

Pathogens

How Do They Cause Disease?

I. Overview

A. Pathogen

1. definition: *any parasite capable of causing disease in its host*

a. parasite: *an organism that gets inside another organism (the host) and causes harm to the host*

b. disease: *a disturbance in the state of health such that the affected organism experiences some loss of normal function*

B. Non-Pathogen Parasites

1. most parasitic relationships are not pathogenic

a. example: certain bacteria that live in the human intestines create a waste product we call vitamin K, which is needed to make certain blood-clotting factors

II. How Pathogens Cause Disease

A. Types of Pathogens

1. **bacteria:** *single cell organisms (prokaryotes)*
2. **viruses:** *non-living entities*
3. **fungi:** *eukaryotes that absorb nutrients from the environ.*
4. **protozoan:** *single cell eukaryotes that are “animal” like*
5. **helminths:** *worms (round and flat)*

B. Possible Entry Points

1. **through the skin:** usually at wound sites
2. **through mucus membranes (example: nose and mouth)**
3. **ingested with food or drink**
4. **inhaled**

C. How Bacteria Cause Disease

1. **they must stick to a certain cell type**
2. **they must be able to colonize, or penetrate the cell's surface**
3. **penetrating the cell surface can result in the destruction of the cell or allow the bacteria to move inside the cell**
4. **once colonized or inside a cell bacteria often produce toxins: *a poisonous substance that causes disease***

D. How Viruses Cause Disease

1. **they must invade a cell (its host) to reproduce**
 - a. **to reproduce, a virus uses the resources of the host cell to make thousands of copies of itself**
 - b. **the use of so much cellular resources kills the cell**


- c. the mass killing of cells can cause a wide range of disease**
 - 1. since intestinal cells reproduce rapidly any infection of these cells does not last long and no permanent damage is done**
 - 2. viral infection of neurons, which cannot be replaced can cause permanent damage including paralysis**
 - 3. viral infection of immune system cells can disable a person's ability to defend itself against pathogens**

E. How Fungi Cause Disease

- 1. host tissue damaged by fungi enzymes that attack cells**
- 2. allergic reactions can also occur**

F. How Protozoans and Helminths Cause Disease

- 1. tissue fluids and cells are consumed**
- 2. toxic waste products are produced**
- 3. nutrients meant for the host are used by the parasitic pathogen - and any disease related to lack of nutrients may occur**

The  End