987). It appears in Peru that the prevalence of ascariasis is higher in urban and sub-urban populations from their settled rural lifestyle into urban areas at a rate quicker than town planners can cope with (WHO, 1987). This may favour the spread and increase of ascariasis. A different pattern has been observed more locally in Morocco (Cadi-Soussi et al., 1982) and it appears in Morocco that the prevalence of ascariasis is higher in urban and sub-urban populations in Peru (Prost, 1987). Twenty years ago, it was hypothesised that there was a good chance that the distribution of the prevalence of ascariasis in underdeveloped nations would shift in this way (WHO, 1967). There is some evidence to indicate that the altitude at which a population resides may be a determining factor in the occurrence of ascariasis in some places (Meakins et al., 1981; Schutte et al., 1981). These studies were conducted in the United States. This potential might be illusory and could be a result of the isolation of the population from health services as well as the fact that they are confined to polluted terrain. While comparing the rural and urban environments of Santa Cruz, no discernible changes in the frequency of ascariasis were found in either setting (Cancrini et ad., 1988). In contrast to the findings of the current investigation, which found a high prevalence of ascariasis in lowlands that were characterised by shady and damp soil, Rawlins et al. (1991) found that the prevalence of ascariasis was greater in uplands than in low lands.

CONCLUSION

The ability of flatworms to adapt their developmental trajectories to their environmental contexts is extraordinary, as seen by the regeneration and asexual reproduction seen in free-living taxa, the peculiar embryonic development of many Neoophora, or the intricate lifecycles of the Neodermata. Although the success of so many flatworms can be attributed to this developmental adaptability, molecular research into these processes is still in its infancy. These information gaps obviate the need for a more extensive study of this crucial biology, not only in model flatworms like planarians but also in free-living and parasitic worms from throughout the phylum.

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