What do we know about Parasites?

Dietrich Klinghardt MD, PhD

April/May 2021

Mitchell, P. D. (2017). Human parasites in the Roman World: health consequences of conquering an empire. *Parasitology*, *144*(1), 48-58.

Summary

The archaeological evidence for parasites in the Roman era is presented in order to demonstrate the species present at that time, and highlight the health consequences for people living under Roman rule. Despite their large multi-seat public latrines with washing facilities, sewer systems, sanitation legislation, fountains and piped drinking water from aqueducts, we see the widespread presence of whipworm (*Trichuris trichiura*), roundworm (*Ascaris lumbricoides*) and *Entamoeba histolytica* that causes dysentery. This would suggest that the public sanitation measures were insufficient to protect the population from parasites spread by fecal contamination. Ectoparasites such as fleas, head lice, body lice, pubic lice and bed bugs were also present, and delousing combs have been found. The evidence fails to demonstrate that the Roman culture of regular bathing in the public baths reduced the prevalence of these parasites. Fish tapeworm was noted to be widely present, and was more common than in Bronze and Iron Age Europe. It is possible that the Roman enthusiasm for fermented, uncooked fish sauce (garum) may have facilitated the spread of this helminth. Roman medical practitioners such as Galen were aware of intestinal worms, explaining their existence and planning treatment using the humoural theory of the period.

Ortega, Y. R., & Sterling, C. R. (Eds.). (2018). *Foodborne parasites*. Springer.

Amoeba and Ciliates

Ynés R. Ortega, Manuela Verastegui

Foodborne *Giardia duodenalis* and *Typanosoma cruzi*

Charles R. Sterling

Cyclospora cayetanensis

Vitaliano A. Cama, Ynés R. Ortega

Cystoisospora belli and *Sarcocystis* spp.

Ynés R. Ortega, Vitaliano A. Cama

Cryptosporidium and Cryptosporidiosis

Lihua Xiao, Vitaliano A. Cama

Toxoplasma gondii

D. E. Hill, J. P. Dubey

Angiostrongylus spp. of Public Health Importance

Alexandre da Silva, Blaine A. Mathison

Anisakiasis

Blaine A. Mathison, Alexandre da Silva

Trichinella and Other Foodborne Nematodes

Edoardo Pozio

Taeniasis and Cysticercosis

Jo Henderson-Frost, Robert H. Gilman

Echinococcus

Armando Gonzalez, Luis A. Gomez-Puerta

Other Cestoda of Public Health Relevance

Hector H. Garcia, Miguel M. Cabada

Foodborne Trematodes:

Paragonimus and *Fasciola*

Ann M. Adams

Haque, R. (2007). Human intestinal parasites. *Journal of health, population, and nutrition*, *25*(4), 387.

Parasitic infections, caused by intestinal helminths and protozoan parasites, are among the most prevalent infections in humans in developing countries. In developed countries, protozoan parasites more commonly cause gastrointestinal infections compared to helminths. Intestinal parasites cause a significant morbidity and mortality in endemic countries.

Helminths are worms with many cells. Nematodes (roundworms), cestodes (tapeworms), and trematodes (flatworms) are among the most common helminths that inhabit the human gut. Protozoan parasites that have only one cell can multiply inside the human body. There are four species of intestinal helminthic parasites, also known as geohelminths and soil-transmitted helminths: *Ascaris lumbricoides* (roundworm), *Trichiuris trichiuria* (whipworm), *Ancylostoma duodenale*, and *Necator americanicus* (hookworms). These infections are most prevalent in tropical and subtropical Recent estimates suggest that *A. lumbricoides* can infect over a billion, *T. trichiura* 795 million, and hookworms 740 million people (3). In addition to their health effects, intestinal helminth infections also impair physical and mental growth of children, thwart educational achievement, and hinder economic development (6,7).

The most common intestinal protozoan parasites are: *Giardia intestinalis, Entamoeba histolytica, Cyclospora cayetanenensis*, and *Cryptosporidium* spp. The diseases caused by these intestinal protozoan parasites are known as giardiasis, amoebiasis, cyclosporiasis, and cryptosporidiosis respectively, and they are associated with diarrhoea (8). *G. intestinalis* is the most prevalent parasitic cause of diarrhoea in the developed world, and this infection is also very common in developing countries. Amoebiasis is the third leading cause of death from parasitic diseases worldwide, with its greatest impact on the people of developing countries. The World Health Organization (WHO) estimates that approximately 50 million people worldwide suffer from invasive amoebic infection each year, resulting in 40-100 thousand deaths annually (9,10). Cryptosporidiosis is becoming most prevalent in both developed and developing countries among patients with AIDS and among children aged less than five years.

- Diagnosis of *E. histolytica* cannot be done any longer by microscopy, since this parasite is morphologically similar to the non-pathogenic parasite *E. dispar*. *E. histolytica*-specific antigen-detection test is now commercially available from TechLab, Blacksburg, Virginia, for the detection of *E. histolytica* antigen in stool specimens (14,15)
- Diagnosis of giardiasis is best accomplished by detection of *Giardia* antigen in stool, since the classic microscopic examination is less sensitive and specific.
- Diagnosis of cryptosporidiosis is also best accomplished by detection of *Cryptosporidium* spp. antigen in stool samples,
- The current treatment modalities for intestinal protozoan parasites include metronidazole, iodoquinol, diloxanide furoate, paromomycin, chloroquine, and trimethoprim-sulphamethoxazole (39). Nitazoxanide, a broad-spectrum anti-parasitic agent, was reported to be better than placebo for the treatment of cryptosporidiosis in a double-blind study performed in Mexico (40).

Maizels, R. M., Bundy, D. A., Selkirk, M. E., Smith, D. F., & Anderson, R. M. (1993). Immunological modulation and evasion by helminth parasites in human populations. *Nature*, *365*(6449), 797-805.

Abstract

Helminth parasites are highly prevalent in human communities in developing countries. In an endemic area an infected individual may harbour parasitic worms for most of his or her life, and the ability of these infections to survive immunological attack has long been a puzzle.

But new techniques are starting to expose the diverse mechanisms by which these agents modulate or evade their hosts' defences, creating a dynamic interaction between the human immune system and the parasite population.

These studies indicate that IL-10 contributes to parasite Ag-induced T cell hypo-responsiveness observed in patients with chronic schistosomiasis hematobia.

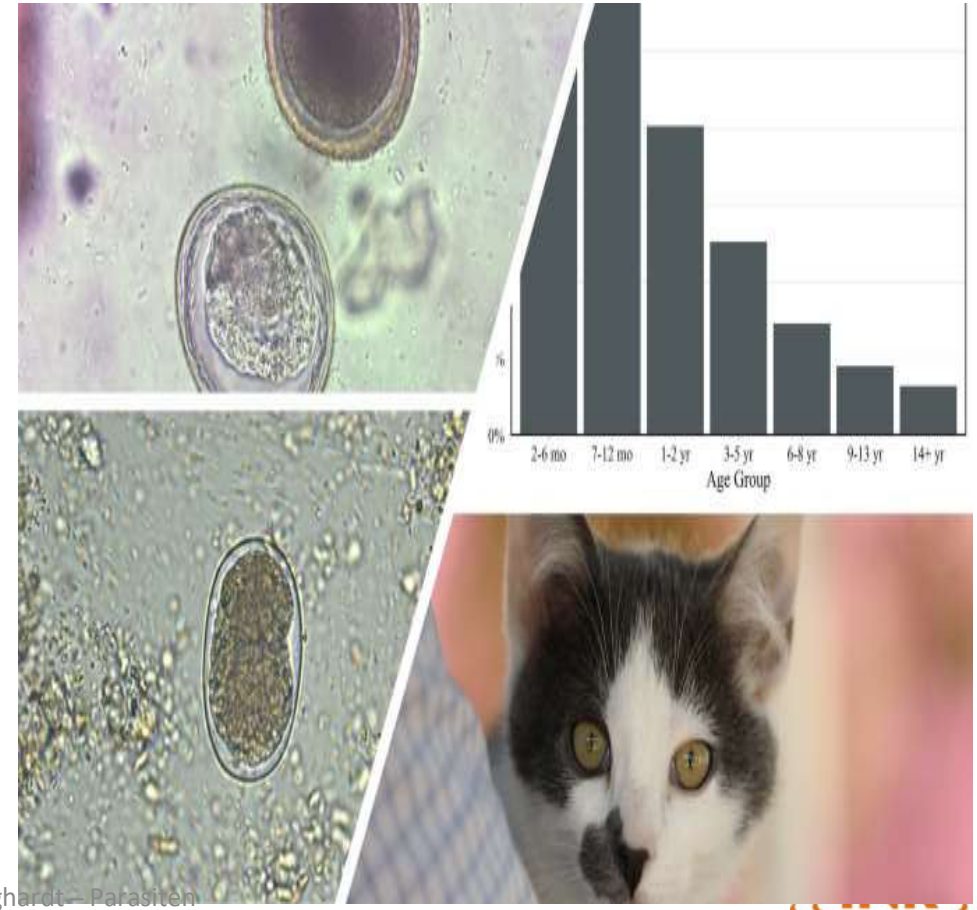
Hoggard, K. R., Jarriel, D. M., Bevelock, T. J., & Verocai, G. G. (2019). Prevalence survey of gastrointestinal and respiratory parasites of shelter cats in northeastern Georgia, USA. *Veterinary Parasitology: Regional Studies and Reports*, *16*, 100270.

Abstract

The goal of this study was to assess the prevalence of gastrointestinal and respiratory parasites of shelter cats from northeast Georgia, thus promoting a more targeted approach in parasite diagnosis and treatment. Fecal samples of cats kept in a shelter located in Lavonia, northeastern Georgia, USA, were processed for the presence of parasites using double centrifugation sugar flotation (*n* = 103) and Baermann techniques (*n* = 98). Flotation revealed eggs of *Toxocara cati* (17.5%), *Ancylostoma* sp. (11.7%), Taeniidae (3.9%), *Spirometra mansonoides* (2.9%), *Mesocestoides* sp. (1%), *Dipylidium caninum* (1%), and *Eucoleus aerophilus* (1%), and oocysts of *Cystoisospora felis* (16.5%), and *Cystoisospora rivolta* (8.7%). Baermann diagnosed *Aelurostrongylus abstrusus* larvae in 5 cats (5.1%), while fecal flotation alone identified only 2 of these infections. Taeniidae eggs were identified to species-level by PCR and sequencing targeting the cytochrome oxidase c subunit 1 (*cox1*) of the mitochondrial DNA. All isolates belong to *Hydatigera taeniaeformis sensu stricto*, which is the first unequivocal report of the species in North America. Overall, 45.6% of the cats were infected with at least one parasite. This prevalence of infection is much higher than what is generally reported in client owned animals, highlighting the importance of using appropriate fecal diagnostic techniques to detect gastrointestinal and respiratory parasites on newly adopted cats. Correct diagnosis may direct appropriate treatment and control strategies, which would mitigate the risk of infection of other animals in household, and human exposure to zoonotic parasites.

Sweet, S., Szlosek, D., McCrann, D., Coyne, M., Kincaid, D., & Hegarty, E. (2020). Retrospective analysis of feline intestinal parasites: trends in testing positivity by age, USA geographical region and reason for veterinary visit. *Parasites & vectors*, *13*(1), 1-10.

- Methods
- Feline fecal test results from the continental USA containing results for fecal exams performed using centrifugation paired with coproantigen results for ascarid, hookworm, whipworm and *Giardia* were obtained from the database of a national commercial reference laboratory comprised of multiple regional sites.
- Results
- Parasite positivity was highest in samples from young cats and decreased with cat age. The western region of the USA had lower total parasite positivity than other regions for all parasites except *Giardia*. Cats receiving fecal tests during veterinary wellness visits had only slightly lower parasite positivity than samples from cats during sick clinical visits.
- Conclusions
- This study showed a larger population of cats are at increased risk of parasitism than commonly believed and coproantigen testing produces more positive test results for the four parasites that antigen can detect than centrifugation of feline fecal samples.



Savilla, T. M., Joy, J. E., May, J. D., & Somerville, C. C. (2011). Prevalence of dog intestinal nematode parasites in south central West Virginia, USA. *Veterinary Parasitology*, *178*(1-2), 115-120.

Abstract

Coprological examination was used to determine prevalence of gastrointestinal helminthes in a sample of 231 dogs (117 females and 114 males) during the summer of 2009 at a veterinary clinic in south central West Virginia, USA. Clinical signs (e.g., diarrhea, vomiting, weight gain or loss) were noted in addition to a history of anthelmintic usage. A total of 79 dogs (33.6%) were infected with one or more intestinal nematodes. Most dogs (58) were parasitized with a single species, 19 were parasitized with 2 species, and 2 were parasitized by 3 species. There was no significant difference (i.e., $X^2 < 3.84$; $P > 0.05$) in prevalence of infection between female and male dogs for any of the identified nematode species. The chi-square test for equality of proportions was used to determine prevalence of infection in 3 age categories of dogs (females and males combined): young dogs (≤12 months of age); mature dogs (13–83 months); and old dogs >83 months. Prevalences of infection for *Ancylostoma caninum* and *Toxocara canis* were significantly ($P < 0.005$) higher in young dogs, whereas there was no significant difference ($P > 0.05$) in prevalence by age category for *Trichuris vulpis*. Dogs exhibiting clinical signs were no more likely to harbor intestinal nematodes than dogs that were asymptomatic. Additionally, dogs receiving heartworm treatment were significantly less likely to be parasitized than dogs receiving no heartworm prophylaxis.

Why are parasites most often not symbiotic - if they depend on our health?

Parasite infestations affect us negatively in 4 ways:

1. immune reaction against the pathogens or their metabolic products (often misdiagnosed as “lymphatic blockage”
2. effects of their secreted exotoxins and metabolic waste (often misdiagnosed as metal toxicity)
3. competition for our micronutrients (often the parasites are fed and nurtured based on the recommendation of the functional medicine workup)
4. The indirect effects: mechanical blockage (lymph, veins), focal areas of inflammation (brain=seizures, teeth/jaw cavitations)

Many parasites complete their life cycle in us and continue to replicate. Parasite testing in the lab is often frustrating with too many false negatives

Biotoxins

- Bacterial toxins (Exotoxin, Gram positive Bacilli): *Clostridium: tetani* (Tetanospasmin) · *perfringens* (Alpha toxin, Enterotoxin) · *difficile* (A, B) · *botulinum* (Botox) *other:* Anthrax toxin · Listeriolysin O
- Cocci: Streptolysin · Leukocidin (Panton-Valentine leukocidin) · *Staphylococcus* (Staphylococcus aureus alpha/beta/delta, Exfoliatin, Toxic shock syndrome toxin, SEB)
- Actinobacteria: Cord factor · Diphtheria toxin
- Gram negative: Shiga toxin · Verotoxin/shiga-like toxin (*E. coli*) · *E. coli* heat-stable enterotoxin/enterotoxin · Cholera toxin · Pertussis toxin · Pseudomonas exotoxin · Extracellular adenylate cyclase
- By mechanism: *type I* (Superantigen) · *type II* (Pore-forming toxin) · *type III* (AB toxin/AB5)
- Endotoxin: Lipopolysaccharide (Lipid A) · Bacillus thuringiensis delta endotoxin
- Virulence factor: Clumping factor A · Fibronectin binding protein A
- Mycotoxins: Aflatoxin · Amatoxin (alpha-amanitin, beta-amanitin, gamma-amanitin, epsilon-amanitin) · Citrinin · Cytochalasin · Ergotamine · Fumonisin (Fumonisin B1, Fumonisin B2) · Gliotoxin · Ibotenic acid · Muscimol · Ochratoxin · Patulin · Phalloidin · Sterigmatocystin · Trichothecene · Vomitoxin · Zeranol · Zearalenone
- Invertebrates: *arthropod: scorpion:* Charybdotoxin, Maurotoxin, Agitoxin, Margatoxin, Slotoxin, Scyllatoxin, Hefutoxin, Lq2, Birtoxin, Bestoxin, BmKAEP, Phaiodotoxin · *spider:* Latrotoxin (Alpha-latrotoxin) · PhTx3 · Stromatoxin · Vanillotoxin · Huwentoxin
  mollusca: Conotoxin · Eledoisin · Onchidal · Saxitoxin · Tetrodotoxin
- Vertebrates: *fish:* Ciguatera · Tetrodotoxin
- *amphibian:* (+)-Allopumiliotoxin 267A · Batrachotoxin · Bufotoxins (Arenobufagin, Bufotalin, Bufotenin · Cinobufagin, Marinobufagin) · Epibatidine · Histrionicotoxin · Pumiliotoxin 251D · Samandarin · Samandaridine · Tarichatoxin
- *Reptile/snake venom:* Bungarotoxin (Alpha-Bungarotoxin, Beta-Bungarotoxin) · Calciseptine · Taicatoxin · Calcicludine · Cardiotoxin III

- Neurotoxins are small molecules (200-1000 kilodaltons, always contain sulfur and nitrogen) attracted to the mammalian nervous system. They are absorbed by nerve endings and travel inside the neuron to the cell body
- On their way they disrupt vital functions of the nerve cell, such as axonal transport of nutrients, mitochondrial respiration and proper DNA transcription. The body is constantly trying to eliminate neurotoxins via the available exit routes: the liver, kidney, skin and exhaled air
- Detox mechanisms include acetylation, sulfation, glucuronidation, oxidation and others
- Often the host is triggered to produce neurotoxins (which are damaging to host tissues) by the invading microbes through molecular trickery
- The liver is most important in the toxin elimination process. Here most elimination products are expelled with the bile into the small intestine and should leave the body via the digestive tract
- However, because of the lipophilic/neurotropic nature of the neurotoxins, most are reabsorbed by the abundant nerve endings of the enteric nervous system (ENS) in the intestinal wall. The ENS has more neurons than the spinal chord

Literature: Buch von Johns-Hopkins University, USA "*Advancing Medicine with Food and Nutrients*" Second Edition.CRC Press 2013. Kapitel Dr.med Dietrich Klinghardt

"*Biotoxins*" pp 851-868

Parasites in the US?

Comment Dr. K: yes! Most of them!!

Nuclear Weapons and Neglected Diseases: The “Ten-Thousand-to-One Gap”. **PLoS;** Negl Trop Dis 4(4): e680; Hotez PJ (2010)

Abstract

Each of the 11 nuclear weapons states also suffer from high rates of neglected tropical diseases (and related neglected infections of poverty), defined as chronic and **debilitating parasitic** and other infectious **diseases** that occur in association with extreme poverty. In addition to their health effects, the neglected tropical diseases also cause poverty through their ability to **impair child physical and intellectual development, pregnancy outcomes, and worker productivity**, while simultaneously promoting conflict and war through their agriculturally and socially destabilizing effects.

Although it is common to think of neglected diseases as confined to low-income countries in sub-Saharan Africa, Southeast Asia, and Latin America, as shown in these infections also exhibit a high prevalence in middle-income countries such as China, India, Pakistan, North Korea, Iran, and Syria, as well as **in selected areas** of poverty found **in the US**, Russia, and Eastern Europe. Indeed high neglected disease burdens are present in all of the nuclear weapons states**, particularly the helminth infections, leishmaniasis and Chagas disease, toxoplasmosis, and trachoma.**

Rose, J. B., & Gerba, C. P. (1991). Assessing potential health risks from viruses and parasites in reclaimed water in Arizona and Florida, USA. *Water Science and Technology*, *23*(10-12), 2091-2098.

Wastewater re-use has been mandated in both the states of Arizona and Florida, U.S.A. In Arizona, standards have been set for **enteric virus and Giardia levels** to maintain a specified effluent quality depending on the reuse, while in Florida, specified treatment control has been implemented. Data on virus levels in treated wastewaters have been generated in both states. Average virus levels ranged from 13-130 pfu/100L after secondary treatment while with the addition of filtration, levels were reduced to averages between 0.13 to 1.25 pfu/100L. Giardia cyst levels also dropped by 100 fold after filtration averaging 0.32/40L. Using a probability of infection model, risk of infection from 100 ml accidental ingestion ranged from approximately 2×10^{-3} to 2×10^{-4} for the levels of viruses and protozoa found in chlorinated secondary effluent and the risk was reduced to 2×10^{-4} to 2×10^{-6} with filtration and disinfection following activated sludge.

Worms affect the brain – you become stupid. Would it not be good, to diagnose and treat?

Psychological Bulletin

1997, Vol. 121, No. 2. 171-191

'Stupidity or Worms": Do Intestinal Worms Impair Mental Performance?

William E. Watkins and Ernesto Pollitt; University of California at Davis

The title of a 1930s article asked the question, "Stupidity or Hookworm?" In this article, the authors discuss research that attempts to answer the question of whether intestinal worms namely, hookworm, whipworm, and **roundworm**—harm the mental performance of their hosts. After Introducing the biology and epidemiology of intestinal worms, the authors present the Historical background to the problem. They review research from the 1910s through the 1990s; there is evidence that high intensities of worms can affect mental performance, but not all dewormed children show Improved performance. They discuss the mechanisms of how worms might affect the mind.

N Engl J Med. 1992 Sep 3;327(10):692-5.

Neurocysticercosis in an Orthodox Jewish community in New York City.

Schantz PM, Moore AC, Muñoz JL, Hartman BJ, Schaefer JA, Aron AM, Persaud D, Sarti E, Wilson M, Flisser A.

Division of Parasitic Diseases, Centers for Disease Control, Atlanta 30333.

Abstract

BACKGROUND AND METHODS: From June 1990 through July 1991, intracerebral infection with the larval stage of the pork tapeworm Taenia solium was diagnosed in four unrelated persons in an Orthodox Jewish community in New York City. None of the patients had eaten pork, and only one had traveled to a country in which T. solium infection was endemic. We investigated this outbreak, screened serum samples from family members household contacts for antibodies to cysticercosis, and examined stool specimens from household employees for eggs of taenia species.

RESULTS:

The four patients had **recurrent seizures and brain lesions** that were radiologically consistent with the presence of cysticerci. The diagnosis was confirmed in two patients by a brain biopsy, and in two by immunoblot assays for cysticercus antibodies. **Of 17 immediate family members screened serologically, 7 from two families had cysticercus antibodies**. Magnetic resonance imaging of the brain showed cystic lesions in two of the seropositive family members, one of whom had had a seizure. **Examinations of six domestic employees from all four households revealed an active infection with taenia species in one and a positive serologic test in another.** Since these women had recently emigrated from Latin American countries where T. solium infection is endemic, they were the most likely sources of infection in the members of these households.

CONCLUSIONS:

A diagnosis of neurocysticercosis should be considered in patients with seizures and radiologic evidence of cystic brain lesions, even in those who do not eat pork and who have not traveled to a country in which T. solium infection is endemic. **Recent emigrants from countries in which T. solium infection is endemic should be screened for tapeworm infection in their stools before they are employed as housekeepers or food handlers.**

INK

Why we need to treat parasites before treating Lyme

the Relationship of Borrelia, Parasites and Metals

Lyme Bacteria Hides Inside Parasitic Worms, Causing Chronic Brain Diseases

Recent discovery confirmed by state-of-the-art Molecular Beacon DNA probes

May 19, 2016, 07:00 ET from Dr. Paul H. Duray Research Fellowship Endowment; PR Newswire

MacDonald found three Borrelia pathogens, including B. Burgdorferi the causative agent of Lyme disease, thriving inside parasitic nematode worms, worm eggs or larvae in the brain tissue of nineteen deceased patients. These microscopic worms are endosymbionts, meaning the Borrelia bacteria dwell inside the worms. A tick bite delivers the nematode into the human body.

The Rocky Mountain Multiple Sclerosis Center Tissue Bank provided MacDonald with ten specimens from deceased MS patients; all ten specimens showed **evidence of Borrelia infected nematodes**. Infected worms were also found in five tissue specimens from patients who succumbed to the highly malignant brain tumor Glioblastoma multiforme, the same cancer which took the life of Senator Edward Kennedy(D-MA). Ironically, in 1993. Four specimens from patients who died from Lewy Body dementia, the same illness which afflicted comedian Robin Williams, also showed the presence of infected nematodes.

MacDonald's work breaks new ground while building on previous studies. In 1984, Lyme pioneer Willy Burgdorfer, Ph.D. wrote of finding **nematodes in tick guts**. In 2014, University of New Haven researcher Eva Sapi, Ph.D., examined the guts of ticks gathered in southern Connecticut and found 22% of the nymphs and 30% of adult Ixodes ticks carried nematodes in their systems. **Namrata, Pabbati, et al. "Filarial nematode infection in Ixodes scapularis ticks collected from Southern Connecticut."** ***Veterinary Sciences*** **1.1 (2014): 5-15.**

The clinical observation, that parasites should be treated before attempting to treat Lyme was first reported by D. Klinghardt at the annual meeting of the Society of Orthomolecular Medicine in San Francisco, 2006

The infectious etiology of vasculitis

Autoimmunity 2009, Vol. 42, No. 5, Pages 432-438

Merav Lidar, Noga Lipschitz, Pnina Langevitz and Yehuda Shoenfeld

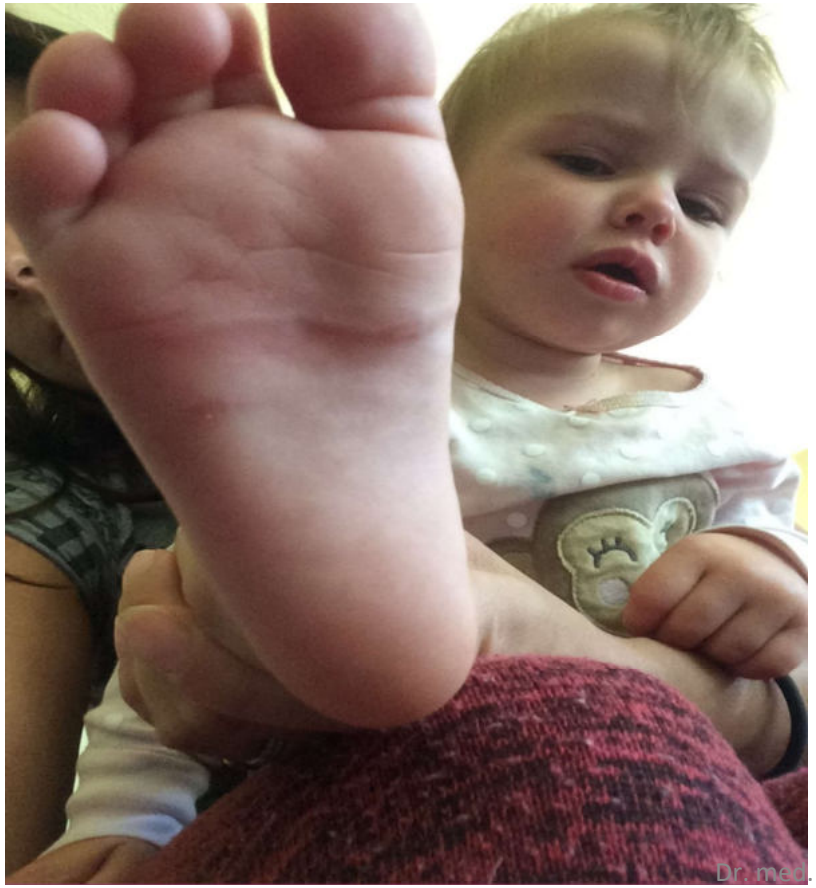
Center for Autoimmune Diseases, Rheumatology Unit, Sheba Medical Center (SMC), Tel Hashomer and Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel

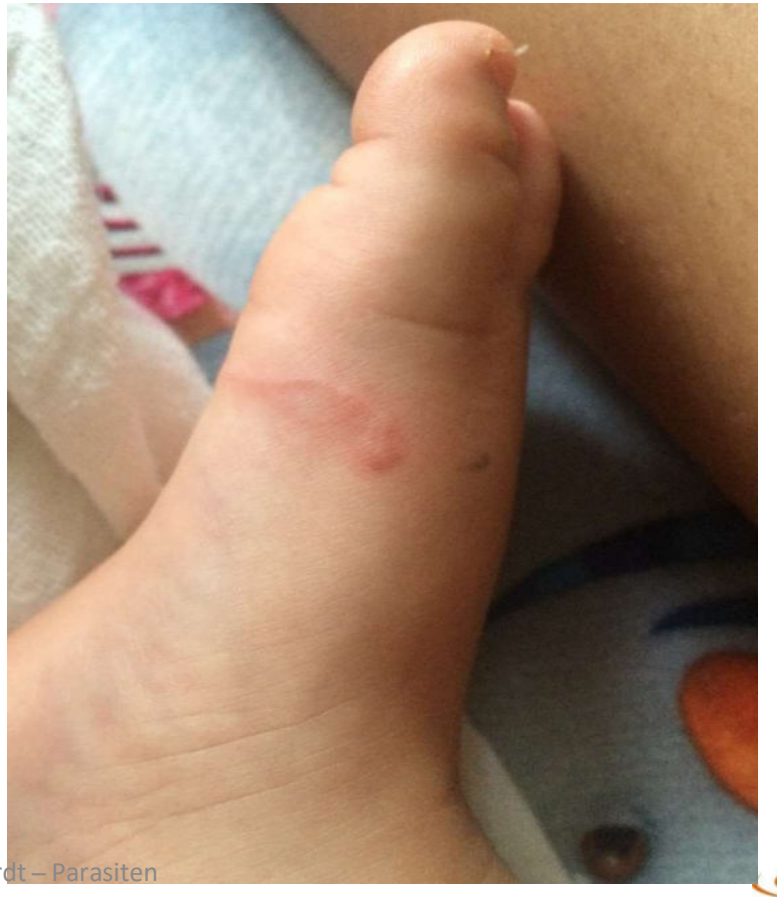
Abstract

Infectious agents have been implicated in the etiopathogenesis of various vasculitides via numerous and overlapping mechanisms including direct microbial invasion of endothelial cells, immune complex mediated vessel wall damage and stimulation of autoreactive B and/or T cells through molecular mimicry and superantigens. While the causative role of hepatitis B virus in polyarteritis nodosa and hepatitis C virus in mixed cryoglobulinemia is clearly established, evidence for the association of other infectious agents with vasculitis, including human immunodeficiency virus, parvovirus B19, cytomegalovirus, varicella zoster virus, *Staphylococcus aureus*, **rickettsiaceae**, *Treponema pallidum* and ***Borrelia burgdorferi*****,** among numerous others, is accumulating. The spectrum of association of infectious agents; bacteria, viruses and **parasites**, with systemic vasculitides, will be reviewed herewith.

Parasites: the Elephant in the Living Room
Pic.: The Rope Parasite

Parasites that used to be found only in Africa are now found in most Western Countries. Here worms under the skin of a 15 month old in the US – contracted by a tick bite





Differential Diagnosis

behavior/moods:

- worms in men: risk taking behavior. In women: docile behavior. In both: short episodes of odd crazy schizoid behavior (hours). Unpredictable eruptions of strange behaviour

- Neuro-Lyme: episodes of rages and depression. Same mood may last for a few days or weeks, not minutes. Normal/nice episodes even in sickest person. Get easily infatuated in inappropriate ways

- Mold: often moods connected with dullness of brain. Can change in minutes after exposure. Often chronically irritated as long as in mold environment and immediately better, as soon as out

- Metal toxicity: affected patients drawn to the dark/evil. Man made: artificial environments (prefer Disney land over trip to the ocean), rhythm without real music (some heavy metal, hip hop or Rap), criminal behavior

Making the Diagnosis

- History of fatigue, skin rashes and “strange” neurological symptoms. Look at travel history! History of Lyme (=immuno-suppressive). Ticks and biting insects often have helminth DNA in their saliva. History of diet (raw veggies? Sushi? Sometimes history of gut symptoms (mostly constipation and leaky gut)
- Physical exam: perioral pallor. Inflamed area of the intestinal tract (giardia and amoebas affecting the small intestine. Worms more likely to affect liver, lung and colon)
- Challenge test: use colonoscopy prep and large dose of antiparasitics. Evaluate the stool over the next few days (take apart with spoon or fork)
- Every lab in the US is different from others in their detection of certain species. Insiders suggest that the detection rate is less than 10 %. Metametrix 2100 Gastrointestinal Function Profile has been good at detecting the most overlooked parasite in the US, Strongyloides (in this genus is also s.stercolaris and varestrongylus klapowi (often found in the lung, may trigger lung cancer). DiagnosteX had been good in finding giardia and amoebas. The saliva tests are improving in sensitivity, but not quite there yet. There are well over 200K species of parasites. Being able to rule out 5 or 6 is good, but falls short of good medicine
- ART: has been a solid and accurate diagnostic tool
- Lab: decreased wbc under 5000, slightly elevated Monocytes (8-12) and in 25% of folks elevated levels of Eosinophils (3 or more).

Diagnosing by the symptoms

- Foamy urine – that's because you excrete eggs in the urine and it increases the foam."**Schistosoma haematobium infection is associated with increased urine foam**" by Sheele JM et al in Pediatr Int 2016 Nov;58*11): 1243-1245
- Urogenital schisto induces cancer in the bladder, nobody's quite sure how, but doctors theorize it's due to the estradiol-like metabolites that the human blood fluke secretes. They theorize that this could dysregulate the tumor suppressor gene p53 expression."**The role of estradiol metabolism in urogenital schistosomiasis – induced bladder cancer**" by Vale N, et al in Tumour Biol 2017 Mar; 39(3)

Natural anti-parasitics

Acta Trop. 2017 Mar;167:163-173. doi: 10.1016/j.actatropica.2016.12.001. Epub 2016 Dec 23.

Antiparasitic activity of menadione (vitamin K_3) against Schistosoma mansoni in BABL/c mice.

Kapadia GJ[1], Soares IAO[2], Rao GS[3], Badoco FR[2], Furtado RA[2], Correa MB[2], Tavares DC[2], Cunha WR[2], Magalhães LG[4].

Abstract: Schistosomiasis is one of the neglected tropical diseases affecting nearly quarter of a billion people in economically challenged tropical and subtropical countries of the world. Praziquantel (PZQ) is the only drug currently available to treat this parasitic disease in spite being ineffective against juvenile worms and concerns about developing resistance to treat reinfections. Our earlier in vitro viability studies demonstrated significant antiparasitic activity of menadione (MEN) (vitamin K_3) against Schistosoma mansoni adult worms. To gain insight into plausible mechanism of antischistosomal activity of MEN, its effect on superoxide anion levels in adult worms were studied in vitro which showed significant increases in both female and male worms. Further confirmation of the deleterious morphological changes in their teguments and organelles were obtained by ultrastructural analysis. Genotoxic and cytotoxic studies in male Swiss mice indicated that MEN was well tolerated at the oral dose of 500mg/kg using the criteria of MNPCE frequency and PCE/RBC ratio in the bone marrow of infected animals. The in vivo antiparasitic activity of MEN was conducted in female BALB/c mice infected with S. mansoni and significant reductions ($P<0.001$) in total worm burden were observed at single oral doses of 40 and 400mg/kg (48.57 and 61.90%, respectively). Additionally, MEN significantly reduced ($P<0.001$) the number of eggs in the liver of infected mice by 53.57 and 58.76%, respectively. Similarly, histological analysis of the livers showed a significant reduction ($P<0.001$) in the diameter of the granulomas.

Since MEN is already in use globally as an over-the-counter drug for a variety of common ailments and a dietary supplement with a safety record in par with similar products when used in recommended doses, the above antiparasitic results which compare reasonably well with PZQ, make a compelling case for considering MEN to treat S. mansoni infection in humans.

INK

El-Khadragy, M. F., Al-Olayan, E. M., Elmallah, M. I., Alharbi, A. M., Yehia, H. M., & Moneim, A. E. A. (2019). Probiotics and yogurt modulate oxidative stress and fibrosis in livers of Schistosoma mansoni-infected mice. *BMC complementary and alternative medicine*, *19*(1), 1-13.

Abstract

Background: Considerable morbidity, mortality, and economic loss result from schistosomiasis infection. Deposition of Schistosoma eggs in the hepatic portal vein is considered as the main causative agent for the development of liver fibrosis and subsequent liver cirrhosis. Probiotics are exogenous and beneficial microorganisms to living hosts against the harmful effect of many parasites. Strong evidence suggests the importance of probiotics in the control strategy of helminth. The ultimate goal of this study is to evaluate the protective effect of probiotics and yogurt on Schistosoma mansoni-induced oxidative stress and hepatic fibrosis in mice.

Methods: Mice were infected by tail immersion of schistosomal cercariae followed by an oral treatment with either probiotics or yogurt for one week before infection and immediately post-infection. Mice were scarified on day 56 following infection with S. mansoni and liver sample were obtained.

Results: We showed that oral administration of probiotics or yogurt revealed a significant reduction in worm number, egg load, and granuloma size in liver tissue, which is mainly assigned to the decreased expression level of matrix metalloproteinases 9 (MMP-9) in liver tissue. A significant reduction in the oxidative stress markers-induced by S. mansoni infection including lipid peroxidation and nitrite/nitrate was also detected. The level of some antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxidase and glutathione reductase) and reduced glutathione was greatly enhanced. Furthermore, treatment with probiotics or yogurt inhibited apoptosis in hepatic tissue, which is mainly assigned to the decreased expression level of caspases-3 in liver tissue.

Conclusion: Our findings represent the promising anti-schistosomal activities of probiotics and yogurt.

Myrrh

Arq Gastroenterol. 2010 Oct-Dec;47(4):393-4.
A short review of the anthelmintic role of Mirazid. Yakoot M[1].
Mirazid® is a patented preparation from a plant that had been used in folk medicine since ancient Egyptians (Myrrh). It was registered in Egypt for the treatment of schistosomiasis and fascioliasis.

Over 32 independent studies for efficacy of Mirazid had been reviewed and their results analyzed. The majority of these studies **reported higher than 90% cure rates**, that even higher in mixed than single trematodal infections in humans and in farm animals. Only two groups of investigators reported lower cure rates as they used lower doses and estimated cure rates at a shorter period from treatment than recommended by innovators

pubmed here: https://www.ncbi.nlm.nih.gov/pubmed/21225152

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- **The Rizols or O3-oils**

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Mimosa Pudica

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The good old Mediterranean Fig

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Our 21-day biological parasite cleanse (KiScience, Biopure.eu)

- Mix a cup of joghurt with 1 tsp with mimosa pudica powder . Add 1 heaping tsp. ficus (fig extract) and 2-3 dropperful of Myrrh tincture. Stirr!

  2-3 times per day
- Take this mix together with 3 caps “3K complete” (source: Thorne.com) or other source of menadione (K3)
- Follow immediately with 15 drops properly prepared Rizol Gamma (in US: O3-oil Gamma) – 2-3 times per day
- In the evening use the Nexus suppository (Artemisinin plus garlic)
- During the day increase your intake of Omega-6 oils to increase arachidonic acid (Ghee, Evenin primrose, etc.)
- Use a high dose of oral melatonin 1 hr before bedtime
- A gallbladder flush at the end of each week (3 times during the cleanse)

The most commonly used Medical drugs in the US

- **Ivermectin**: a biotoxin from soil bacteria streptomyces, derived from avermectin B. Also used in cancer management. High-end dose: 12 mg 4 times a day for2 weeks, followed by 12 mg at bedtime for months or years. Well tolerated, initial visual phenomena (increased contrast vision). Best for the lungworm(s) – species of strongyloides
- **Albendazole** (a benzimidazole): crosses blood brain barrier – consider when there are brain related symptoms. High-end dosing: 400 mg b.i.d. 28 days on 2 weeks off. 3 cycles
- **Nitazoxanide**: (rapidly converted to the active compound "tizoxanide"broad spectrum anti-parasitic, anti-amoebic/giardia; also anti-viral (influenza etc.): high end dosing: 1000 mg b.i.d., most often for 20 days
- **Praziquantel** (Biltricide – a soap that removes the protective film on the parasite) – roundworms and schistosomiasis. Especially when liver is involved
- **Levamisole:** consider also with colon cancer. Miller, M. J. "Use of levamisole in parasitic infections." *Drugs* 20.2 (1980): 122-130.
- **Tinidazole** (giardia, amoebas, anaerobes, intro-cellular Lyme). High-end dosing: 1000 mg t.i.d. for 14 days. Always consider low dose treatment for persistent Lyme: 125-250 mg b.i.d.
- **Metronidazole**: only i.v use recommended: 500 mg 1-3 times/day
- Less available but phantastic for resistant cases: oral **mepacrine**; i.v. suramin
- We know that **ozone** kills at least some stages of Schisto because of this study: ("Efficacy of medical ozone in attenuation of murine Schistosomiasis mansoni infection morbidity" by Thabet SS, Thabet HS, Atalla SS in J Egypt Soc Parasitol 2007 Dec; 37(3): 915-44) @ http://www.ncbi.nlm.nih.gov/pubmed/?term=efficacy+of+medical+ozone+in+attenuation+of+murine+schistosomiasis+mansoni+infection+morbidity

Ivermectin to the rescue:

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- *Footnote:* **strongyloides is a human pathogenic roundworm, even though commonly referred to as threadworm**

Ivermectin and Propolis as Anti-Cancer Agents

Drug Discov Ther. 2009 ;3(6):243-246.

Ivermectin inactivates the kinase PAK1 and blocks the PAK1-dependent growth of human ovarian cancer and NF2 tumor cell lines.

Hashimoto H, Messerli SM, Sudo T, Maruta H

ABSTRACT

Ivermectin is an old anti-parasitic antibiotic which selectively kills nematodes at a very low dose (0.2 mg/kg) by inhibiting their GABA (gamma-aminobutyric acid) receptor, but not mammalian counterpart. Interestingly, several years ago it was reported by a Russian group that Ivermectin can suppress almost completely the growth of human melanoma and a few other cancer xenografts in mice at the much higher doses (3-5 mg/kg) without any adverse effect on mice. However, its anti-cancer mechanism still remained to be clarified at the molecular levels, that would determine the specific type of cancers susceptible to this drug. The first hint towards its anti-PAK1 potential was a recent finding that Ivermectin at its sublethal doses dramatically reduces the litter size (number of eggs laid) of the tiny nematode C. elegans. Interestingly, either a PAK1-deficiency (gene knock-out) or treatment with natural anti-PAK1 products such as CAPE (caffeic acid phenethyl ester) and ARC (artepillin C), the major anti-cancer ingredients in propolis, also causes the exactly same effect on this nematode, suggesting the possibility that the kinase PAK1 might be a new target of Ivermectin. This kinase is required for the growth of more than 70% of human cancers such as pancreatic, colon, breast and prostate cancers and NF (neurofibromatosis) tumors. Here we demonstrate for the first time that Ivermectin blocks the oncogenic kinase PAK1 in human ovarian cancer and NF2-deficient Schwannoma cell lines to suppress their PAK1-dependent growth in cell culture, with the IC50 between 5-20 µM depending on cell lines.

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Nitazoxanide (Alinia, Daxon)

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Nitazoxanide (Alinia, Daxon) and cancer. Asthma

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Nitazoxanide (Alinia, Daxon) and our new virus

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Praziquantel

Indicated for schistosomiasis, ascaris and chlonorchiasis. Schisto is after malaria the second most frequent parasitic illness, with frequent reports from Europe, the US and Canada. Praziquantel is a soap that washed the protective coat of the worms

- Biltricide has a serum half-life of 0.8 to 1.5 hours in adults with normal renal and liver function.
- Metabolites have a half-life of 4 to 5 hours. In patients with significantly impaired liver function (Child-Pugh score B and C), the serum half-life is increased to 3 to 8 hours.
- Praziquantel and its metabolites are mainly excreted renally; within 24 h after a single oral dose, 70 to 80% is found in urine, but less than 0.1% as the unchanged drug. Praziquantel is metabolized through the cytochrome P450 pathway via CYP3A4.
- Agents that induce or inhibit CYP3A4 such as phenytoin, rifampin, and azole antifungals will affect the metabolism of praziquantel.
- *Dosage recommendations vary greatly! Available studies show that dosages ranging from 20 mg/kg through to 1000 mg/kg achieve exciting and amazing results.*
- *Several available studies in fact claim that 500 mg/kg is actually "the cure" and that lesser dosages are known to be low-dosing.*
- *For a 90 kg patient that means a cure consists of 45 grams. That's about 75 pills. That's quite a bit different than the Bayer recommended dosage of 5, 400 mg or the WHO's recommendation of 3,600 mg for the same patient.* **"Diagnosing Urogenital Schistosomiasis" by Le L, Hsieh MH in Trends Parasitol. 2017 May;33(5): 378-87 at**
- Researchers concluded that in order to cure children of Schistosoma, the WHO guidelines do not work. Children may require multiple dosages of 40 mg/kg – often as many as four or more – in order to achieve a cure. (in this study: once monthly***) "Efficacy and side-effects of two praziquantel treatments against Schistosoma haematobium infection, among schoolchildren from Cote d'Ivoire" by N'goran EK et al in Ann Trop Med Parasitol. 2003 Jan; 97(1):37-51***
- Twelve months after treatment "prevalence rates approached pre-treatment levels, but infection intensities remained low." Clearly, PZQ, given in two closely spaced dosages (q 3 weeks) of 40 mg/kg doesn't really cure anybody**. "Efficacy and safety of two closely spaced doses of praziquantel against Schistosoma hamatobium and S. Mansoni and re-infection patterns in school-aged children in Niger" by Garba A et al in Acta Trop 2013 Nov; 128(2): 334-44**

The Bayer-Monsanto Praziquantel Monograph

- About 80% of Biltricide and its derivatives get excreted in the kidneys, but dose adjustment for renal impairment is not considered necessary – nephrotoxic effects of Biltricide or its metabolites have not been shown. (p.5, Product Monograph)
- No studies have been done on pregnant women (p.5)
- Biltricide appears in breast milk at a concentration of about 25% and breastfeeding should be suspended for the day of treatment and the following 72 hours (p.5)
- No studies have been done in children under four or in geriatrics (pp.4-5)
- Mild increases in liver enzymes have been reported by some patients and may need to be monitored (p.6)
- Biltricide is metabolized via the CYP450 enzyme system, so any drugs or herbs that affect this enzyme system should probably be monitored or eliminated where possible when taking Biltricide (p.6) – these include albendazole, anticonvulsants, azole anti-fungals, cimetidine, chloroquine, dexamethasone, erythromycin, rifampin, glucose, bicarb and grapefruit juice (p.6)
- Rifampin should be discontinued 4 weeks before administration of Biltricide and can be restarted one day after completion of treatment (p.7)
- Grapefruit juice reproduces a 1.6 fold increase in the Cmas and a 1.9 fold increase in the AUC of Biltricide (p.7)
- Be mindful of possible liver and thyroid gland enlargement with high dosdages – in a four-week rat and dog study and in a three-month dog study, the only consistent observed toxicities involved the enlarged liver and thyroid in rats (at 300 mg/kg/day and above), and enlarged livers in dogs (180 mg/kg/day after 4 weeks of exposure) and increased absolute and relative liver weight (180 mg/kg/day after 3 months of exposure). (Product Monograph, p.14)
- “Long-term carcinogenicity studies were conducted in Sprague-Dawley rats and golden hamsters. PZQ was not considered to be carcinogenic in rats. In hamsters, PZQ might be considered a weak carcinogen based on a slight increase in percent malignant tumours in the female.” (Product Monograph, p.14)
- In reproduction tests with doses up to 40 times the human dose (300 mg/kg body weight/day), PZQ had no effect either on the fertility of male and female rats or on the embryonal and fetal development of the offspring. Even with daily oral administration during organogenesis, PZQ did not show any embryotoxic or teratogenic effects. An increase in the abortion rate was found in rats receiving three times the single human therapeutic dose. Reproduction studies in rabbits at doses up to 40 times the human dose revealed no evidence of impaired fertility or harm to the fetus due to PZQ. Extensive studies in various test systems (both in vitro and in vivo) have yielded no evidence of mutagenicity. Mutagenic effects in Salmonella tests observed by one lab have not been confirmed in the same tested strain by other labs” (Product Monograph p.14-15)

On their Animal Health Division website BAYER writes:
"Praziquantel is **active against cestodes (tapeworms).** Praziquantel is absorbed, metabolized in the liver, and excreted in the bile. Upon entering the digestive tract from the bile, cestocidal activity is exhibited. Following exposure to praziquantel, the tapeworm loses its ability to resist digestion by the mammalian host. Because of this, whole tapeworms, including the scolices (plural of "scolex"), are very rarely passed after administration of praziquantel. In many instances, only disintegrated and partially digested pieces of tapeworms will be seen in the stool. The majority of tapeworms are digested and are not found in the feces."[19]

World Health Organization – Dosing Advice for Schisto:

- **40 mg/kg** in a one-time dose, taken once yearly in endemic areas (70 countries).
- 90 kg adult would take **3600 mg** all at once, in one day, one day per year
- **BAYER's Biltricide Product Mongraph– dosing advice for Schisto Infections (all forms of Schisto):**
- Advises **20 mg/kg** of bodyweight for adults and children four and older, taken 3 times daily for one day, dosages to be taken 4-6 hours apart.
- Therefore 90 kg adult would take 1800 mg x 3 = **5400 mg** in one day.
- Here is the link to Bayer's Biltricide Product Manual https://omr.bayer.ca/omr/online/biltricide-pm-en.pdf

These same scientists advised using Pentoxifylline (PTX) in addition to PZQ because of its' significant anti-fibrinogenic role – they deemed it a good adjuvant therapeutic tool to PZQ. Their starting point assumption that 500 mg/kg/day for 2 days is the "curative" dose.

- "Pharmacodynamics of **pentoxifylline** and/or praziquantel in murine schistosomiasis mansoni" by El-Lakkany N et al. in APMIS, 2007 Mar; 115(3): 184-94.
- "Therapeutic effect of subcurative dose praziquantel on Schistosoma mansoni infected mice and resistance to challenge infection after treatment" by Chaiworapom R et al in Southeast Asian J Trop Med Public Health. 2005 Jul;36(4):846-52. **Here neither 300 mg/kg nor 600 mg/kg were curative**.
- "**Liposomal-praziquantel**: efficacy against Schistosoma mansoni in a preclinical assay" by Frezza Tf in Acta Trop. 2013 Oct; 128(1) where 300 mg/kg of liposomal PZQ only decreased worms by 68%, eggs in the intestine by 79%, hepatic granulomas by 98.4% and egg counts by 55.5% compared to untreated controls.
- "**Liposomal**-praziquantel: efficacy against Schistosoma mansoni in a preclinical assay" by Frezza Tf in Acta Trop. 2013 Oct; 128(1)
- PZQ at 200 mg/kg administered alone resulted in just 49% reduction of the total number of mature worms When combined **with 200 mg of Mef, scientitst achieved a 95% reduction in the number of mature worms. "Pharmacodynamics of mefloquine and praziquantel combination therapy in mice harbouring juvenile and adult Schistosoma mansoni" by el-Lakkany NM et al in Mem Inst Oswaldo Cruz 2011 Nov; 106(7)**
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- "Effect of dietary **zinc supplement** on egg granuloma in Swiss mice treated with praziquantel". Helmy MM[1], Mahmoud SS, Fahmy ZH. Exp Parasitol. 2009 Aug;122(4):310-7. doi: 10.1016/j.exppara.2009.04.006. Epub 2009 Apr 21. Also please consider adding a good dose of calcium into the patient's anti-Schistosoma cocktail. **Calcium supplementation soon after consuming the PZQ might also greatly increase the efficacy of this treatment.**
- J Parasit Dis. 2016 Sep;40(3):823-32. doi: 10.1007/s12639-014-0586-4. Epub 2014 Oct 30. Effect of **Lactobacillus sporogenes** (probiotic) on certain parasitological and molecular aspects in Schistosoma mansoni infected mice. Mohamed AH[1], Osman GY[1], Zowail ME[2], El-Esawy HM[1].
- https://www.ncbi.nlm.nih.gov/pubmed/27605791

Antimicrob Agents Chemother. 2012 Feb;56(2):1090-2. doi: 10.1128/AAC.05371-11. Epub 2011 Nov 21.

In vivo activity of aryl ozonides against Schistosoma species.

Keiser J[1], Ingram K, Vargas M, Chollet J, Wang X, Dong Y, Vennerstrom JL.

Abstract

We evaluated the in vivo antischistosomal activities of 11 structurally diverse synthetic peroxides. Of all compounds tested, ozonide (1,2,4-trioxolane) OZ418 had the highest activity against adult Schistosoma mansoni, with total and female worm burden reductions of 80 and 90% ($P < 0.05$), respectively. Furthermore, treatment of S. haematobium-infected mice with OZ418 reduced the total worm burden by 86%. In conclusion, OZ418 is a promising anti-schistosomal lead compound.

Comment Dr.Klinghardt: *The "O3-oil Gamma" (Rizol Gamma) is rich in hundreds of Ozonides (Research: Prof.G.Steidl) and has become our most effective and yet also most tolerated anti-parasitic when combined with enema/colonic treatment. If the client has KPU, Ghee or other sources of Omega 6 oils have to be incuded (arachidonic acid is a potent inhibitor of most parasites*

Toxoplasmosis (CDC)

Diagnosis

- Diagnosis of toxoplasmosis is usually made by detection of *Toxoplasma*-specific IgG, IgM, or IgA antibodies. There are several tests available that detect these immunoglobulin antibodies within several weeks of infection:
- dye test (DT)
- indirect fluorescent antibody test (IFA)
- enzyme immunoassays (ELISA, immunoblots)
- If acute infection is suspected, the patient's serum should be tested for IgG and IgM *Toxoplasma*-specific antibodies. For a testing results algorithm, see CDC's DPDx Toxoplasmosis: Antibody Detection page.
- Serologic tests are sometimes unreliable in immunosuppressed patients. Because of the persistence of *Toxoplasma* cysts and antibody in asymptomatic chronic latent infections, immunosuppressed persons with both positive PCR and serologic results should have their diagnostic testing results interpreted in relation to clinical features of an active infection. A negative PCR does not rule out active infection. PCR can also be performed on amniotic fluid which can be helpful in determining fetal infection following acute acquired infection of the mother.
- Diagnosis can be made by direct observation of the parasite in stained tissue sections, cerebrospinal fluid (CSF), or other biopsy material. These techniques are used less frequently because of the difficulty of obtaining these specimens. Parasites can also be isolated from blood or other body fluids (for example, CSF) but this process can be difficult and requires considerable time.

Nitazoxanide and Toxoplasmosis

- El-Kowrany, S. I., Abd El Ghaffar, A. E. S., Shoheib, Z. S., Mady, R. F., & Gamea, G. A. M. (2019). Evaluation of nitazoxanide as a novel drug for the treatment of acute and chronic toxoplasmosis. *Acta tropica*, *195*, 145-154
- FarahatAllam, A., Shehab, A. Y., Mogahed, N. M. F. H., Farag, H. F., Elsayed, Y., & Abd El-Latif, N. F. (2020). Effect of nitazoxanide and spiramycin metronidazole combination in acute experimental toxoplasmosis. *Heliyon*, *6*(4), e03661..\
- Saleh, M., Nagaty, I., Zalat, R., Yaseen, D., Abdelhameed, R., & Kishik, S. (2021). Assessment of Nitazoxanide Loaded on Silver nanoparticles Efficacy on Treatment of Murine Model of Chronic Toxoplasmosis. *Benha Medical Journal*, *38*(Academic issue), 186-199.
- Stuppy, W. P. (2017). Enteropathogens Masquerading as Functional Bowel Disorders: ADe novoStage for TreatingToxoplasma gondiiWith Nitazoxanide: 2698. *American Journal of Gastroenterology*, *112*, S1468.

US patent: 1999-10-12 US5965590A Inventor: Jean-François Rossignol
Current Assignee : LAMINAR DIRECT CAPITAL LLC Romark Laboratories LC Original Assignee: Romark Laboratories LC Priority date 1994-09-08

SUMMARY OF THE INVENTION The present invention is based on the surprising discovery that Cryptosporidium parvum, Isospora belli, Enterocytzoon bieneusi, Encephalitozoon intestinalis, Mycobacterium tuberculosis, Mycobacterium avium intracellulare, Pneumocystis carinii, and **Toxoplasma gondii** infections can be optimally and effectively treated, particularly in the immuno-compromised, by a method comprising administration of a pharmaceutical composition containing as active agent a compound selected the group consisting of desacetyl-nitazoxanide and **nitazoxanide.**

Lateef, Mohammad, et al. "Successful treatment of niclosamide-and praziquantel-resistant beef tapeworm infection with nitazoxanide." *International Journal of Infectious Diseases* 12.1 (2008): 80-82.

Lam, Karen KY, et al. "**Nitazoxanide stimulates autophagy** and inhibits mTORC1 signaling and intracellular proliferation of **Mycobacterium tuberculosis**." *PLoS pathogens* 8.5 (2012): e1002691.

- “Classic therapy” for ocular toxoplasmosis, adults: **pyrimethamine** 100 mg for 1 day as a loading dose, then 25 to 50 mg per day, plus **sulfadiazine** 1 gram four times per day, plus folinic acid (**leucovorin)** 5-25 mg with each dose of pyrimethamine; pediatric dose: pyrimethamine 2 mg/kg first day then 1 mg/kg each day, plus sulfadiazine 50 mg/kg two times per day, plus folinic acid (leucovorin) 7.5 mg per day) for 4 to 6 weeks followed by reevaluation of the patient’s condition. Leucovorin protects the bone marrow from the toxic effects of pyrimethamine. If the patient has a hypersensitivity reaction to sulfa drugs, pyrimethamine plus **clindamycin** can be used instead. The fixed combination of **trimethoprim** with **sulfamethoxazole** has been used as an alternative, as well as other drugs such as **atovaquone and pyrimethamine plus azithromycin**, which have not been extensively studied (see: Montoya JG, Boothroyd JC, Kovacs JA. *Toxoplasma gondii* in Mandell, Douglas, and Bennett’s Principles and Preactice of Infectious Diseases, 7th, Edition, 2010. Mandell GL, Bennett JE, Dolin R, Eds. Churchill Livingstone Elsevier, Philadelphia, PA.; and de-la-Torre A, Stanford M, Curi A, Jaffe GJ, Gomez-Marin JE. Therapy for ocular toxoplasmosis. Ocul Immunol Inflamm. 2011;19:314-20. Corticosteroids are sometimes prescribed in addition to antiparasitic agents.
- Management of maternal and fetal infection varies depending on the treatment center. In general, **spiramycin** is recommended (for the first and early second trimesters) or **pyrimethamine/sulfadiazine** and leucovorin (for late second and third trimesters) for women with acute *T. gondii* infection diagnosed at a reference laboratory during gestation
- PCR is often performed on the amniotic fluid at 18 gestation weeks to determine if the infant is infected. If the infant is likely to be infected, then treatment with drugs such as pyrimethamine, sulfadiazine, and leucovorin is typical. Congenitally infected newborns are generally treated with pyrimethamine, a sulfonamide, and leucovorin for 1 year (see Montoya JG, Liesenfeld O. Toxoplasmosis. Lancet. 2004 Jun 12;363:1965-1976; for additional information regarding management in pregnant women, see Montoya JG, Remington JS. Management of *Toxoplasma gondii* infection in pregnancy. Clin Infect Dis 2008;47:554-566).

- **Albendazole** (a benzimidazole): giardia, trichuriasis, filariasis, neurocysticercosis, hydatid disease, pinworms and ascaris, flatworms, fasciolopsis and tapeworms, visceral larva migrans, hookworms,, trichinosis, strongyloides
- FDA approved only for treatment of hydatid disease (dog tapeworm larvae) and neurocysticercosis
- Common side effects: mild elevation of liver enzymes, headache, abdominal pain. Less than 1% leukopenia or other hypersensitivity, aplastic anemia, renal failure. Because of poor absorption overdoses are not reported (LD 50: 2.5 grams/kg). Usual dose: 800 mg/day
- **Synergy: give Cimetidine** 200 mg twice daily
- Jamshidi, Mahin, et al. "The effect of combination therapy with albendazole and praziquantel on hydatid cyst treatment." *Parasitology research* 103.1 (2008): 195-199. (Albenza 400 mg bid for 4 weeks, Praziquantel 40 mg/kg /day – twice weekly)

Pérez-Molina, José A., et al. "Evaluation of nitazoxanide for the treatment of disseminated cystic echinococcosis: report of five cases and literature review." *The American journal of tropical medicine and hygiene* 84.2 (2011): 351-356.

We aimed to evaluate the effectiveness of nitazoxanide in disseminated cystic echinococcosis (DCE) that failed to respond to surgical and antiparasitic therapy. We report on seven patients (five of them with bony involvement): two cases from the literature and five patients who were included in a compassionate trial of nitazoxanide therapy in our hospital. Median follow-up time until nitazoxanide therapy was 12 years and all patients had received prior medical treatment and extensive surgery. **Nitazoxanide (500 mg/12 h) in combination with albendazole, with/without praziquantel, was administered for 3–24 months**. Three patients improved: one with muscle involvement (clinico-radiological response), one with lung involvement (radiological response), and another with soft tissue and bony involvement (clinico-radiological response of soft tissue cysts). There was one discontinuation after 15 days of starting therapy. Nitazoxanide combination therapy could have a role in the treatment of DCE when there is no bony involvement. Long-term safety profile seems to be favorable.

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Comment Dr. K: Nitazoxanide is also our preferred treatment for chronic giardiasis and amoebiasis (1000 mg bid for 10-20 days)

It appears safe and far more effective to stack anti-parasitic drugs on top of each other

Mohammed, Khalfan A., et al. "Triple co-administration of ivermectin, albendazole and praziquantel in Zanzibar: a safety study." *PLoS neglected tropical diseases* 2.1 (2008): e171.

Methodology/Principal Findings

Ivermectin, albendazole and praziquantel were co-administered to 5,055 children and adults living in areas endemic for LF, STH and schistosomiasis in Zanzibar, United Republic of Tanzania, during a pilot intervention aimed at elucidating and quantifying possible side-effects. Subsequently, these drugs were co-administered to about 700,000 individuals during a countrywide intervention targeting a large part of the total population of Zanzibar. Passive and active surveillance measures carried out during both interventions showed that side-effects attributable to the three drugs given at the same time were mild and self-limiting events.

Conclusions/Significance

Our data suggest that co-administration of ivermectin, albendazole and praziquantel is safe in areas where lymphatic filariasis, soil-transmitted helminthiasis and schistosomiasis are co-endemic and where several rounds of treatment with one or two drugs have been implemented in the past. Passive surveillance measures, however, should be continued and detection, management and reporting of possible side-effects should be considered a key component of any health intervention administering drugs.

Olsen, Annette. "Efficacy and safety of drug combinations in the treatment of schistosomiasis, soil-transmitted helminthiasis, lymphatic filariasis and onchocerciasis." *Transactions of the Royal Society of Tropical Medicine and Hygiene* 101.8 (2007): 747-758.

Summary

This review concerns the efficacy and safety of combinations of various drugs, including albendazole (ALB), diethylcarbamazine (DEC), ivermectin (IVM), mebendazole and praziquantel (PZQ). **There were no significant pharmacokinetic interactions when ALB–PZQ, ALB–DEC, ALB–IVM or ALB–IVM–PZQ were co-administered**. ALB did not add to the cure rate of PZQ in the treatment of *Schistosoma* japonicum, *S. mansoni* and *S. haematobium*. ALB and DEC in combination and alone were ineffective against *S. haematobium* infections. No combinations (ALB–PZQ, ALB–IVM and ALB–DEC) were superior to ALB against *Ascaris lumbricoides* and hookworm infections, whilst IVM, but not PZQ or DEC, added to the effect of ALB in the treatment of *Trichuris* trichiura. Results with ALB added to single-drug therapy with IVM or DEC against lymphatic filariasis were inconclusive, but DEC and IVM in combination appeared to be superior to DEC or IVM alone. None of the drug combinations against lymphatic filariasis showed more adverse reactions than single-drug therapy. In onchocerciasis patients, ALB and IVM were safe in those also infected with lymphatic filariasis, but were not superior to IVM alone. Existing policies are based on limited knowledge. Well conducted, comparative, randomised controlled studies would greatly aid in the future use of these drug combinations.

A few tricks that improve outcome

Use **melatonin** in high doses (10 mg b.i.d) as adjunctive therapy in parasite treatment:

Ermakova, O. N., et al. "Melatonin effect on the regeneration of the flatworm Girardia tigrina." *Ontogenez* 40.6 (2009): 466-469.

Use **Bromelain between meals:**

Stepek, Gillian, et al. "In vitro and in vivo anthelmintic efficacy of plant cysteine proteinases against the rodent gastrointestinal nematode, Trichuris muris." *Parasitology* 132.5 (2006): 681-689.

Mansur, F., et al. "The anthelmintic efficacy of natural plant cysteine proteinases against two rodent cestodes Hymenolepis diminuta and Hymenolepis microstoma in vitro." *Veterinary parasitology* 201.1-2 (2014): 48-58.

Add **Vit K3** to the regime:

Kapadia, G. J., Soares, I. A., Rao, G. S., Badoco, F. R., Furtado, R. A., Correa, M. B., ... & Magalhães, L. G. (2017). Antiparasitic activity of menadione (vitamin K3) against Schistosoma mansoni in BABL/c mice. *Acta tropica*, *167*, 163-173.

Increase your Omega 6 intake while deworming:

El Ridi, Rashika, et al. "In vitro and in vivo activities of arachidonic acid against Schistosoma mansoni and Schistosoma haematobium." *Antimicrobial agents and chemotherapy* 54.8 (2010): 3383-3389.

Acta Trop. 2014 Sep;137:31-8. doi: 10.1016/j.actatropica.2014.04.021. Epub 2014 May 6.

Effects of melatonin on oxidative stress, and resistance to bacterial, parasitic, and viral infections: a review.

Vielma JR1, Bonilla E2, Chacín-Bonilla L3, Mora M1, Medina-Leendertz S1, Bravo Y1.

Abstract

Melatonin, a hormone secreted by the pineal gland, works directly and indirectly as a free radical scavenger. Its other physiological or pharmacological activities could be dependent or independent of receptors located in different cells, organs, and tissues. In addition to its role in promoting sleep and circadian rhythms regulation, it has important immunomodulatory, antioxidant, and neuroprotectiveeffects suggesting that this indole must be considered as a therapeutic alternative against infections. The aim of this review is to describe the effects of melatonin on oxidative stress and the resistance to bacterial (Klebsiella pneumoniae, Helicobacter pylori, Mycobacterium tuberculosis, and Clostridium perfringens), viral (Venezuelan equine encephalomyelitis virus and respiratory syncytial virus), and parasitic (Plasmodium spp., Entamoeba histolytica, Trypanosoma cruzi, Toxoplasma gondii, and Opisthorchis viverrini) infections.

The Gubarev Protocols

All enemas are preceded with a 2 liter cleaning water enema. Each type can be done once in 4 days.
They should be followed by another 2 liter water enema at the end of the day, or the next morning.
This is when the ropes come out. Find the type of enema that is the most effective.

1. 1 quart of whole milk with 2 table spoons of salt. Room temperature. Hold for 2 hours. A pound of Mucus may come out as a result

2. 1 quart of water with 2 table spoons of baking soda. Room temperature. Hold for 2 hours.

3. Eucalyptus leaves (30 grams) boiled in water for 15 minutes, then cooled to 42C with added 30-100 drops of eucalyptus oil. Hold for 2 hours. After this juice from 5-6 lemons in 1 quart water. Hold for 2hours.

4. One or two table spoons of vinegar in 1 liter of water. Hold for 2 hours. Best for fecal stones.

- As a result of these enemas the rope worms migrate to sinuses and lungs. Eucalyptus inhalations and “dead” water drops in the nose take care of that.
  These procedures are quite involved and time consuming, but chronic symptoms are relieved almost instantaneously when the large ones come out.
- Source: eucalyptus leaves: www.amazon.com, oil: “Young living oils” or “NOW”
- Alternative : inhalation with 5 ml ASEA (Omron hand held device)

Chronic Schistosomiasis

Schistosomiasis is a disease that is caused by parasites (genus Schistosoma) that enter humans by attaching to the skin, penetrating it, and then **migrating through the venous system** to the portal veins where the parasites produce eggs and eventually, the symptoms of acute or chronic disease (for example, fever, abdominal discomfort, blood in stools). This disease is also known as Bilharziosis. **Schistosomiasis is the second most prevalent tropical disease in the world**; malaria is the first. The disease is found mainly in Africa**, Asia, South America, the Middle East, and the Caribbean**. About 207 million people in at least 74 countries are estimated to have the disease**. In the U.S., it is diagnosed in tourists who have visited** these developing countries and in visitors from these countries, or from lab accidents. The type of snail that is part of the parasite's life cycle (see below) is not endemic to U.S. freshwater sources, so the disease is not endemic in the U.S. Acute schistosomiasis may reach a death (mortality) rate of 25%, although most areas report lower rates.

- Schistosomiasis is a disease caused by Schistosoma spp. that can cause acute and chronic infection with many symptoms that frequently include fever, blood in stools or urine, and abdominal discomfort.
- The immune response and Schistosoma spp. egg migration through tissues and their deposition in body organs cause the disease.
- Schistosomiasis has an acute and chronic phase.
- Schistosomiasis is diagnosed by the identification of characteristic eggs in feces, urine, or biopsy samples; diagnosis may be aided with serologic (blood) tests.
- Schistosomiasis is most often effectively treated with the antiparasitic drug **praziquantel (Biltricide)**, especially in acute phase disease.
- Chronic schistosomiasis often produces complications in various organ systems (for example, gastrointestinal system, urinary system, heart, liver).
- Currently, there is no vaccine available for schistosomiasis.

REFERENCES:
United States. Centers for Disease Control and Prevention. "Schistosomiasis." July 20, 2009. <http://www.dpd.cdc.gov/dpdx/HTML/Schistosomiasis.htm>.

The majority of people who develop chronic schistosomiasis have symptoms develop months or years after the initial exposure to the parasites. The following is a list of most symptoms associated with chronic schistosomiasis. Patients usual have a few of these symptoms:

Abdominal pain

- Abdominal swelling (ascites)
- Bloody diarrhea or blood in the stools
- Blood in the urine and painful urination
- Shortness of breath and coughing
- Weakness
- Chest pain and palpitations
- Seizures
- Paralysis
- Mental status changes
- Lesions on the vulva or the perianal area

Diagnosis

The presumptive diagnosis of schistosomiasis is based on the medical caregiver's history and physical examination of the patient. Thick fecal smears and urine concentration tests are used to determine if any Schistosoma spp. eggs are present. Blood tests and, more recently, polymerase chain reaction (PCR) tests can help confirm the diagnosis, but positive results may only indicate past exposure. However, these tests are not usually positive until the patient has been infected for about six to eight weeks because it takes time for the eggs to develop and stimulate the human immune response. The PCR test is available from the U.S. Centers for Disease Control and Prevention. Many other tests and procedures may be necessary to establish the diagnosis, especially if no eggs are found in the feces or urine, which is often the situation in chronic schistosomiasis. Colonoscopy cystoscopy endoscopy and liver biopsy are all methods that can be used to obtain tissue biopsy material. In addition, ultrasound, chest X-rays, CT MRI and echocardiograms may be used to determine the extent of the infection in various organ systems.

Antimicrob Agents Chemother. 2010 Aug; 54(8): 3383–3389

In Vitro and *In Vivo* Activities of Arachidonic Acid against *Schistosoma mansoni* and *Schistosoma haematobium*

Rashika El Ridi,[1,*] Marwa Aboueldahab,[2] Hatem Tallima,[1] Mohamed Salah,[3] Noha Mahana,[1] Samia Fawzi,[2] Shadia H. Mohamed,[2] and Omar M. Fahmy[1]

ABSTRACT

The development of arachidonic acid (ARA) for treatment of schistosomiasis is an entirely novel approach based on a breakthrough discovery in schistosome biology revealing that activation of parasite tegument-bound neutral sphingomyelinase (nSMase) by unsaturated fatty acids, such as ARA, induces exposure of parasite surface membrane antigens to antibody binding and eventual attrition of developing schistosomula and adult worms. Here, we demonstrate that 5 mM ARA leads to irreversible killing of ex vivo 1-, 3-, 4-, 5-, and 6-week-old *Schistosoma mansoni* and 9-, 10-, and 12-week-old *Schistosoma haematobium* worms within 3 to 4 h, depending on the parasite age, even when the worms were maintained in up to 50% fetal calf serum. ARA-mediated worm attrition was prevented by nSMase inhibitors, such as $CaCl_2$ and GW4869. Scanning and transmission electron microscopy revealed that ARA-mediated worm killing was associated with spine destruction, membrane blebbing, and disorganization of the apical membrane structure. ARA-mediated *S. mansoni* and *S. haematobium* worm attrition was reproduced *in vivo* in a series of 6 independent experiments using BALB/c or C57BL/6 mice, indicating that ARA in a pure form (Sigma) or included in infant formula (Nestle) consistently led to 40 to 80% decrease in the total worm burden. Arachidonic acid is already marketed for human use in the United States and Canada for proper development of newborns and muscle growth of athletes; thus, ARA has potential as a safe and cost-effective addition to antischistosomal therapy.

Koul, P. A., et al. "Mepacrine therapy in niclosamide resistant taeniasis."

The Journal of the Association of Physicians of India; 48.4 (2000): 402-403.

Abstract

OBJECTIVE: To evaluate the efficacy of mepacrine (quinacrine) in patients with niclosamide resistant Taenia saginata infection.

METHODS:

Eighty six cases with niclosamide resistant Taenia saginata (unresponsive to 2-8 courses of niclosamide) were treated with quinacrine (1 g) administered orally or via a nasogastric tube, and followed at 2, 4, 8 and 12 weeks for recurrence of passage of proglottids and presence of Taenia eggs in the stool examinations. Pre and post-therapy egg counts were obtained and egg viability was tested by staining with methylene blue.

RESULTS:

Eighty-one (94.2%) patients responded promptly with passage of the worm within 4-72 hours. The egg counts showed a drastic fall in 79 cases and a fall in viability from a median of 100% to 0% was observed. Only one patient demonstrated a relapse at 4 weeks. Gastrointestinal side effects occurred in 9 cases but were controlled easily by symptomatic therapy.

CONCLUSION:

We conclude that quinacrine is a safe, inexpensive, effective and generally well tolerated drug for the treatment of niclosamide resistant Taenia saginata infestations.

PMID: 11273175 [Indexed for MEDLINE]

Quinacrine (mepacrine) is a potent anti-retroviral, lyme and cancer drug

Neural Regen Res. 2018 Mar;13(3):449-455. doi: 10.4103/1673-5374.228727. **Quinacrine pretreatment reduces microwave-induced neuronal damage by stabilizing the cell membrane**

Future Oncol. 2018 Jun;14(15):1511-1520. doi: 10.2217/fon-2017-0728. Epub 2018 Jan 30. **Novel applications for an established antimalarial drug: tumoricidal activity of quinacrine.**

Yan H[1], Bian A[1], Gao X[2], Li H[1], Chen Z[1], Liu X[1].

Med Hypotheses. 1996 Jul;47(1):43-7. **Could an aminoacridine interfere with the cellular mechanisms involved in the process of human immunodeficiency virus infection?** Sotelo J[1].

Mol Cancer Res. 2018 Jun;16(6):935-946. doi: 10.1158/1541-7786.MCR-17-0511. Epub 2018 Mar 15.**Therapeutic Effect of Quinacrine, an Antiprotozoan Drug, by Selective Suppression of p-CHK1/2 in p53-Negative Malignant Cancers.** Park S[#1], Oh AY[#1], Cho JH[1], Yoon MH[1], Woo TG[1], Kang SM[1], Lee HY[2], Jung YJ[3], Park BJ[4].

Sci Rep. 2018 Feb 6;8(1):2487. doi: 10.1038/s41598-018-20531-w. **Quinacrine upregulates p21/p27 independent of p53 through autophagy-mediated downregulation of p62-Skp2 axis in ovarian cancer.** Jung D[1], Khurana A[1], Roy D[1], Kalogera E[2], Bakkum-Gamez J[2], Chien J[3], Shridhar V[4].

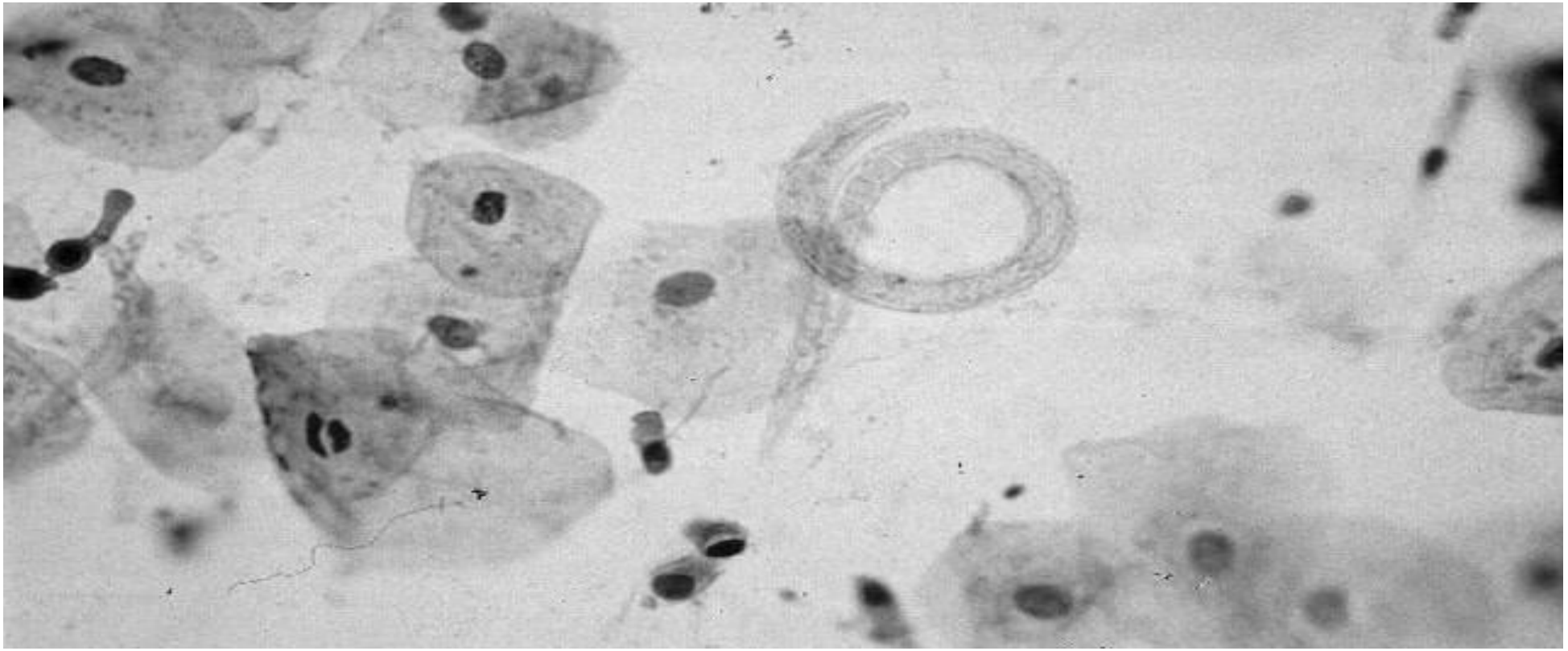
Gynecol Oncol. 2017 Jul;146(1):187-195. doi: 10.1016/j.ygyno.2017.04.022. Epub 2017 May 22. **Quinacrine in endometrial cancer: Repurposing an old antimalarial drug.** Kalogera E[1], Roy D[2], Khurana A[2], Mondal S[2], Weaver AL[3], He X[2], Dowdy SC[1], Shridhar V[4].

Insights Imaging. 2017 Feb;8(1):101-125. doi: 10.1007/s13244-016-0525-2. Epub 2016 Nov 23. **Unexpected hosts: imaging parasitic diseases.** Rodríguez Carnero P[1], Hernández Mateo P[2], Martín-Garre S[2], García Pérez Á[3], Del Campo L[4].

A patient report from SHI

- A 40 y.o female patient lived a restricted life with inability to have a spontaneous bowel movement since 30 years and severe abdonial pain, brain fog and multiple other symptoms. She was dependent on daily colonics, more than one. She described seeing daily “bundles of parasites” in the colonic equipment glass tube. She had been through every available anti-parasitic drug and had several fecal transplants in Florida (FMT). 2 years ago a painful section of bowel near the ileo-cecal valve was surgically removed to give her relief. She did not test positive on conventional stool tests for parasites.
- ART testing showed taeniasis and a google search found the year 2000 article on successful treatment for persistent taeniasis with mepacrine.
- We suggested a one month treatment and she did it. She was cured. That is the word she used: cured. I would never dare to say that in the current legal environment.

Mayayo, E., et al. "Strongyloides stercolaris infection mimicking a malignant tumour in a non-immunocompromised patient. Diagnosis by bronchoalveolar cytology." *Journal of clinical pathology* 58.4 (2005): 420-422**.**Squamous cells, some bronchial cells, and the presence of a filariform larva (Papanicolaou stain; original magnification, ×400)



Parasites in the Lung?

J Clin Pathol. 2005 Apr;58(4):420-2.

Strongyloides stercolaris infection mimicking a malignant tumour in a non immunocompromised patient. Diagnosis by bronchoalveolar cytology. Mayayo E, Gomez-Aracil V, Azua-Blanco J, Azua-Romeo J, Capilla J, Mayayo R.

Abstract

Autoinfective strongyloidiasis is often fatal in immunosuppressed patients or in immunocomprised hosts. An interesting case of Strongyloides stercolaris hyperinfection was seen in an immunocompetent patient. This report describes a case of fatal strogyloidiasis in a 79 year old man, who had suffered gastrointestinal discomfort for years, and who presented because of respiratory illness. A chest radiograph showed an irregular mass close to the mediastinum and interstitial infiltrates, but blood eosinophilia was not observed. Cytological examination of the samples obtained from bronchial aspiration and brushing identified several filariform larvae. Thus, cytology was essential for the correct diagnosis in this patient and is a very reliable method to diagnose lung parasitosis.

PMID: 15790710 [PubMed - indexed for MEDLINE] PMCID: PMC1770632

http://www.ncbi.nlm.nih.gov/pubmed/15790710

A case from my practice Sept. 2018

- A 50 year old female patient from Canada called – she was just diagnosed with a CT scan with stage 3 lung cancer – one lung was completely “collapsed” – the other full of metastases. She could not fly due to severe shortness of breath
- I told her to take 80 mg of ivermectin (somewhat effective for some cancers and for strongyloides – the lung worm).
- Her partner drove her from Eastern Canada to us in Seattle in 4 days. 2 days into the trip she coughed up 2 cups of “soup” and could breathe better since.
- After arrival in Seattle we used ART-based anti-parasitic drugs, including injectable ivermectin (used to be available in compounding pharmacies),and oral Quinacrine, Nitazoxanide and Albendazole. We covered her with a one-time dose of dexamethasone. She coughed up several cups of visible parasites - and felt well since.
- 10 days after the initial CT scan we repeated a set of chest x-rays. Diagnosis: possible light bronchitis. No sign of cancer, no collapsed lung. She drove back home happy.

Hi Dr K

I just watched your parasite lecture, ha ha ha!!! I am in there.

But you were too modest – because the cancer clinic in Ottawa – supposedly one of the best in Canada – told me I had to cut half my lung out and that if I didn't I would be dead in six months.

When I got back to Canada after seeing you, I brought in my report showing the light bronchitis and he STILL wanted to cut half my lung out.
It's important for this reason: It shows your patients with a cancer diagnosis how CRAZY WRONG an expert oncologist can be -- He knows nothing about parasites
- It also shows that oncologists are totally ignoring one of the world's main causes of cancer – parasites
- It shows that they do not understand the limitations of their own imaging

By the way I brought him ALLLLLLL my studies on strongyloides in the lung, tabbed and hi-lighted in a beautiful little binder which I offered to give him (but he wouldn't take it)
He mocked me and laughed at me s aying they were "internet" studies.
I told him I got them from you and that you recommended he read them. Then he sat up.
Then he admitted he knew nothing about parasites -- -zero.
I asked him how he hoped to ever differentiate between a lung tumor and parasites --- since I had also brought the studies showing that you cannot differentiate on CT or an MRI between parasites ni the lung and strongyloides

Now – do you think he learned from this? I know that he didn't. Since that time I have met many people who have been diagnosed with lung cancer (another one today as a matter of fact)
They've all been to the islands down south.
Nobody listens to me about strongyloides because I am not a doctor – even though I am a survivor

So if you ever give this lecture again – please freely use my case.

But also please tell your audience about the fact that this guy was willing to take my lung out EVEN AFTER the tumor disappeared. (I asked him what he thought he'd be cutting out, exactly. Didn't phase him)

Also please tell your audience he was one of the best that we have in Canada.

Also – he had NEVER READ the studies proving you cannot differentiate on a ct or mri between lung parasites and tumors, on his own admission.

He had never read the studies showing that parasites can cause lung tumors.

Yet he was cutting lungs out every Monday morning anyway.

I do not blame him for not knowing these things

But I do blame him for refusing to learn from my history.

Every now and then I see him in a restaurant that we both frequent and he doesn't like to talk to me --- I always remind him that I am still alive and I still have the entire lung :0)

THANKS TO YOU!!!!!

Other than that – my lung feels a lot better than it did last year

YOUR LECTURES ARE GREAT.

Jessica McNally

Why are parasites becoming more problematic? We have agreed to an uneasy alliance. Parasites are saving us from the inner pollution!

Parasitologia. 2007 Sep;49(3):173-6.

Host-parasite interactions from an ecotoxicological perspective.

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Abstract

In recent years there has been an increasing number of papers showing how parasitism and pollution can interact with each other in aquatic organisms. Apart from parasitological aspects these interactions are also important in terms of ecotoxicological research. The current presentation aims at identifying three promising directions for future research in the interdisciplinary field of parasitology and ecotoxicology. 1. **Parasites as sinks for pollutants within their hosts: Some parasites are able to reduce pollutant levels in the tissues of their host.** The reduction of pollutants is an interesting implication since parasites are beneficial to their hosts from this perspective. In other cases free-living accumulation indicators may erroneously indicate low levels of pollution if they are infected with parasites. 2. Parasites as a diagnostic tool to test bioavailability of substances. In order to take up and accumulate pollutants the substances have to be metabolized by the host first. Accordingly, the detection of substances within endoparasites is a sign for the biological availability of pollutants. 3. Changes of biomarker responses of the host against pollutants. Parasites can alter physiological reactions of their hosts against pollutants in different ways. Therefore, in ecotoxicological studies, examining the question whether exposure to certain chemicals affects the physiological homeostasis of a test organism, it is important to use organisms that are known to be uninfected.

PMID: 18410076 [PubMed - indexed for MEDLINE]

Parasitology / Volume 126 / Issue 07 / March 2003, pp S53-S60

Accumulation of heavy metals by intestinal helminths in fish: an overview and perspective

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Abstract

Intestinal helminths of fish are of increasing interest as potential bioindicators for heavy metal contamination in aquatic habitats. **Among these parasites cestodes and acanthocephalans in particular have an enormous heavy metal accumulation capacity exceeding that of established free living sentinels.** Metal concentrations several thousand times higher in acanthocephalans than in host tissues were described from field and laboratory studies. Whereas larval stages inside their intermediate hosts are not able to take up high quantities of metals, young worms begin to take up metals immediately after infection of the final host. After four to five weeks of exposure, the parasites reach a steady-state concentration orders of magnitude higher than the ambient water level. Thus, acanthocephalans are not only very effective in taking up metals, but they can also respond very rapidly to changes in environmental exposure. The mechanism which enable acanthocephalans to take up metals from the intestinal lumen of the host appears to be based on the presence of bile acids, which form organo-metallic complexes that are easily absorbed by the worms due to their lipophilicity. Investigations of the environmental conditions affecting metal uptake have shown that the parasites are more consistent and reliable indicators for metal pollution than the host tissues as metal levels of the latter are much more dependent on the water chemistry. Thus, after some years of research on the uptake of metals by acanthocephalans and on the factors affecting metal accumulation in intestinal parasites it should be asked if acanthocephalans meet the criteria commonly accepted for sentinels. If parasites can be considered as promising sentinels, we need reasons for the establishment of 'new' indicators. Therefore, this review summarises the present knowledge about parasites as bioindicators and compares the accumulation properties of parasites and established free living indicators. Finally, this review presents possible answers to the question why it could be advantageous to have new and even more sensitive indicators for environmental monitoring purposes.

Parasites: an uneasy alliance

Parasit Vectors. 2013 Jan 18;6:21. doi: 10.1186/1756-3305-6-21.

"Comparison of the metal accumulation capacity between the acanthocephalan Pomphorhynchus laevis and larval nematodes of the genus Eustrongylides sp. infecting barbel (Barbus barbus).

Nachev M, Schertzinger G, Sures B.

Abstract

METHODS: Eleven elements Arsenic (As), Cadmium (Cd), Cobalt (Co), Copper (Cu), Iron (Fe), Manganese (Mn), Lead (Pb), Selenium(Se), Tin (Sn), Vanadium (V) and Zinc (Zn) were analyzed in barbel tissues (muscle, intestine, liver) as well as in their acanthocephalan parasites Pomphorhynchus laevis and the larval nematode Eustrongylides sp. (L4) using inductively coupled plasma mass spectrometry (ICP-MS).

RESULTS: Nine elements were detected in significantly higher levels in the parasites compared to host tissues. The element composition among parasites was found to be strongly dependent on parasite taxa/developmental stage and localization within the host. Intestinal acanthocephalans accumulated mainly toxic elements (As, Cd, Pb), whereas the intraperitoneal nematodes bioconcentrated essential elements (Co, Cu, Fe, Se, Zn).

CONCLUSION: Our results suggest that in addition to acanthocephalans, **nematodes** such as Eustrongylides sp**. can also be applied as bioindicators for metal pollution**. Using both parasite taxa simultaneously levels of a wide variety of elements (essential and non essential) can easily be obtained. Therefore this host-parasite system can be suggested as an appropriate tool for future metal monitoring studies, if double infected fish hosts are available.

INK

Environmental Pollution

Volume 157, Issues 8–9, August–September 2009, Pages 2584–2586

Influence of parasitism on the use of small terrestrial rodents in environmental pollution monitoring

Ivana Jankovská[a,], Daniela Miholová[b], Iva Langrová[a], Vladimír Bejček[c], Jaroslav Vadlejch[a], Dana Kolihová[b], Miloslav Šulc[b]

Abstract

Bioaccumulation of cadmium, chromium, copper, manganese, nickel, lead and zinc in small terrestrial rodents – voles and their cestode parasite *Paranoplocephala dentata* was studied. Contents of Pb, Mn, Ni and Zn in the parasite were found to be higher than in the kidney and liver of the parasitized animals. **Lead** level in the cestode was **37 fold higher** than in the liver of the infected rodents. Bioaccumulation factors of zinc, nickel and manganese in the cestode are mostly in the range from 2 to 4.5. Considering the different contents of manganese and zinc in livers of non-parasitized and parasitized rodents, kidney tissue was found to be more reliable than liver as an indicator of environmental pollution by manganese and zinc; the kidneys of parasitized animals showed no significant change in the concentrations of those elements that are accumulated in the cestode.

Parasites: an uneasy alliance

Helminthologia 2000 Vol. 37 No. 1 pp. 15-18

Concentrations of some heavy metals in *Ligula intestinalis* plerocercoids (Cestoda) and *Philometra ovata* (Nematoda) compared to some of their hosts (Osteichthyes).

Tenora, F.; Baruš, V.; Kráčmar, S.; Dvořáček, J.

Abstract

Ligula intestinalis and *Philometra ovata* from the body cavity of 3 cyprinid fishes (*Abramis brama, Rutilus rutilus, Blicca bjoerkna*) were analysed for heavy metals using atomic absorption spectrometry. The **Pb, Cr and Cd** levels in *L. intestinalis* plero cercoids were 15X, 6X and 2.6X higher, respectively, than those in fish muscle, whereas the levels in *P. ovata* (adult females) were **106X, 43X and 119X higher**, respectively, than those in fish muscle.

Cambridge Test Journal / Volume 138 / Issue 11 / September 2011, pp 1400-1405

The parasitic nematodes *Hysterothylacium* sp. type MB larvae as bioindicators of lead and cadmium:

a comparative study of parasite and host tissues

H. KHALEGHZADEH-AHANGAR[a1], M. MALEK[a1] [c1] and K. McKENZIE[a2]

SUMMARY

Cadmium and lead concentrations were compared in tissues of cutlassfish, *Trichiurus lepturus* L., its intestinal nematode *Hysterothylacium* sp. type MB larvae, and in water from the same location in the Sea of Oman. Metal accumulation in hosts, parasites and sea water was measured by ICP-OES. *Hysterothylacium* larvae from the intestinal lumen and visceral cavity showed much higher metal concentrations than in host tissues or sea water. Statistical analyses revealed no significant differences in metal accumulation between infected and uninfected hosts. Cadmium concentration in the host muscle was lower than in intestine, liver and gonad tissues.

The mean concentrations **of lead and cadmium in nematodes were 289·03 and 81·5 times higher than in host intestine, 188·4 and 225 times higher than in host muscle, 108·6 and 65·3 times higher than in host gonads, 70·5 and 19·5 times higher than in host liver and 3351 and 148 times higher than in sea water.**

The results show the value of this and possibly related nematodes as bioindicators of heavy metals and their potential use in environmental studies.

Our own tests

- We had a patient's rope parasite evaluated for metal content by a Chicago based laboratory. The results were compared with a calculated total body burden (the results of a mathematical equation used in many research papers - hair analysis, urine challenge, blood and serum levels)
- Aluminum: 228 times increase
- Lead: 72 times increase
- Zinc: 62 times increase
- Magnesium 94 increase

Parasite Treatment

- Step 1: stop foods, behaviors and supplements that feed the parasite (processed foods, mushy foods, sweet and processed foods, unfermented dairy, all cooked or baked grains
- Step 2: establish toxic metal detoxification and mineral (=good metals) replacement protocol. Focus on Al, Pb and Hg
- Step 3: Enema/suppository protocols: bi-weekly, 18 months. Use Nexus suppositories from BioPure.eu. Gubarev protocols. HOCL enemas (briotech isotonic), Bravo suppositories
- Step 4: repeated simultaneous courses of oral anti-helminthics: liposomal **Artemisia annua,** freeze dried garlic, Klinghardt yoghurt protocol (Mimosa, ficus, myrrh, Rizol Gamma. Medical drugs: Simon Yu MD protocols with powerful antiparasitic drugs (Albendazole, Ivermectin, Nitazoxanid, usw.)
- Optional (but powerful): selected use of electromagnetic fields (sputnik, PEMF, Rife, etc.)

A common Medical protocol for de-worming (180 lbs person). This is needed and extremely helpful also in most persistent Lyme cases

- Start with Biltricide 1200 mg t.i.d for 2-3 days, repeat after the 2 week Ivermectin protocol. Always with Tagamet 200 mg t.i.d. Then:
- Ivermectin 12 mg 4 times a day for 2 weeks together with pyrantel pamoate
- Second 2-day course of Biltricide
- Followed by Albendazole 400 mg twice daily for 2 weeks
- This is followed by nitazoxanide 1000 mg twice daily for 2-3 weeks.
- This should b e followed by high daily doses of garlic and other plant based anti microbials. Over each full moon we recommend 10 drops O3 oil Gamma t.i.d for 3 days.
- Regular colonics during the active treatment phase
- Consider 8-10 mg dexamethasone on day 3 or 4 of the regime to prevent life- threatening die-off effects (such as dying of cysticercosis nests in the brain causing a seizure)
- For recurrent cases, babesia, bartonella, toxoplasmosis, persistent giardia consider Mepacrine protocol: 200 mg given 4 times in the first hour, followed by 100 mg t.i.d for 27 days

Betreff: "Sputnik" elektronische gastro-internale Kapseln

Man bekommt die Kapseln in Russland, z.B. hier:

- https://www.kalinka-store.com/kremlin-tablet-git-stimulator
-

- In den USA und Irland scheinen alle Quellen versiegt oder sogar „geschlossen worden“ zu sein:

- http://www.altcancer.net/duna.htm
- http://www.altcancer.net/ecomed1.htm
- http://www.altcancer.net/tomsk1.htm
- http://www.altcancer.net/images/tomsk_cr_L.jpg

- Infos:
- https://lymebusters.proboards.com/thread/7984/electric-parasite-worm-pill
- https://blizi.wordpress.com/zap-the-worms-out-of-your-body/
- https://artofdetox.com/russian-zapper-tools-detox/
- https://www.angelfire.com/rnb/shortcuts/parasite.html
- http://www.positivehealth.com/article/colon-health/electronic-sputnik-capsule-against-parasites
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