

### Hypersensitivity

**Hypersensitivity** is an antigenic response that isn't normal; allergies are an example

There are four types of hypersensitivity reactions: type 1 (anaphylactic), type 2 (cytotoxic), type 3 (immune complex), and type 4 (delayed cell-mediated, or delayed hypersensitivity)

### Type 1 reactions - anaphylactic reactions

Anaphylactic reactions occur within 2 to 30 minutes of coming into contact with an antigen

IgE antibodies bind to mast cells or basophils; causes degranulation of mast cells or basophils, and causes the release of reactive substances like histamine

There are two types of anaphylactic reactions: **systemic anaphylaxis** and **localized anaphylaxis**

**Systemic anaphylaxis** is the result of an individual, who is sensitized to a particular antigen, is exposed to the particular antigen again. An example is an allergic reaction to penicillin

### Type 1 reactions - anaphylactic reactions (cont)

**Localized anaphylaxis** is the result of someone ingesting (eating a food) or inhaling (things like pollen) an antigen, and the symptoms depend on the way the antigen entered the body

Sensitivity to an antigen is shown by a rapid inflammation reaction that causes swelling, and itching at the inoculation site. The inoculation site is called a **wheal**

**Desensitization** is one way to prevent anaphylactic reactions, and avoiding the antigens known to cause reactions is another way to prevent an anaphylactic reaction

### Microbial diseases of the skin

Caused by bacteria, viruses, and fungi/parasites

### Bacterial diseases of the skin

The bacteria that cause well known diseases are *Staphylococci*, *Streptococci*, *Micrococci*, *Propionibacterium acnes*, and *Pseudomonas aeruginosa*

### Viral diseases of the skin

The viruses that cause well known skin diseases are *Morbillivirus*, the mumps virus, *Togaviruses*, *Papillomas*, *coxsackievirus/entovirus*, *Sma*, and *Haemophilus influenzae*

### Fungal and parasitic diseases of the skin

The fungi and parasites that cause well known diseases of the skin are ringworm, *Candida albicans*, and *Sarcoptes scabiei* mites\*

### Helminths

Most parasitic animals belong to one of two groups: **Platyhelminthes** (flatworms) and **Nematodes** (roundworms)

### The Nematodes, aka the roundworms

The **roundworms** are dioecious cylindrical bodies and have a complete digestive system

The roundworms are dioecious **spicules**, which are used to take the sperm to the female's genital pore

The Protozoa				The Protozoa (cont)				Platyhelminths, aka the flatworms		Platyhelminths (cont)
The protozoa are unicellular eukaryotes that inhabit water and soil	The protozoans have complex life cycles and animal-like nutrition	They require a large supply of water	Some protozoa have a pellicle, which is an outer protective covering. The protozoa that have pellicles require specialized structures to take in food	The amoebae <i>Acanthamoeba</i> infects the corneas and causes blindness	The amoebae <i>Balamuthia</i> causes granulomatous amebic encephalitis	<b>Apicomplexa</b> are nonmotile, obligate intracellular parasites that have complex life cycles	The apicomplexan parasite <i>Plasmodium</i> causes malaria, and it's transmitted by insect bites	There are two types of flatworms: <b>trematodes, or flukes</b> and the <b>cestodes, or tapeworms</b>	The trematodes usually have flat, leaf-shaped bodies with a ventral sucker and an oral sucker	The head of cestodes is known as the <b>scolex</b> , and the body is made up of segments called <b>proglottids</b>
Protozoa's food is digested in <b>vacuoles</b> and wastes are eliminated through an <b>anal pore</b>	There are some medically important protozoa: the <b>Excavata</b> , <b>Amebae</b> , <b>Apicomplexa</b> , and the <b>Ciliates</b>	Amebae move by extending <i>pseudopods</i> *	The amoebae <i>Entamoeba histolytica</i> causes amebic dysentery	<i>Babesia</i> affects the red blood cells of its host. It causes fever and anemia of immunocompromised people. It's transmitted by an insect bite	The amoebae <i>Toxoplasma gondii</i> is transmitted by cats and causes fetal infections	The apicomplexan parasite <i>Cryptosporidium</i> is transmitted by feces and causes waterborne illness	The lung fluke (lung trematode) is a member of the <i>Paragonimus</i> species	The blood flukes (blood trematode) are members of the <i>Schistosoma</i> species	The Asian liver fluke (Asian liver trematode) is known as <i>Clonorchis sinensis</i>	<b>Phylum Platyhelminthes (flatworms)</b> The trematodes are also known as the flukes  The <i>Paragonimus</i> species is known as the lung fluke
							The trematodes absorb food through their nonliving outer covering, which is called the <b>cuticle</b>	Cestodes are intestinal parasites		The cestodes are known as the tapeworms



### Phylum Platyhelminthes (flatworms) (cont)

The body segments of the cestodes are called **proglottids**; the proglottids have male and female reproductive organs

The cestode *Taenia solium* uses humans as a definitive host

The cestodes that use humans as a definitive host produce eggs in the human, the eggs hatch in to larvae, and the larvae bore into the intestinal wall

The cestodes produce cysticerci in pigs

When humans are the intermediate hosts for cestodes, humans ingest the eggs, and the eggs hatch in the intestine. The larvae migrate to the liver or the lungs of the host and form a hydatid cyst

The cestode species *Echinococcus granulosus* uses humans as an intermediate host

### Characteristics of helminths

They might lack a digestive system

They have a reduced nervous system

Their means of moving (locomotion) are occasionally

The reproductive system is usually complex

reduced or are completely lacking

Adult helminths life cycle can be **dioecious** or **monoecious**, or **hermaphroditic**

**Dioecious** adult helminths have male reproductive organs in one individual, and female reproductive organs in another individual

**Monoecious** adult helminths have male and female reproductive structures in the same individual



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