

VIII. HORSES AND ZEBRAS

"Common diseases commonly occur most commonly. Uncommon diseases commonly occur most uncommonly. If you hear hoofbeats on the lawn, it's probably a horse, not a zebra."

-old diagnostic adage.

Chapter VII. focussed on the horses.

The zebra's infectious diseases seldom seen in Western countries. Most of them are tied to major lapses in common-sense hygiene: fecal contamination of the water supply (amebic dysentery), an indifference to the presence of biting insects (malaria, sleeping sickness), and human overcrowding (rat-borne typhus). The medical treatment of the zebra is often cheap and effective, but the zebra's diseases seldom occur in the U.S.

There are at least 122 *zoonoses*, zebra-type diseases transmitted from animals to man.¹ Omitting the ones not transmitted by food and adding a few super-zebras transmitted by plant foods, we get the list below.²

ORGANISMS SPREAD BY ANIMAL SOURCE FOOD.

Parasites: (life cycles abbreviated →)

Anisakis simplex.³ Sashimi.

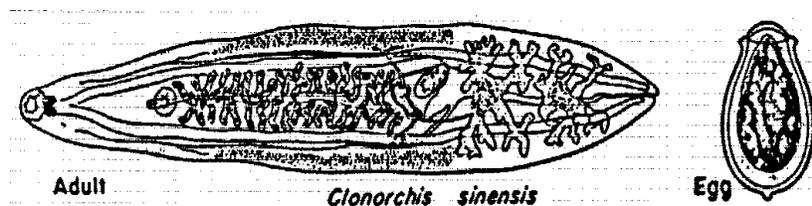
Gastrointestinal worm. Epigastric pain, bleeding.
(crustaceans → fish → human gut → eggs in feces → crustacean)

Capillaria philippinensis. Raw fish.

An intestinal worm. Rarely fatal liver disease.
(Raw fish → human gut → eggs in feces → fish)

Clonorchis sinensis. Raw fish.

Chinese liver fluke. Occasional liver disease.
(Snail → raw fish → human bile duct → eggs in feces → snail)



Dioctophyma renale. Raw fish.

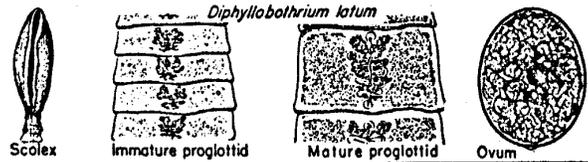
Giant kidney worm disease. Occasional uremia.
(Eggs in urine → annelid worm → raw fish → human gut → worm burrows to kidney → eggs in urine)

¹Bell JC, Palmer SR, and Payne JM. *The Zoonoses: Infections transmitted from animals to man*. Edward Arnold. London, 1988. ISBN 0-7131-4561-7.

² Mackie TT, Hunter GW, and Worth CB. *A Manual of Tropical Medicine*. W.B. Saunders Company. Philadelphia, 1954. LCCCN 54-5314.

³Schroeder SA, Krupp MA, Tierney LM, and McPhee SJ. *Current Medical Diagnosis & Treatment 1990*. Appleton Lange. Norwalk, 1990. ISBN 0-8385-1428-6. p 1016.

Diphyllobothrium latum. Raw fish.
 Fish tapeworm. Occ. vitamin B₁₂ deficiency, obstruction.
 (Crustacean → raw fish → tapeworm in human gut → eggs in feces → crustacean)

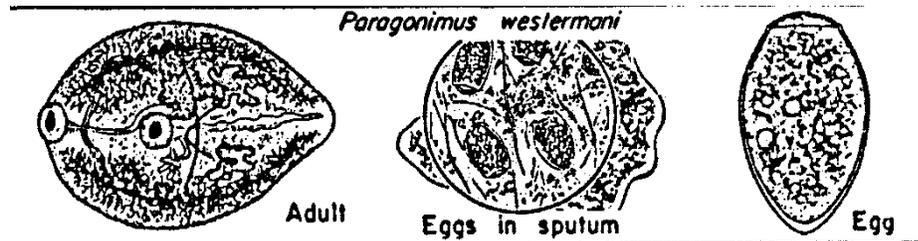


Echinostoma species. Undercooked snails.
 Mild intestinal worm infection. Enteritis, ulceration.
 (Raw snail → fish → human gut → eggs in feces → snail)

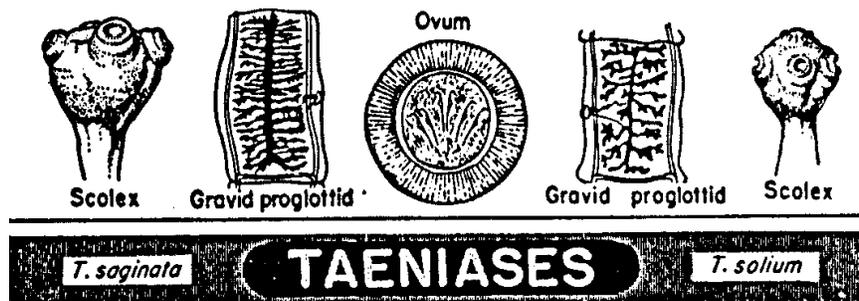
Gnathostoma spinigerum.⁴
 (Undercooked fish, fowl, frogs, pork → human gut → larval migration to skin, eye, lung, brain. Cycle stops.)

Opisthorchis species. Raw fish.
 Mild liver fluke infection. Jaundice, cirrhosis.
 (Raw fish → human bile duct → feces → snails → fish)

Paragonimus westermani. Raw crab.
 Lung fluke disease. Bloody cough, occ. paraplegia as fluke migrates to brain and spinal cord.
 (Raw crab → human gut → lung → coughed up, swallowed → eggs in feces → snail → crab)



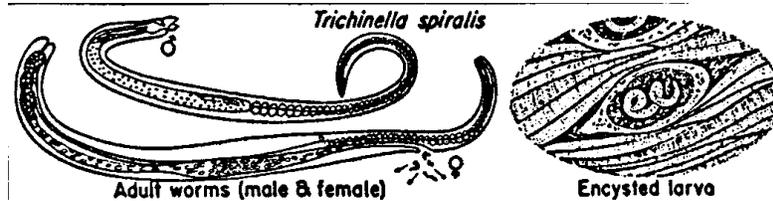
Taenia saginata. Undercooked beef.
 Beef tapeworm. Usually benign. Occ. brain damage from burrowing larvae.
 (Encysted eggs in raw beef → human gut → intestinal tapeworm → eggs in feces → cattle)



Taenia Solium. Undercooked pork.
 Pork tapeworm. Same cycle as *T. saginata*, only pigs.

⁴*ibid.*Schroeder. p 1022.

Trichinella spiralis. Raw pork, horse, bear meat.
 Trichinosis, a severe roundworm infection. Pain and weakness. Calcified cysts in muscle. ~300 cases/yr. Fatality rate 5%.
 (Cysts in raw meat hatch →larvae migrate into muscle, encyst there)



Protozoa:

Cryptosporidium. Raw milk.
 Cryptosporidiosis. Diarrhea, abdominal pain.

Toxoplasma gondii. Raw meat, goat's milk.
 Toxoplasmosis. Usually asymptomatic but can cause brain damage in children.

Bacteria:

Brucella species. Raw, contaminated dairy foods.
 Brucellosis. Fever and malaise.

Campylobacter species. Raw milk, chicken.
 Campylobacteriosis. Abdominal pain and bloody diarrhea.

Corynebacterium ulcerans. Contaminated milk.
 Pharyngitis, diphtheria (rarely).
Escherichia coli, serotype O157:H7. Raw milk and beef.
 Hemorrhagic colitis. Diarrhea and abdominal pain.

Listeria monocytogenes. Milk, refrigerated cheese.
 Listeriosis. Meningitis, pneumonia, endocarditis, abscesses.

Mycobacterium bovis. Raw milk.
 Bovine tuberculosis. Similar to human TB. Slow, progressive, fatal disease if untreated.

Salmonella species (>1000 serotypes). Milk, poultry, eggs.
 Salmonellosis. Usually a self-limiting watery diarrhea. This zebra is almost a horse. In 1974 the organism was found in 90% of inspected chicken carcasses.⁵ About 50,000 cases are reported yearly in the U.S.⁶

Streptobacillary species. Contaminated milk.
 Streptobacillary fever. Fever, malaise, endocarditis, arthritis.

Streptococcus species. Raw milk.
 Streptococcosis. Fever, occ. meningitis. Fatality rate 8% for
S. suis.

⁵*Salmonella Contamination in a Commercial Poultry Processing Operation*. Poultry Science. 1974;53:814-21.

⁶See note 220. Schroeder. p 353.

Vibrio species. Usually transmitted by contaminated water, but linked to ingestion of raw shellfish⁷ in ten U.S. cases in 1991.
Cholera. Profuse, watery diarrhea, occ. death within hours.

Yersinia species. Raw milk, pork, cheese.
Yersiniosis. Abdominal pain and diarrhea.

Rickettsial: (size between a bacterium and a virus)

Coxiella burnetti. Raw milk.

Q fever. Pneumonia and endocarditis. A great flap occurred over this one in Los Angeles in the 60's between the health department and parents who believed raw milk was healthier than pasteurized since the enzymes were still active. It's unlikely that enzymes have any bearing on nutrition since they are copolymers, usually proteins, and are digested prior to absorption.
The kids would likely have been better off without any milk.

Viral:

Hepatitis A virus. While it can be acquired in other ways, in Hawaii shellfish are an affirmed risk factor in about 15% of cases.⁸
Total U.S. cases ~32,000 in 1989.⁹
Fever, malaise, jaundice.

Picornaviradae virus. Frozen meat.

Foot and mouth disease. Mild blistering of lips, mouth, extremities (1-2 week duration).

ORGANISMS SPREAD BY PLANT FOOD.

Parasites:

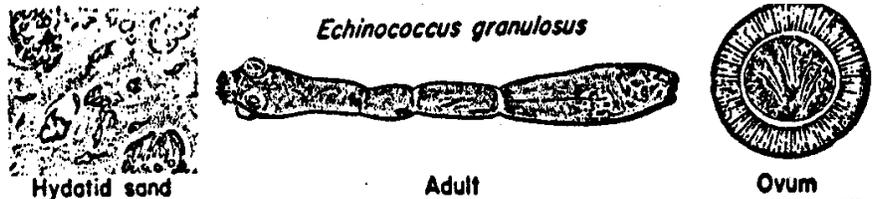
Dicrocoelium dendriticum. Ants on raw vegetables.

Dicrocoeliasis. Mild worm infection of bile ducts.

(Feces → snail → "slime balls" (eaten by ants) → humans accidentally eat the ants crawling on fresh vegetables)

Echinococcus granulosus. Dogs and foxes are the final hosts but eggs can contaminate the outside of vegetables.

Hydatid disease. Liver and lung cysts with jaundice and cough, often fatal.



Fasciola hepatica. Intermediate form of parasite encysts on water plants.

Fascioliasis. Liver fluke disease. Jaundice and liver pain. (Herbivores → eggs in feces → snail → intermediate form encysts on plant leaves (e.g. watercress) → ingested and migrate to liver)

Gastrodiscoides hominis. Water plants.

A flatworm infection of the human cecum and colon. Local inflammation.

(Eggs pass in feces → snail → intermediate form encysts on aquatic plants → humans infected by eating the plants)

⁷Hawaii State Department of Health, *Epidemiology Branch Communicable Disease Report*. PO Box 3378 Honolulu, HI 96801. June/July 1991.

⁸*ibid.* p 5.

⁹See note 146. *Health, United States, 1990*.

Protozoa:

Entamoeba histolytica. Usually in contaminated water, but vegetables fertilized by human manure also transmit.
Amebic dysentery. Bloody diarrhea.

The score: Animal foods 28, plant foods 5. Most of the animal food organisms are actively exploiting the metabolic shelters of the animal hosts. The plant food organisms extract no metabolic support from the plant, and are present largely as accidental contaminants.

It can't be argued that these unpleasant guests represent a major reason to go vegan; the cholesterol and saturated fat dependably present in that daily piece of beef will plug your arteries long before the occasional beef tapeworm causes a mild intestinal malaise.

Nevertheless, there are grounds for contemplation. Most higher organisms have microbes and parasites that over a 500 million year period have adapted to their host's "internal milieu." Nature puts up "no off limits" signs; our most private and romantic parts are regarded as fair game by the gonococcus and the spirochete, but they, of course, are not transmitted by food. Of the organisms that are, it's not surprising to find that they also find places to hide in our fellow animals.

Out of 116 laboratory culture media used to grow and isolate bacteria that cause human disease, 97 contain blood, serum, brain, heart, bile, eggs, and other animal material.¹⁰ By contrast, only 1 out of 9 media used to grow bacteria that cause plant disease uses animal material (beef extract).¹¹ In short, humans are unlikely to get oak wilt by eating acorns, and tapeworms can't live in trees.

Even the most fastidious vegan is a walking bacterial culture medium, a treasure trove of microorganisms looking for a break. Unlike omnivores, however, the vegan does not enhance that break by eating the stuff the bugs love best.

TOXIC CONDITIONS.

Animal Foods:

Gambierdiscus toxicus. Reef fish, cooked or raw.

Ciguatoxin (CTX) originates in this plankton which is eaten and concentrated 100 times in the fish.¹² CTX opens sodium channels in nerve cells causing numbness, tingling, reversal of temperature sensation, and abdominal pain. If not fatal, symptoms may persist for months. In Hawaii ~33 cases/yr.



Barracuda (*Sphyraena barracuda*). Sporadically poisonous in a few tropical localities.

Protogonyaulax catanella. Clams, oysters, and scallops.

Saxitoxin originates in this plankton and is passed on to human gourmets. Paralytic shellfish poisoning. Fatality rate 8%.

¹⁰See note 193. Baron. Appendix A.

¹¹Streets RB. *The Diagnosis of Plant Diseases*. p 2.13. University of Arizona Press. Tucson, 1982. ISBN 0-8165-0350-8.

¹²See note 224. *Hawaii Epidemiology*. Feb/Mar 1991.

Scombroid fish poisoning. Fish has the highest content of the amino acid histidine, of any food. Bacteria readily degrade histidine to histamine and saurine. Symptoms: Headache, peri-oral numbness, peppery taste, and a rash. Mild hives occur frequently by a similar mechanism after eating fish and shrimp.

Staphylococcus species. Food poisoning. Staph grows best in meats and dairy. It produces an enterotoxin that causes a severe, short term gastroenteritis, mostly vomiting.

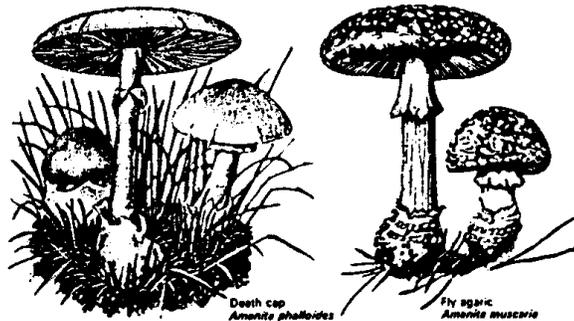
Plant Foods:

Aspergillus flavus. Aflatoxin. This fungus in peanut meal stored in hot, humid places, produces a substance that induces liver cancer.

Claviceps purpurea. Ergot. This fungus may grow on rye, producing an alkaloid that stimulates smooth muscle in arterioles, intestines, and uterus. While one author suggests ergotism may have been the real cause of the Black Plague of the 14th century¹³ (usually attributed to *Pasteurella pestis*), toxicity now is rare.

Clostridium botulinum. This bacillus produces a neurotoxin that blocks acetylcholine in nerve endings, leading to respiratory paralysis and death. Famously attributed to improper home vegetable canning, botulism has also been linked to ingestion of honey,¹⁴ and fish intestines.¹⁵

While a laundry list of plant toxins could be drawn up, (e.g. toadstools, hemlock, castor beans, foxglove), most reflect innate plant metabolism rather than parasitic contamination. People generally have enough sense to avoid hemlock but they continue to dally with animal food in spite of its preponderance in the above lists.



FURTHER CONDITIONS ONLY AN EMERGENCY PHYSICIAN WOULD NOTICE.

Animal Foods:

We should not leave without mentioning the ubiquitous fishbone in the throat, a first magnitude nuisance for both patient and doctor, who must perform acts of hand-eye legerdemain with mirror and forceps to locate and extract the fishbone. Large pieces of meat often stick in the esophagus, requiring operative removal, while wolfed plant food usually digests enough to go down by itself.

In a cardiac arrest, the ER doc frequently gets a regurgitated display of the patient's prior meal which usually includes chunks of meat. It's less likely the patient choked on the meat ("The Cafe Coronary") than that the saturated fat and cholesterol plugged the heart's capillary circulation, usually about 3-4 hours after dinner.

Plant Foods:

While pediatric texts warn of the dangers of children aspirating and choking on beans and peanuts, this is a rarity. Kids prefer to stick these items in their noses and ears.

¹³Matossian MK. *Poisons of the Past: Molds, Epidemics, and History*. Yale University Press, 1989.

¹⁴See note 220. Schroeder. p 944.

¹⁵See note 224. *Hawaii Epidemiology*. Aug 1990.