THE GALEN

A PHARMACY MAGAZINE

Fifth Edition: May 2024

Theme: "Parasitic Diseases, Its Precautions and Treatment

Congratulation

Dr. Anupam Kumar Pathak

(Winner Best Paper 4th Edition)

Published By:

SAGAR INSTITUTE OF PHARMACY AND TECHNOLOGY,
GANDHI NAGAR, BHOPAL

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SAGAR INSTITUTE OF PHARMACEUTICAL TECHNOLOGY AND RESEARCH,
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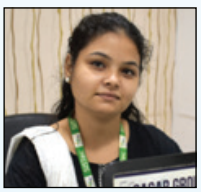

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BIOGRAPHY OF DR. ANUPAM KUMAR PATHAK
(Winner Best Paper 4th Edition)

For past three decades in the field of pharmacy profession, Dr Anupam Kumar Pathak has been a well known and respected figure. He has provided guidance and knowledge to countless individuals who are leaders in their respective fields today both in academics as well as in pharmaceutical industries.

Dr Pathak started his career in academics in 1986 after completing his studies from Dr Hari Singh Gaur University, Sagar. He completed his PhD in Pharmacognosy from Dr HS Gaur University and joined SV Polytechnic College Bhopal. In 1998 Dr Pathak joined Department of Pharmacy at Barkatullah University. In 1999 he became Head of the Department. He was Director of University Institute of Technology at Barkatullah University and acted as Proctor also.
He has more than 200 research publications in reputed national and international journals. He has completed numerous research projects of DST and DBT. Dr Pathak was Vice Chairman of Society of Pharmacognosy for more than a decade. He also was Editor in Chief of Indian Journal of Natural Products.

He has guided 25 PhD students and almost 100 post graduate students. Dr Pathak has chaired various government committees during his tenure at Barkatullah University. He has also worked as Acting Vice Chancellor of Barkatullah University, Bhopal. He is member of many Board of Studies in prominent universities. Striving to achieve excellence, this magazine The Galen, is stationed at this remarkable milestone of Indian Pharmacy Education, Dr A.K. Pathak.

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ARTICLE 1

NOVEL PROTEIN TARGETS OF DIFFERENT PARASITES FOR COMPUTATIONAL RESEARCH

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Computational research in pharmacy, also known as computational pharmacy or computational pharmaceutical sciences, involves the multidimensional application of computational techniques and different methods of various aspects of pharmacy and drug discovery. It is an interdisciplinary field which utilizes computational tools, algorithms and approaches to understand, model, analyze, and optimize pharmaceutical processes. It has huge application in drug molecules, and their interactions with biological systems at different degrees and extent. One such approach is structure based Drug designing (SBDD)

Structure-based drug design (SBDD) is a strategic approach used in drug discovery which relies on the knowledge and novel information of the three-dimensional (3D) structure of a biological target, such as a protein or enzyme, to design, optimized perfect drug candidates with significant higher binding affinity and specificity.

Structure-based drug design is a multistep process which starts from target identification, characterization, ligandbinding, virtualscreening, scoring, leadoptimization, experiment validation and end up with the last step of clinical development.

The first step in SBDD is to identify a relevant biological target implicated in a disease process. Target is typically a protein involved in a biological pathway or it can be a receptor responsible for a specific physiological response.

In this work an attempt has been made to have compilation of differentparasitic protein along with 3d Structure ,resolution ,mutation status ,Structure weight ,atom count and chain as a basic selection criteria for computational research of protein . Information of Pores or cavities of the protein is also mentioned with the protein so that these cavities can be utilized with the interaction with the drug or binding of ligand.Ramchandran Plot of all the proteins are also included in the article so that it can be easily used as a validation parameter for the protein.

1.leishmania-Leishmania is a genus of parasitic protozoa belonging to the family Trypanosomatidae. These parasites are responsible for causing a group of diseases collectively known as leishmaniasis, which affects both humans and animals.

a)PDB-3H4VPteridinereductase (PTR1) is essential for salvage of pterins by parasitic trypanosomatids and is a target for the development of improved therapies. To identify inhibitors of Leishmania major and Trypanosomacruzi PTR1,Selective screening and design to identify inhibitors of leishmania major pteridinereductase 1

- Method: X-RAY DIFFRACTION
- Resolution: 2.40 Å
- Mutation(s)- Non Mutated protein
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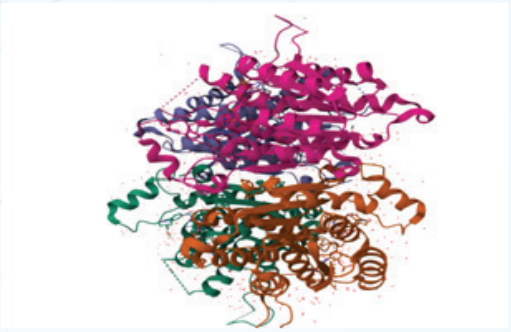
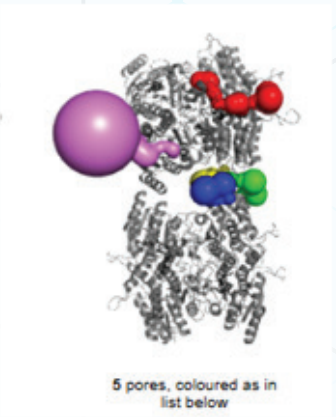
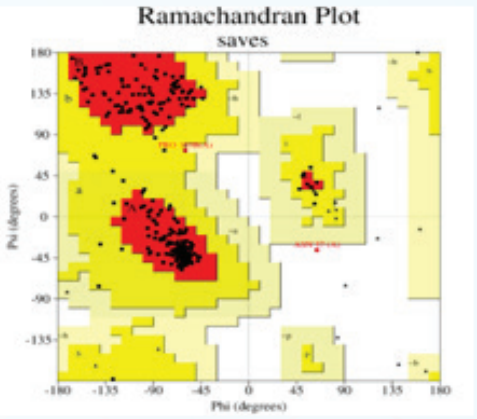
- Modelled Residue Count: 2128
- Deposited Residue Count: 2308
- Unique protein chains: 1





	Radius	Free R	Length	HPathy	HPhob	Polar	Rel Mut
1	1.62	3.56	113.4	-1.03	-0.24	20.9	84
2	1.19	1.53	112.7	-1.38	-0.23	21.6	80
3	1.87	2.05	27.1	-2.02	-0.51	21.5	87
4	1.68	1.68	35.5	-1.49	-0.36	21.0	99
5	2.18	2.45	41.5	-2.09	-0.34	23.9	99



b)5EBK-Trypanothione reductase in complex with 6-(sec-butoxy)-2-((3-chlorophenyl)thio) pyrimidin-4-amine-The study presented here aimed at identifying a new class of compounds acting against Leishmania parasites, the causative agent of Leishmaniasis. For this purpose, the thioether derivatives of our in-house library have been evaluated in whole-cell screening assays in order to determine their in vitro activity against Leishmania protozoan.

- Method: X-RAY DIFFRACTION
- Resolution: 3.51 Å
- Mutation(s)- Non Mutated protein
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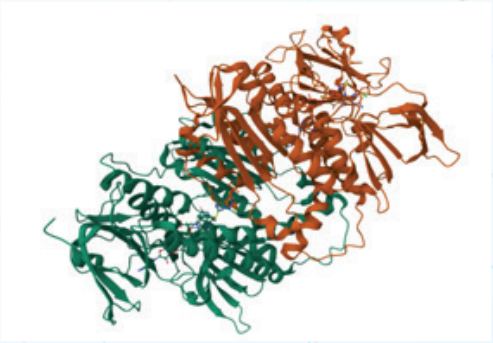

2.Trypanosomacruzi-Trypanosomacruzi is a parasitic protozoan belonging to the Trypanosomatidae family, which also includes other important parasites like Trypanosomabrucei and Leishmania species. T. cruzi is the causative agent of Chagas disease, also known as American trypanosomiasis

c)3HBB-Structures of dihydrofolatereductase-thymidylate synthase of Trypanosomacruzi in the folate-free state and in complex with two antifolate drugs, trimetrexate and methotrexate

- Method: X-RAY DIFFRACTION
- Resolution: 3.00 Å
- Mutation(s)- Non Mutated protein
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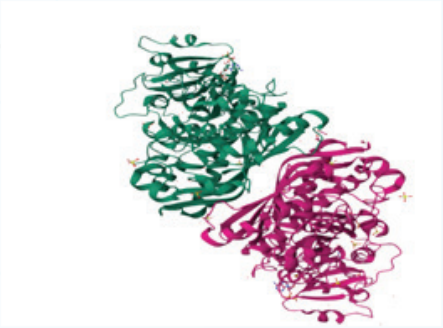

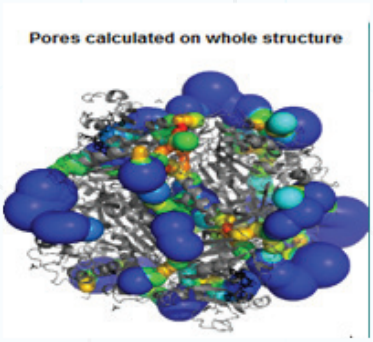

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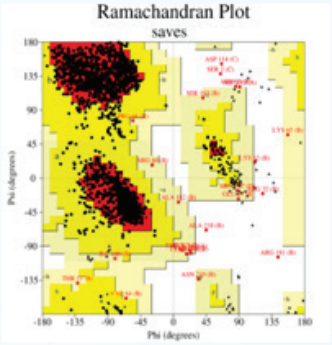
1	2.31	2.41	44.8	0.97	0.21	5.0	87
2	1.16	1.52	57.0	-0.71	-0.07	22.3	81
3	1.97	2.07	70.9	-1.12	0.00	22.2	73
4	1.69	1.88	74.0	-2.62	-0.62	28.9	87
5	1.96	4.52	78.0	-2.59	-0.63	30.4	87
6	1.68	1.74	80.7	-2.44	-0.62	26.6	88
7	1.66	1.73	83.1	-2.71	-0.66	30.9	86
8	1.85	1.94	84.2	-2.55	-0.62	28.6	88
9	1.20	1.36	84.2	-1.88	-0.47	22.9	84
10	1.86	1.95	84.9	-2.66	-0.66	29.8	87



d)3V94-TcrPDEC1 catalytic domain in complex with inhibitor wyq16

- Method: X-RAY DIFFRACTION
- Resolution: 2.33 Å
- Mutation(s)- Non Mutated protein
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- Atom Count: 21,762
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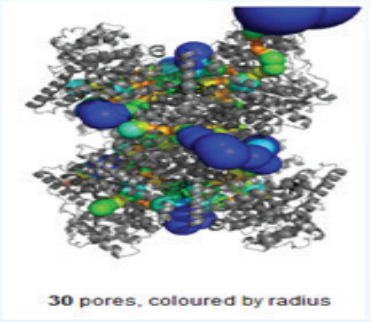
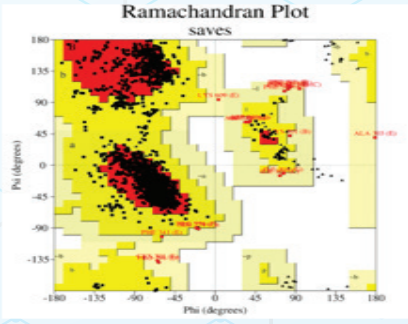
- Unique protein chains: 1



	Radius	Free R	Length	HPathy	HPhob	Polar	Rel Mut
1	1.82	5.35	37.6	-1.54	-0.35	20.4	82
2	1.57	1.57	39.0	-2.09	-0.60	22.2	85
3	1.64	1.74	40.3	-1.39	-0.60	11.5	88
4	1.61	1.61	41.7	-1.60	-0.61	16.6	83
5	2.27	2.36	44.8	-1.09	-0.46	20.8	83
6	2.20	2.28	46.1	-1.59	-0.61	24.0	87
7	2.20	2.27	47.8	-1.01	-0.47	18.4	86
8	2.17	2.17	51.5	-1.09	-0.49	19.0	85
9	2.20	2.28	52.4	-1.40	-0.57	22.3	88
10	2.34	2.33	53.7	-1.86	-0.42	20.1	75



Parasitic diseases treatment is a massive challenge if the conventional approaches of medical research and treatment has been continuously use .In this article it is tried to give significant information of the novel proteins that could be used along with their cavities for better protein drug binding.In this article the best 10 cavities of the protein are explained having significant space for binding with the ligand .

Information that could be extracted out from the Ramchandran plot as a validation of protein are the presence of amino acids in different zones from favored region ,additionally allowed region, generously allowed region and disallowed region could be utilize in the computation based research to facilitate structure based drug designing approach for the finding of the best lead and finally the most portent molecule to treat the Parasitic disease .

In conclusion, By leveraging computational techniques such as molecular modeling, docking studies, and bioinformatics analyses, researchers can identify and prioritize potential protein targets crucial for parasite survival and pathogenesis. In essence, the pursuit of novel protein targets through computational research not only drives innovation in the field of parasitology but also holds the potential to transform the landscape of parasitic disease control and management, ultimately improving global health outcomes.

ARTICLE 2

PARASITIC DISEASES: UNDERSTANDING, PRECAUTIONS, AND TREATMENTS

DRASHTI DAVE*, TAUFIK MULLA

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ABSTRACT

Parasitic diseases pose a substantial threat to global public health, affecting millions of individuals worldwide. These diseases, caused by various parasites including protozoa, helminths, and ectoparasites, manifest with a wide array of symptoms and can lead to severe complications if left untreated. Understanding the transmission routes and symptoms of parasitic infections is crucial for effective prevention and management.Precautionary measures play a pivotal role in reducing the risk of parasitic diseases. Practices such as maintaining good hygiene, ensuring food and water safety, avoiding contact with contaminated environments, and controlling vectors are essential in preventing parasite transmission. Additionally, educating communities about proper sanitation and hygiene practices can further mitigate the spread of parasitic infections.Treatment of parasitic diseases typically involves the use of antiparasitic medications tailored to the specific parasite involved. Antimalarials, anthelmintics, antiprotozoals, and Ectoparasiticides are among the commonly prescribed drugs used to combat parasitic infections. Supportive care may also be necessary to manage symptoms and complications associated with severe infections.In conclusion, addressing parasitic diseases requires a comprehensive approach that encompasses preventive measures, access to appropriate healthcare services, and community engagement. By implementing effective prevention strategies and ensuring timely treatment, the burden of parasitic diseases can be significantly reduced, contributing to improved health outcomes and well-being on a global scale.

INTRODUCTION

Parasitic diseases are a significant global health concern, affecting millions of people around the world, particularly in regions with poor sanitation and limited access to healthcare. These diseases are caused by parasites, organisms that live on or inside other organisms (hosts) and depend on them for nourishment. Parasitic infections can lead to a wide range of symptoms, from mild discomfort to severe illness and even death if left untreated. Understanding these diseases, taking precautions, and seeking appropriate treatment are crucial steps in combating their spread and minimizing their impact on public health.

Understanding Parasitic Diseases

Parasitic diseases are caused by various types of parasites, including protozoa, helminths (worms), and ectoparasites (such as ticks and lice). These parasites can enter the human body through various routes, including ingestion of contaminated food or water, contact with infected animals or vectors (organisms that transmit diseases), and through the skin.

Protozoan parasites, such as Plasmodium (the causative agent of malaria), Trypanosoma (responsible for sleeping sickness), and Giardia (causing giardiasis), are single-celled organisms that can cause significant morbidity and mortality. Helminthic parasites, including roundworms, tapeworms, and flukes, can infect different organs in the body, leading to conditions like schistosomiasis, ascariasis, and hookworm infection. Ectoparasites, such as ticks, fleas, and lice, can transmit diseases like Lyme disease, typhus, and scabies.

The symptoms of parasitic diseases can vary widely depending on the type of parasite involved and the organs affected. Common symptoms may include fever, fatigue, diarrhea, abdominal pain, skin rash, and weight loss. In severe cases, parasitic infections can lead to complications such as anaemia, malnutrition, organ damage, and neurological disorders.

Precautions Against Parasitic Diseases

Preventing parasitic infections requires a combination of personal hygiene practices, environmental management, and public health interventions. Here are some essential precautions individuals can take to reduce their risk of parasitic diseases:

- **Practice good hygiene:** Wash hands thoroughly with soap and water, especially before eating or preparing food, after using the toilet, and after handling animals or soil.
- **Ensure food and water safety:** Consume only clean and properly cooked food and drink safe, purified water to minimize the risk of ingesting parasite eggs or cysts.
- **Avoid contact with contaminated water:** Swimming or bathing in untreated or contaminated water sources can expose individuals to waterborne parasites like Schistosoma. Always use safe water sources for
- recreational activities.
- **Take precautions while traveling:** In regions where parasitic diseases are endemic, take preventive
- measures such as using insect repellents, wearing protective clothing, and taking antimalarial medications as prescribed.
- **Control vectors:** Use insecticides, mosquito nets, and other vector control measures to reduce the transmission of vector-borne parasites like malaria and dengue fever.
- **Practice safe sex:** Use condoms to reduce the risk of sexually transmitted parasites like Trichomonas vaginalis and pubic lice.
- **Keep pets and livestock healthy:** Regularly deworm pets and livestock, and practice good hygiene when
- handling them to prevent zoonotic parasite transmission.
- **Maintain a clean-living environment:** Keep living spaces clean and free of pests like rodents and fleas, which can harbour parasitic infections.
- **Educate communities:** Raise awareness about the importance of sanitation, hygiene, and preventive measures through community-based health education programs.

Treatment of Parasitic Diseases

Effective treatment of parasitic diseases often involves the use of antiparasitic medications, which can target specific parasites and help eliminate them from the body. The choice of treatment depends on factors such as the type of parasite, the severity of the infection, and the individual's health status. Commonly used antiparasitic drugs include

- **Antimalarials:** Drugs such as chloroquine, artemisinin-based combination therapies (ACTs), and mefloquine are used to treat malaria, a life-threatening parasitic disease transmitted by infected mosquitoes.
- **Anthelmintics:** Medications like albendazole, mebendazole, and praziquantel are used to treat infections caused by intestinal worms, including roundworms, tapeworms, and flukes.
- **Antiprotozoals:** Drugs such as metronidazole, quinine, and atovaquone are used to treat protozoan infections like giardiasis, amoebiasis, and leishmaniasis.
- **Ectoparasiticides:** Topical treatments, shampoos, and oral medications are used to eliminate ectoparasites like lice, scabies mites, and ticks

In addition to pharmacological treatments, supportive care may be necessary to manage symptoms and complications associated with parasitic infections. This may include rehydration, nutritional support, blood transfusions (in cases of severe anaemia), and surgical intervention (for conditions like intestinal obstruction caused by heavy worm infestations).

Conclusion

Parasitic diseases represent a significant public health challenge, particularly in regions with poor sanitation and limited access to healthcare. Preventing and treating these infections require a multi-faceted approach involving personal hygiene practices, environmental management, vector control, and access to effective healthcare services. By raising awareness, promoting preventive measures, and ensuring access to appropriate treatment, we can mitigate the burden of parasitic diseases and improve the health and well-being of communities worldwide.

Acknowledgement

Iwould like to express my sincere gratitude to Mr. Taufik Mulla, my mentor,for their invaluable guidance, support, and encouragement throughout the preparation of this review article. His expertise and insightful feedback greatly enhanced the quality of this work.

ARTICLE 3

PARASITIC DISEASES AND ITS MANAGEMENT

AUTHOR: MR. RAHUL SHARMA
Research Scholar, Department of Pharmacy SAGE University, Bhopal, M. P.

Introduction

Parasitic infections are any illnesses or conditions caused by parasites living and reproducing in your body. Parasites are organisms that need another living thing (a host) to get the nutrients they need to survive.

Parasitic infections often cause intestinal illness, with symptoms like diarrhea and vomiting. But they can also give you itchy skin rashes or infect other parts of your body, like your brain or lungs.

Parasitic infections are diseases caused by organisms that live off of another living thing. They can cause fever, fatigue, intestinal symptoms, skin rashes or neurological symptoms. You can get them from contaminated food, water or surfaces, bug bites and eating undercooked meat. Antiparasitic medications treat parasitic infections.

There are three main types of parasites that cause infections in humans

- Protozoa.
- Helminths.
- Ectoparasites

Protozoal infections

Protozoa are single-celled parasites. They can infect your blood, intestinal tract (gut), brain, skin, eyes and other parts of your body.

Helminth infections

Helminth is a general term for parasitic worms. Scientists further classify them as flukes (trematodes), tapeworms (cestodes), roundworms (nematodes) and thorny-headed worms (acanthocephalans). Both adults and immature (larval) helminths can infect you. Helminths usually infect your intestinal tract, but they can also infect your skin, brain and other tissues.

Ectoparasitic infections

Ectoparasites are insects and arachnids (spider-like bugs) that burrow into your skin and live there. This includes ticks, mites, lice and fleas. They usually don't infect other parts of your body.

Most common parasitic infections

Millions of people around the world get parasitic infections every year.

The most common parasitic infections include:

- Malaria.
- Toxoplasmosis
- Head lice.
- Giardiasis.
- Pinworms.

The most common parasitic infections include:

- Trichomoniasis.
- Cryptosporidiosis.
- Cyclosporiasis.
- Cysticercosis.
- Strongyloidiasis.
- Tapeworm infections.
- Chagas disease.
- Leishmaniasis.
- Schistosomiasis.

Common symptoms of parasitic infections

Symptoms of parasitic infections depend on where in your body you're infected. Some common symptoms include:

- Fever.
- Muscle aches.
- Fatigue.
- Nausea.
- Vomiting.
- Diarrhea.

You can get parasitic infections from:

Drinking contaminated water or getting it in your mouth.

- Eating undercooked meats.
- Eating contaminated foods (like food washed with contaminated water).
- Mosquito bites, tick bites, fly bites or other bites from insects that carry parasites.
- Contaminated surfaces.
- Unprotected sex.
- Contaminated dirt (soil).

Treatment

Antiparasitic drugs are used to manage infections caused by various protozoa, helminths, and ectoparasites. Treatment options vary, depending on the specific causative organism within each group.

Since 1960 the introduction of new drugs has enabled remarkable advances in the chemotherapy of some endoparasitic infections. Albendazole and mebendazole have significantly improved the treatment of several intestinal nematode infections, whereas praziquantel has revolutionized the treatment of trematode and cestode infections. At the same time, metronidazole and tinidazole have provided more effective and less-toxic drugs for the treatment of amebiasis, giardiasis, and trichomoniasis.

Unlike endoparasitic infections, ectoparasitic infestations are caused by organisms that live on the skin or hair shafts of patients. The most common examples are the lice and mites that cause pediculosis and scabies, respectively. Well known ectoparasiticidesused used to kill the parasites that live on the body surface are: Permethrin, sulfur, lindane, dicophane, benzyl benzoate, ivermectin and crotamiton.

Education re use is paramount to attain better outcomes (the implementation of long term community programs are necessary for endemic regions). In many cases, the antiparasitic drugs have severe adverse reactions, and thus, adherence with medications is low. Therefore, direct observer therapy by the pharmacist may be essential if one wants to improve outcomes.

ARTICLE 4

MANAGEMENT OF MALARIA AND LEISHMANIASIS

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Bhopal muskansamaiya.2@gmail.com

ABSTRACT:

Parasitic infections are distributed worldwide and affect hundreds of millions of individuals primarily those living in endemic areas or in regions with a high rate of immigration from endemic areas causing significant morbidity and mortality. A broad spectrum of parasitic infections (eg. amebiasis, malaria, trypanosomiasis, ascariasis, strongyloidiasis, dirofilariasis, cystic echinococcosis, schistosomiasis, paragonimiasis) frequently affect the lungs, mediastinum, and thoracic wall, manifesting with abnormal imaging findings that often make diagnosis challenging. Although most of these infections result in nonspecific abnormalities, familiarity with their imaging features as well as their epidemiologic, clinical, and physio-pathologic characteristics may be helpful to the radiologist in formulating an adequate differential diagnosis. Keywords - Parasitic Infections, Parasitic Disease, Organisms, Protozoans.

INTRODUCTION:

Parasites are organisms that obtain nourishment and shelter from other organisms. The parasite derives all the benefits, whereas the host may either be unaffected or suffer harmful consequences, with the development of a parasitic disease. The parasites responsible for these diseases are called obligate if they can live only in association with a host and facultative if they can live either in a host or independently. the parasites vary widely in size and complexity, from relatively simple unicellular protozoans (eg, amebae) to more complex multicellular organisms (eg, worms, flukes).

Parasitic diseases are distributed worldwide, with a higher prevalence in developing countries, especially in areas with inadequate sanitation. Some of these diseases are restricted to tropical and subtropical regions. Parasitic diseases represent one of the most common types of human infection throughout the world and are still the cause of much human morbidity and mortality. Epidemics of parasitic diseases (eg, malaria) have devastated large populations and pose a serious barrier to progress in many developing countries.

Parasitic diseases that are more common in rural areas are no longer entirely absent in the urban population. In industrialized countries, risk groups for parasitic diseases includes travelers, recent immigrants, institutionalized populations, and patients with acquired immunodeficiency syndrome (AIDS). The radiographic and computed tomographic (CT) characteristics of several common and rare tropical parasitic infections with thoracic involvement, including infections from Protozoa (amebiasis, malaria, trypanosomiasis), Nematodes (strongyloidiasis, dirofilariasis), Cestodes (cystic echinococcosis), and trematodes (schistosomiasis, paragonimiasis).

1. Malaria Parasitic Disease -

Malaria is a disease caused by a parasite. Anopheles mosquitoes are the type of mosquito that transmit malaria from one person to another. Not all Anopheles mosquitoes have malaria, but if they bite a person with malaria, they can become infectious. Once they bite another person, this continues the cycle of spreading malaria from mosquito to people.

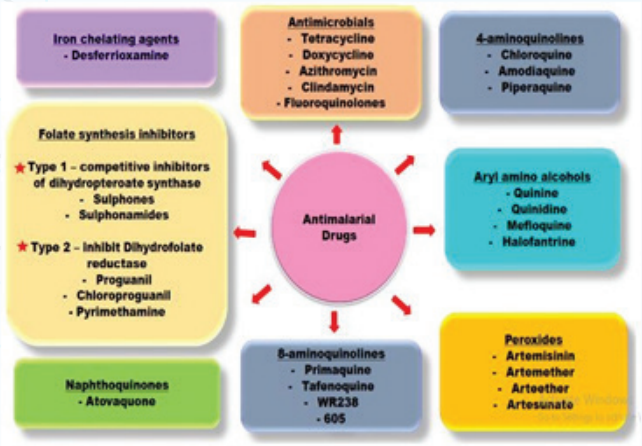
People do not spread malaria to other people, is a mosquito-borne disease caused by a parasite. People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications (like kidney failure, seizures, mental confusion, come) and die.

Diagnosis -

Malaria can be diagnosed using tests that determine the presence of the parasites causing the disease. There are 2 main types of tests: microscopic examination of blood smears and rapid diagnostic tests. Diagnostic testing enables health providers to distinguish malarial from other causes of febrile illnesses, facilitating appropriate treatment.

Treatment -

Malaria is a treatable disease. Artemisinin-based combination therapies (ACTs) are the most effective antimalarial medicines available today and the mainstay of recommended treatment for Plasmodium falc parum malaria, the deadliest malaria parasite globally. ACTs combine 2 active pharmaceuticals with different mechanisms of action, including derivates of artemisinin extracted from the plant Artemisia annua and a partner drug. The role of the artemisinin compound is to reduce



the number of parasites during the first 3 days of treatment, while the role of the partner drug is to eliminate the remaining parasites.

Prevention-

A. Vector control interventions-

Vector control is the main approach to prevent malaria and reduce transmission. Two forms of vector control are effective for people living in malaria- endemic countries: insecticide-treated nets, which prevent bites while people sleep and which kill mosquitoes as they try to feed, and indoor residual spraying, which is the application of an insecticide to surfaces where mosquitoes tend to rest, such as internal walls, eaves and ceilings of houses and other domestic structures. For travelers, the use of an insecticide- treated net.

B. Chemo preventive therapies and chemoprophylaxis-

Although designed to treat patients already infected with malaria, some antimalarial medicines can also be used to prevent the disease.

2. Leishmaniasis (Kala- Azar) Parasitic Disease -

Leishmaniasis is a parasitic disease that is found in parts of the tropics, subtropics, and southern Europe. Leishmaniasis is caused by infection with Leishmania parasites, which are spread by the bite of infected sand flies. There are several different forms of leishmaniasis in people. The most common forms are cutaneous leishmaniasis, which causes skin sores, and visceral leishmaniasis, which affects several internal organs (usually spleen, liver, and bone marrow). The other main form is visceral leishmaniasis, which affects several internal organs (usually spleen, liver, and bone marrow) and can be life threatening. The illness typically develops within months (sometimes as long as years) of the sand flybite. There are several different forms of leishmaniasis in people. Some people have a silent infection, without any symptoms or signs.

Diagnosis -

Various laboratory methods can be used to diagnose leishmaniasis to detect the parasite as well as to identify the Leishmania species (type). Some of the methods are available only in reference laboratories. In the United States, CDC staff can assist with the testing for leishmaniasis.

Tissue specimens - such as from skin sores (for cutaneous leishmaniasis) or from bone marrow (for visceral leishmaniasis)—can be examined for the parasite under a microscope, in special cultures, and by molecular tests. Blood tests that detect antibody (an immune response) to the parasite can be helpful for cases of visceral leishmaniasis; tests to look for the parasite (or its DNA) itself usually also are done.

Treatment -

Before considering treatment, the first step is to make sure the diagnosis is correct. Treatment decisions should be individualized. Health care providers may consult Centre for Disease Control and Prevention (CDC) staff about the relative merits of various approaches. Examples of factors to consider include the form of leishmaniasis, the Leishmania species that caused it, the potential severity of the case, and the patient's underlying health.

The skin sores of cutaneous leishmaniasis usually heal on their own, even without treatment. But this can take months or even years, and the sores can leave ugly scars. Ensuring adequate treatment of the cutaneous infection may help prevent mucosal leishmaniasis.

If not treated, severe (advanced) cases of visceral leishmaniasis typically are fatal.

Chemotherapeutic Agent– Existing drugs repurposed for leishmaniasis include amphotericin B, miltefosine, paromomycin and petamidine. Azole antifungals have also studied for leishmaniasis; itraconazole was found to be superior to ketoconazole and fluconazole for inhibiting growth of most Leishmania strains.4 In a multicentre trial, paromomycin was found to be successful in Indian patients with VL, but was less efficacious in a Sudanese population.5 Pentamidine is used intramuscularly/intravenously, but is not available in an oral formulation. It has the advantage of a short course, but its efficacy varies for different Leishmania species, and its use may be associated with dysglycaemia and other AEs.

Combination Chemotherapy– To prevent drug resistance, improve compliance, shorten the duration of treatment and thereby reduce the cost of therapy, combination chemotherapy has been developed. The various combinations include liposomal amphotericin B plus miltefosine, liposomal amphotericin B plus paromomycin, miltefosine plus paromomycin, and sodium stibogluconate/meglumine antimoniate plus paromomycin.

Local therapies have been developed for limited CL as options to avoid toxicity with systemic use of drugs. Photodynamic therapy (PDT), cryotherapy and thermotherapy have all been tried in CL.

Prevention -

No vaccines or drugs to prevent infection are available. The best way for travelers to prevent infection is to protect themselves from sand fly bites. To decrease the risk of being bitten, follow these preventive measures:

Avoid outdoor activities, especially from dusk to dawn, when sand flies generally are the most active.

When outdoors (or in unprotected quarters):

• Minimize the amount of exposed (uncovered) skin. To the extent that is tolerable in the climate, wear long-sleeved shirts, long pants, and socks; and tuck your shirt into your pants. (See below about wearing insecticide-treated clothing.)
• Apply insect repellent to exposed skin and under the ends of sleeves and pant legs. Follow the instructions on the label of the repellent. The most effective repellents generally are those that contain the chemical DEET (N,N- di- ethylmeta-toluamide).

When indoors:

• Stay in well-screened or air-conditioned areas.
• Keep in mind that sand flies are much smaller than mosquitoes and therefore can get through smaller holes.
• Spray living/sleeping areas with an insecticide to kill insects.
• If you are not sleeping in a well-screened or air-conditioned area, use a bed net and tuck it under your mattress. If possible, use a bed net that has been soaked in or sprayed with a pyrethroid-containing insecticide. The same treatment can be applied to screens, curtains, sheets, and clothing (clothing should be retreated after five washings).

ARTICLE 5

PREVENTION & CONTROL OF PARASITE DISEASES

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ABSTRACT:

One of the most common and deadly illnesses in the world, parasitic diseases cause millions of morbidities and deaths every year. A variety of these illnesses have historically been primarily associated with tropical or subtropical regions. But in the modern era, factors including shifting climate and vector ecology, a marked rise in global travel, violent confrontations, and animal and human migration have all had an impact on the spread of parasitic illnesses. Both direct and indirect means can be used to spread the parasitic illness. Several prevalent parasitic diseases, including Giardiasis, Malaria, Toxocariasis, and Tapeworm infection, continue to pose a threat to global health. These illnesses have a severe negative impact on endemic communities, impairing cognitive abilities along with growth in young children, preventing them from attending jobs or school, and seriously taxing entire nations financially. For the majority of patients with parasitic illness, both immediate antiparasitic therapy and the usage of herbal remedies are recommended. Taking standard safeguards is always advisable. This study examines parasitic diseases, their precautions, and treatment.

Keywords: Parasitic diseases, Giardiasis, Malaria, Toxocariasis, Tapeworm, global health

Introduction

Any ailments or disorders brought on by parasites that survive and multiply within your body are known as parasitic infections. Parasites are creatures that rely on a host—another living thing—to provide them with the nourishment they require to survive. While some parasitic illnesses respond well to treatment, others do not. From microscopic, one-celled creatures known as protozoa to worms that are visible to the unaided eye, parasites come in a variety of sizes. Infections with Giardia can result from contaminated water sources. Pregnant women are at risk of contracting toxoplasmosis, which cats may spread. Some, like malaria, are widespread in other regions of the globe. Human communities have long been impacted by parasites that cause disease. In fact, intestinal parasites or protozoans contaminate approximately three billion individuals worldwide, and parasitic illnesses rank within the world's major causes for individual mortality. Diagnosing parasitic disorders was initially based on the morphological identification of phases in the parasite life cycle. Whereas diagnosing and discovering pathogens that cause illness during the preliminary stage is impractical, a shortage of the necessary skills to reach prompt and exact diagnoses utilizing morphology/morphometrics is becoming more prevalent with an ongoing shortage of experienced diagnosticians, despite the fact that it is still highly useful, particularly in economically disadvantaged communities and regions with an extensive rate of parasites. Financial losses have resulted from parasitic infections ever since humans started domesticating animals. Even though raising ill animals is expensive, lower output results in lower profitability and financial losses from reduced productivity and animal mortality. Even with all of the advancements in disease detection, intervention, and prevention, certain parasites still have high rates of morbidity and mortality, particularly in animals.

They can also still lead to financial losses, contamination of the environment, and serious health risks for the general public (5,6).

Giardiasis:

Giardiasis is a protozoan illness that has remained a concern to humans for numerous years, but it was mostly ignored until lately. Giardia duodenalis is known to be the primary cause of parasite-induced diarrhea in individuals as well as animals. It is additionally an important threat to public health that imposes a significant burden on medical structures' ability to diagnose and treat patients, primarily in emerging economies but also in advanced nations [7]. One of the most prevalent gastrointestinal parasite illnesses, giardiasis is found all over the world. Even in the modern day, many elements are still poorly understood despite the significant consequences for health, particularly for children's health. Giardia intestinalis is a flagellated protozoon that may infect humans and other animals' small intestines. It is the cause of one of the most prevalent parasitic gastrointestinal illnesses, giardiasis [8]. The lack of trophozoite invasion of the intestinal tissues and the lack of overt inflammatory cell infiltration—aside from a little increase in intraepithelial lymphocytes and mast cells—are the pathophysiology of the acute phase of giardiasis. The majority of the time, 1-2 weeks following infection, giardiasis clinical symptoms show. Giardiasis causes bowel movements due to a series of factors, including the permeability of the intestines, enterocyte apoptosis induced by the parasite, brush-border microvillous shortening reliant on CD-8+ lymphocytes, which may or may not coincide with villous atrophy, and deficits in the enzyme disaccharidase. Diarrhea is caused by a combination of these factors, including increased intestinal transit, anion hypersecretion, and small intestine malabsorption of water, minerals, and electrolytes [9,10].

The symptoms of Giardiasis:

Numerous intestinal symptoms, such as diarrhea, gas, foul-smelling, greasy excrement that floats, discomfort or pain, upset stomach or nausea, and dehydration, can be brought on by a Giardia infection (giardiasis). Giardiasis often manifests as two to five bowel movements (poop) per day and gradually worsening tiredness. Fever, hives, itchy skin, and swelling in the joints and eyes are some other, less frequent symptoms. Giardiasis can eventually lead to weight loss as well as prevent the body from receiving necessary nutrients.

Diagnostic methods of Giardiasis:

Giardiasis is diagnosed by looking for cysts or trophozoites in the feces, which may be done with concentration techniques and direct mounts. Trophozoites are usually visible in permanent mounts (e.g., trichrome), whereas cysts are usually seen in moist mount preparations. It may be required to do repeated samplings [13]. Numerous techniques, including microscopy, immunological tools, cyst recovery or concentration techniques, fluorescent in situ hybridization (FISH), cyst viability, PCR-based diagnostic techniques, and/or genetic analysis, are employed in the diagnostic process [14].

TheTreatment of Giardiasis:

Minimizing the intensity and length of diarrhea, as well as preserving ideal electrolyte balance and hydration, are all important aspects of managing giardiasis. Giardiasis with symptoms should be managed to shorten the illness's course, avoid complications, and limit the parasite's ability to infect new hosts [15,16]. There are various anti-giardial medications; metronidazole and other 5-nitroimidazole compounds are the most commonly utilized. Metronidazole is a prodrug that must be lowered in concentration before it becomes toxic, at which point anaerobic and microaerophilic organisms experience damage to their DNA and proteins [17]

Preventions and control measurement of Giardiasis:

Giardia bacteria are easily transmitted from a single individual to another, and even a tiny quantity of the bacteria can cause illness in a human. Giardia bacteria are found in feces, or poop, and everything contaminated by dung has the potential to transmit the bacteria. You may assist yourself and those you love from becoming ill by learning how to stop the growth of Giardia bacteria (12,18). The following factors have to be considered: staying away from contaminated food and water, using caution when interacting with infected individuals, using caution with companion animals, and washing your hands properly. It will contribute to a higher standard of living [19].

Malaria:

Plasmodium protozoan parasites are the primary cause of malaria, which is a leading global cause of disease and death. The female Anopheles mosquito carrying the malaria virus bites humans and spreads the disease. The eukaryotic, single-celled parasites that cause malaria are members of the Plasmodium genus. Only four types of parasites—Plasmodium falciparum, Plasmodium ovale, Plasmodium vivax, and Plasmodium malariae—can attack humans naturally out of about 100 species that may infect a wide range of animal taxa, including birds, mammals, and reptiles. Malaria has an impact on both the health and prosperity of countries and individuals. Malaria is now recognized in Africa as both a cause and an illness of poverty. Malaria has been demonstrated to be a serious barrier to economic growth and to have substantial, quantifiable costs that are direct and indirect. This has resulted in a growing annual disparity in wealth between malaria-affected and malaria-free nations for nations that are developing.

During a blood feed, sporozoites of Plasmodium are introduced into the host's dermis. These sporozoites can leave this location in one to three hours; however, it is unclear what will happen to them after that. They depend on gliding motility in this situation, which is a random mechanism that allows a fraction to enter the bloodstream by reaching and penetrating a blood vessel. The lymphatics, where a host immune response is produced, can eliminate those that are still in the skin and drain them.

Immediate identification of cases and prompt treatment (EDPT), active case detection, and passive disease monitoring using fever therapy depots and village link workers in the remote and distant areas are the three main ways for controlling malaria in India. The National Drug Policy offers recommendations for treating malaria in India. In low-risk and chloroquine-sensitive settings, chloroquine is the first-line therapy for both P. falciparum and P. vivax malaria.

Thesymptomsof Malaria:

The breakdown of erythrocytes and schizont burst tend to be the main causes of malaria's clinical symptoms. Malaria can present with ambiguous signs and either a slow or rapid progression. Most patients with malaria have the following symptoms, which are similar to those of common viral illnesses [25]. The initial signs and symptoms of malaria often appear 10–15 days after a malaria-causing mosquito bite. Usually, one has a headache, a fever, and chills, however these symptoms might be minor and hard to diagnose as malaria. People with limited immunity may get an infection in malaria-endemic areas but not show any symptoms (asymptomatic infections) [26].

Diagnostic methods of malaria:

The primary approach to controlling malaria involves prompt and precise diagnosis, followed by efficient treatment. Effective illness treatment and malaria surveillance depend on early and precise identification of the condition. In every environment, accurate identification of malaria is crucial because incorrect diagnoses can lead to substantial morbidity and death. These days, polymerase chain reaction (PCR), microscopy, and rapid diagnostic tests (RDT) are employed as diagnostic techniques. The following techniques were identified: transdermal hemozoin detection, saliva-based test for Plasmodium protein detection, urine malaria test (UMT), loop-mediated isothermal amplification (LAMP), isothermal thermophilic helicase-dependent amplification (tHDA), nucleic acid sequence-based amplification (NASBA), and saliva-based test for nucleic-acid amplification. RDT is still the most practical diagnostic test since it is quick, simple to perform, and does not require expensive equipment—despite its rising false-negative rate. Some of the most current assays being developed have the potential to help manage and eradicate malaria. These tests employ saliva or urine instead of a blood sample. [28-31]

Treatment of malaria:

In every given community, the primary effect of malaria is personal mortality. A patient must receive the right care in order to avoid passing away from the illness. Determining which patients are parasite positive, treating those that are, and identifying presumed cases are all part of the mortality control plan [32]. P. falciparum infections may cause severe sickness or even death in as little as one to two days, thus patients should receive treatment for malaria as soon as possible. The patients should be treated as though they have P. falciparum infection until the species responsible for the infection is discovered if the species cannot be determined. When choosing an antimalarial medication, the patient's past travel experiences might be a helpful guide in determining the likelihood of drug resistance [33]. A course of chloroquine can be used to treat falciparum malaria that is sensitive to the drug. Primaquine and chloroquine should be taken one after the other in order to cure vivax and all other forms of malaria. When treating severe falciparum malaria, quinine administered intravenously is the most effective treatment [34]. Chloroquine at the maximal therapeutic dose of 25 mg/kg spread over three days is the recommended course of treatment for P. vivax positive patients. Relapses of vivax malaria are caused by the liver's hypnozoites. In India, the recurrence rate for vivax malaria is around 30%. Primaquine may be administered under supervision for 14 days at a rate of 0.25 mg/kg per day in order to prevent it [35].

Prevention and Control of Malaria.

In nations where malaria is endemic, public health measures are designed to stop the disease's spread and manage the vector. Numerous elements needto beconsidered, such as the population's biological,

Anthropological, cultural, and social traits play significant roles in the implementation and success of malaria prevention and management strategies. Environmental clean-up, which involves destroying or removing all mosquito breeding grounds and generally clearing shrubs and tall grasses where mosquitoes congregate, is a crucial strategy for both preventing and managing malaria.Preventing adult mosquito bites inside the home can be achieved through various means such as insecticide-treated mosquito nets and house screening. Indoor residual spraying is another effective method as it eliminates adult mosquitoes within the home. Killing malaria parasites in the bloodstream before they cause malaria is known as presumptive therapy.Mosquito coils and home remedies are two types of repellents commonly used for personal defense against mosquito bites. Additionally, wearing long sleeves and pants can provide physical protection from mosquito bites.It's crucial that all malaria patients receive prompt and appropriate diagnosis and treatment to prevent complications and further transmission of the disease. (37-40)

Toxocariasis:

The clinical name for human infection with Toxocara canis and Toxocara cati, parasitic roundworms commonly discovered in the gut of dogs and cats, respectively, is toxocariasis. When embryonated T. canis eggs are consumed by humans, they can spread the infection through contact with contaminated hands and food. The small bowels of their ultimate hosts are home to adult Toxocara spp. worms, while the environment is exposed to the worms' eggs through excrement. The eggs become infectious to humans (and paratenic hosts) following a period of embryonation, and they can spread illness if they are inadvertently consumed through infected hands or food (41,42). The condition known as visceral larval migration (VLM) mainly affects children who have a higher chance of consuming Toxocara eggs. Larvae of Toxocara migrate through blood to different organs, where they inflict harm and inflammation. Since the larvae travel through the tissues and stay latent or hypobiotic parasites, diagnosing and controlling toxocariasis is difficult (43).

The symptoms of Toxocariasis.

The afflicted organ, the extent of the infection, and the strength of the host inflammatory response all influence the symptoms of toxocariasis (44). Ocular larva migrans (OLMs) are Toxocara larvae that migrate to the eye. OLM can cause retinal injury, granulomas, and vision loss. Neural larva migrans (NLM), a more severe type of the illness, causes fever, headaches, and seizures, among other nonspecific symptoms (45). VLM primarily affects young children (less than five years old). Fever, spleen and liver enlargement and necrosis, lower respiratory symptoms (especially bronchospasm, which resembles asthma), eosinophilia that can occasionally exceed 70%, and hypergammaglobulinemia of the immunoglobulin M (IgM), IgG, and IgE classes are some of the symptoms that represent. The final of these cases had more severe symptoms and higher IgE/anti-IgE immune complex levels (46–49).

Diagnostic methods of Toxocariasis.

Histological analysis, morphometric evaluation of larvae (if present), or the particular detection of larval DNA from tissue or bodily fluid samples, can enable the diagnosis of toxocariasis and Toxocara infection in paratenic or unintentional hosts. Total serum IgE levels, cytological analysis of various fluids, laboratory indicators of inflammation, and a blood count TESAg production, immunodiagnosis, and direct visual diagnostic. The instruments shown above are frequently used to diagnose toxocariasis in the human body. (50-53)

Treatment of Toxocariasis:

A physician's prior experience treating toxocariasis and the drugs that are licensed and accessible for usage in their country will determine which medication is best for treating the disease. [54] Albendazole is the most widely used medication on the market; however, other benzimidazole compounds are also effective. Albendazole is prescribed at a dose of 15 mg/kg body weight per day for five days; in certain cases of VLM syndrome, further therapy may be required. [55-56]

Control and prevention of Toxocariasis:

Toxocariasis can be avoided. Healthcare professionals should inform patients and parents about ways to prevent Toxocara infection and be knowledgeable about the warning signs and symptoms of toxocariasis.[57] Individual preventative actions have therefore shown to be effective. It is important to take precautions against infection regardless of the treatment regimen or the clinical manifestation of toxocariasis. In order to determine one's own vulnerability for Toxocara infection and to identify potential environmental sources of Toxocara spp. eggs, it is important to thoroughly examine individuals or their surrogates. [58] Any dogs or cats that have roundworm infection should be dewormed right away, the contaminated soil should be removed, and the area should be sealed off from children's access. Regular care should begin for puppies as early as two or three weeks of age. [59] Washing hands after interacting with or playing with dogs, or after visiting potentially contaminated areas, can also help prevent human diseases. Children should be taught the fundamentals of personal hygiene, including the importance of washing their hands often and the risks associated with ingesting dirt. Play places for kids should be kept clean on a regular basis, and dogs should be kept out of public playgrounds by covering or enclosing them. [60-62]

Summary:

In addition to causing a variety of symptoms, such as gastrointestinal problems, fever, exhaustion, skin lesions, and in rare cases, more serious repercussions, parasitic illnesses can impact several organ systems. The type of parasite implicated and the extent of the infection determine how a parasitic condition is treated. Antiparasitic medicines and other therapies that target the parasite are frequently used in this context. Supportive therapies like rehydration and symptom management could also be required in specific circumstances. For an accurate diagnosis and course of treatment, it is imperative that you seek medical help as soon as you suspect you may have a parasite infection. Several steps are taken to prevent parasite diseases. Food and water safety, practicing good hygiene, avoiding contaminated environments, and implementing controls on insects and other parasite-transmitting vectors. In order to minimize the impact of these illnesses on public health, managing parasitic diseases from a future perspective will necessitate a mix of preventative measures, better treatments, and cooperative efforts at local, national, and international levels.

Acknowledgement

The Author Acknowledge NIMS Institute of Pharmacy ,NISM University Jaipur for his Motivation ad support to complete this Paper

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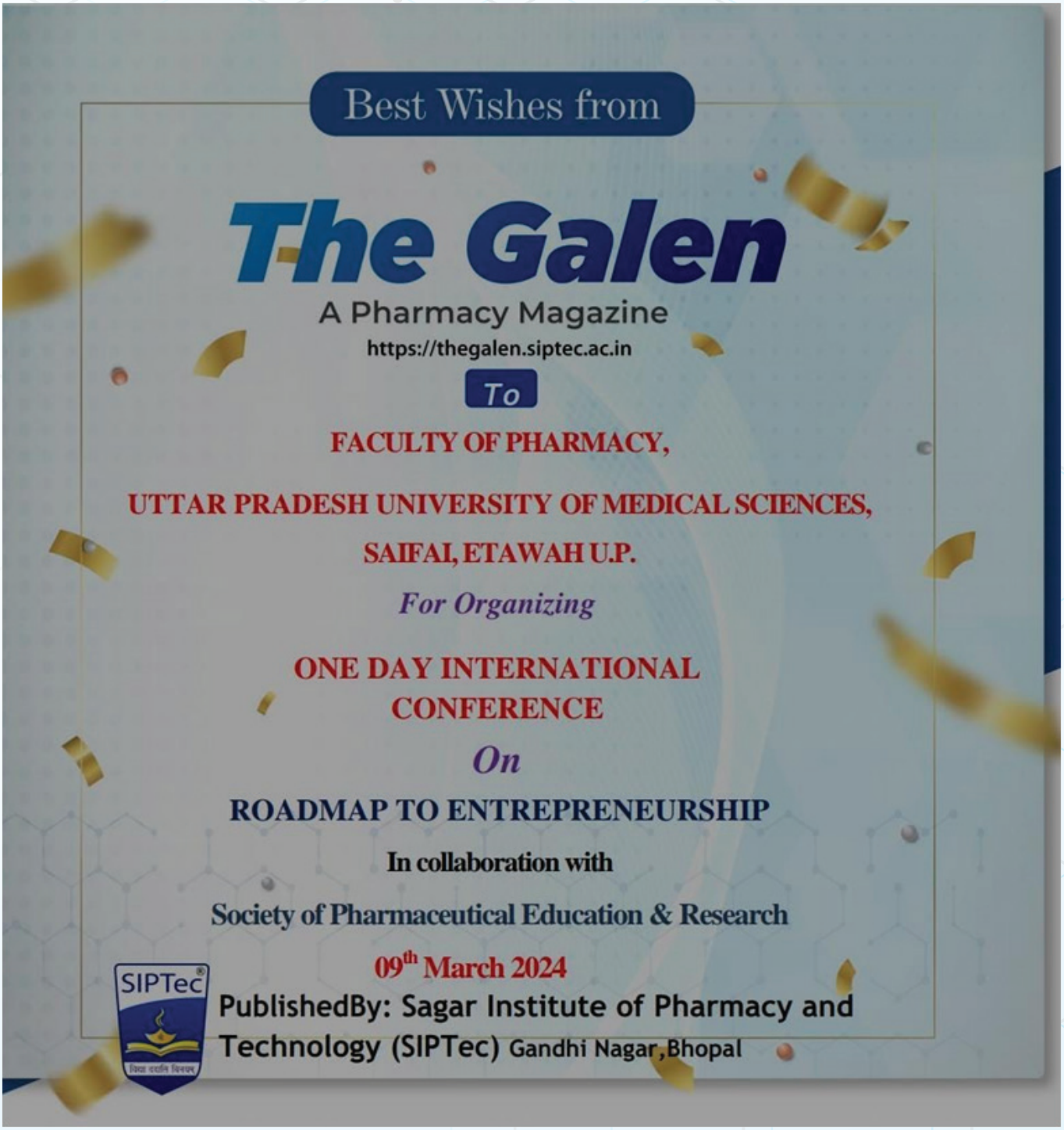


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10st & 11th May 2024
Published By: Sagar Institute of Pharmacy and Technology (SIP Tec) Gandhi Nagar, Bhopal
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