SKIN

BACTERIAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
• Folliculitis **• Sty** **• Furuncle ("boil")** **• Carbuncle** **• Impetigo** **• Toxic shock syndrome** **• Scalded skin syndrome**	*Staphylococcus aureus*	• **Folliculitis:** inflammation of a hair follicle • **Sty:** inflammation of a sebaceous gland that opens intoa follicle of an eyelash • **Furuncle:** localized pyogenic (pus-producing) infection of the skin, usually a folliculitis • **Carbuncle:** deep-seated pyogenic infection arising from coalescence of furuncles	Penicillins Methicillin Vancomycin (for MRSA)
• Erysipelas (red patches) **• Impetigo (isolated postules)** **• Rapid skin destruction** **• Streptococcal toxic shock syndrome**	*Streptococcus pyogens*	-	Penicillin Bacitracin
Pseudomona dermatitis	*Pseudomona aeruginosa*	• a self-limiting rash about 2 weeks duration, associated with swimming pools and pool type saunas and hot baths	Piperacillin
Buruli ulcer	*Mycobacterium ulceran*	• deep, damaging ulcers; exceeds incidence of leprosy	Rifampicin, Dapsone
Comedonal acne	-	• mild sebum channels blocked	Topical agents, Salicylic acid preparations, Retinoids, Adapalene
Inflammatory acne	*Propionibacterium acnes*	-	Isotretinoin (prevention of sebum formation) Benzoyl peroxide (loosens clogged follicles) Visible blue light
Nodular cystic acne	-	• severe and characterized by nodules or cysts (inflamed lesions filled with pus deep within the skin)	Isotretinoin (Accutane) tetratogenic

VIRAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Warts	*Papillomavirus (HPV)*	• spread by direct contact	Vaccination Treatment: Removal (Cryotherapy. Electrodesiccation, Salicylic aicd) Imiquimod, Bleomycin
Smallpox	*Orthopox virus (Variola virus: manor and major)*	• systemic viral infection with fever, malaise, headache, prostration, severe backache, a characteristic skin rash and occasional abdominal pain and vomiting	Vaccination
Monkeypox	*Orthopox virus (Monkeypox virus)*	• rare; symptoms similar with smallpox; milder than smallpox	-
Chickenpox	*Varicella-zoster virus (VZV)*	• an acute, generalized viral infection with fever and a skin rash • transmission: person to person by direct contact, droplet or airborne	Acyclovir
Shingles	*Herpes-zoster virus*	• characterized by a vesicular rash along affected cutaneous sensory nerves (dermatome)	Acyclovir

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DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Herpes simplex	*Herpes simplex virus*	• cold sores or fever blisters • **herpes gladiatorum** (skin) • **herpes whitlow** (fingers) • **herpes encephalitis** (brain) • **HSV-1**: latent in trigerminal nerve ganglia • **HSV-2:** latent in sacral nerve ganglia (70% fatality)	Acyclovir
Measles (Rubeola)	*Rubeola virus*	• acute, highly communicable viral disease with fever, conjunctivitis, cough, photosensitivity • kopik spots in the mouth and red blotchy skin rash • transmission: airborne (droplet) and direct contact	Vaccination (MMR)
Rubella (Germal Measles)	*Rubella virus*	• transmission: droplet spread or direct contact • a macular rash of small red spots and light fever might occur in an infected individual	-
Fifth Disease (Erythema infectiosum)	*Human parvovirus B19*	• name derives from a list of skin rash diseases: measles, scarlet fever, rubella, Filatov Dukes' disease • symptoms similar to mild case of influenza but has a distinctive slapped-cheek facial rash that slowly fades	-
Roseola	*Human herpes 6 & 7*	• mild, very common childhood disease • high fever for a few days, followed by a rash over the body lasting for a day or two • recovery leads to immunity	-
Hand-Foot-and-Mouth-Disease	*Enteroviruses (coxsackie virus)*	• transmission: contact with mucous or saliva of an infected person • commonly occurs in children in day care, preschool, and kindergarten	-

FUNGAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Cutaneous mycoses	• *Tinea corporis* (body) • *Tinea capitis* (scalp) • *Tinea cruris* (groin/jock itch) • *Tinea pedis* (foot/athlete's foot) • *Tinea unguium* (nails)	• Dermatophytes: Microsporum (skin and hair) Trichophyton (hair, skin, and nails) Epidermophyton (skin and nails)	Topical miconazole Clotrimazole Allylamines (Terbinafine and Naftifine)
Subcutaneous mycoses (Sporotrichosis)	*Sporothrix shenckii*	• more serious than cutaneous mycoses • CA enters puncture wound	Potassium iodide
Candidiasis	*Candida albicans (yeast)*	• result from suppression of competing bacteria by antibiotics • occurs in skin and mucous membranes of mouth • thrush: infection of mucous membranes of mouth	Miconazole Nystatin
Systemic Candidiasis	*Candida albicans (yeast)*	• immunocompromised indiv.	Fluconazole, Amphotericin B, Ketoconazole

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PARASITIC INFECTION

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Scabies	*Sarcoptes scabiei*	• caused by mite burrowing and laying eggs in the skin • lives about 25 days (eggs hatch within this time) • causes intense itching • transmission: intimate contact	Gamma benzene hexachloride (Lindane) Permethrin
Pediculosis	*Pediculus humanus:* *capitis (head)* *corporis (body)*	• lice infection • common outbreaks among school children • transmission: close contact • first sign of infection is itching	Topical insecticides Permethrin

EYE

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Conjunctivitis ("pinkeye/red eye")	*Haemophilus influenza*	• inflammation of the conjunctiva • associated with unsanitary contact lenses	Cefotaxime
Opthalmia neonatorum	*Neisseria gonorrhoeae*	• transmission: newborn's eyes during passage through the birth canal	Erythromycin eye ointment
Inclusion conjunctivitis ("chalmydial conjunctivitis")	*Chlamydia trachomatis*	• same transmission as ophtalmia neonatorum; spreads through swimming pool water	Tetracycline or Erythromycin
Trachoma	*Chlamydia trachomatis*	• leading cause of blindness worldwide • causes permanent scarring (abrade the cornea leading to blindness)	Doxycycline
Keratitis	-	• inflammation of the cornea	
Herpetic keratitis	*Herpes simplex virus (HSV-1)*	• infects cornea and may cause blindness	Trifluridine
Acanthamoeba keratitis	*Acanthamoeba keratits*	• transmission via water • associated with unsanitary contact lenses, wearing too long, and usage while swimming	Chlorhexadine + Brolene

NERVOUS SYSTEM

BACTERIAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Bacterial meningitis	-	• initial symptoms: fever, headache, and a stiff neck followed by nausea and vomiting • may progress to convulsions and coma • death from shock and inflammation (due to endotoxin and cell wall release) • viral meningitis is more common and mild	

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Haemophilus influenzae meningitis	*Haemophilus influenzae* (gram-negative aerobic; normal throat microbiota)	• enters the bloodstream • pathogenicity: capsule antigen B • occurs mostly in children (6 mos-4 yrs)	Cefotaxime Prevented by Hib vaccine
Neisseria meningitidis meningitis ("Meningococcal meningitis")	*Neisseria meningitidis* (gram-negative aerobic cocci w/ capsule)	• 6 serotypes associated w/ disease • begins as a throat infection, rash, and bacteremia • outbreaks common in dorms and military barracks	Ceprofloxacin
Streptococcus pneumoniae meningitis ("pneumococcal meningitis")	*Streptococcus pneumoniae* (gram-positive encapsulated diplococcus)	• causes pneumonia and otitis media • most common in children (1 month - 4 yrs)	Penicillin Prevented by Conjugated vaccine
Listeriosis	*Listeria monocytogenes* (gram-negative aerobic rod)	• usually in foodborne and asymptomatic • can invade the bloodstream (causes sepsis) • infects pregnant women, crossing the placenta and leading to stillbirth	Citromoxazole Ampicillin
Tetanus	*Clostridium tetani* (gram-positive, endospore-forming, obligate anaerobe)	• grows in deep wounds with anaerobic conditions (more info in Lecture module 8)	Tetanus immune globulin (TIG)
Botulism	*Clostridium botulinum* (gram-positive, endospore-forming, obligate anaerobe)	• intoxication comes from ingesting the botulinal exotoxin • <u>Type A toxin:</u> Fatality: 60-70% Heat resistant & proteolytic • <u>Type B toxin:</u> Fatality: 25% • <u>Type E toxin:</u> • produced by organisms in marine and lake sediments • less heat-resistant <u>Infant botulism:</u> growth in intestines of infants due to lack of intestinal microbiota (associated with honey) <u>Wound botulism:</u> growth in wounds	Respiratory assistance Antitoxins
Leprosy ("Hansen's disease")	*Mycobacterium leprae*	• transmission: prolonged contact with an infected person, inhalation of secretions • <u>Tuberculoid (neural) form:</u> loss of sensation in skin areas • <u>Lepromatous (progressive) form:</u> disfiguring nodules of the body, mucous membranes are affected • case increases due to infected immigrants from endemic countries	Dapsone Rifampin Clofazimine

VIRAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Poliomyelitis	*Poliovirus*	• transmission: ingestion of water containing feces containing the virus • initial symptoms: sore throat and nausea • Post polio syndrome: muscle weakness occurring decades after infection	Salk vaccine (inactivated; injectible) Sabin vaccine (attenuated; oral; lifelong immunity)
Rabies	*Rabies virus*	• transmission: saliva of an animal bite • initial symptoms: muscle spasms of the mouth and pharynx, hydrophobia • average incubation: 30-50 days • Furious (classical) rabies: animals are restless, then highly excitable • Paralytic (dumb/numb) rabies: animals seem unaware of their surroundings; minimally excitable	Human diploid cell vaccine (HDCV) Human rabies immune globulin (RIG)
Arbovirus Encephalitis	*Arboviruses*	• caused by mosquito-borne viruses • symptoms range from subclinical to severe • Eastern (EEE) & Western (WEE) equine encephalitis: 30% mortality in humans, causes brain damage, deafness, and neurological damage	Prevented by controlling mosquitoes
St. Louis Encephalitis (SLE)		• Culex mosquito • mostly in the central and eastern US • fewer than 1% of the infected show symptoms	Systemic treatment
California Encephalitis (CE)		• Aedes mosquito • mild and rarely fatal	
West Nile virus (WNV)		• Culex mosquito • maintained in the bird-mosquito-bird cycle • cause poliolike paralysis and fatal encephalitis	
Japanese Encephalitis		• Far East and South Asia • 1% show symptoms • 20-30% mortality in those w/ symptoms	
Zika virus disease	*Zika virus*	• Aedes mosquito; sexual transmission; mother to child during pregnancy and delivery; blood transfusions	Rest, intake of sufficient fluid, pain and fever medications

FUNGAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Cryptococcus neoformans meningitis ("Cryptococcosis")	*Cryptococcus neoformans*	• transmission: respiratory route through dried contaminated droppings • spreads through blood to the CNS in immunocompromised individuals • mortality: 30%	Amphotericin B Flucystosine

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PROTOZOAN DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
African Trypanosomiasis	*Trypanosoma brucei gambiense* (human reservoir) *T.b. rhodsiense* (livestock and wild animals reservoir)	• parasite evades antibodies through antigenic variation (difficult for vaccine development)	Eflornithine (crosses the blood-brain barrier, blocks an enzyme necessary for parasites) Prevented by elimination of tsetse fly vectors
Amebic meningoencephalitis			
	Naegleria fowleri	• causes primary amebic meningoencephalitis (PAM) • infects nasal mucosa from swimming water, penetrates the brain, and feeds on brain tissues • 100% fatal	Amphotericin B
	Acanthamoeba	• causes granulomatous amebic encephalitis (GAE) • granulomas form around the site of infection, forming multiple lesions around the brain	

PRIONS DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Transmissible spongiform encephalopathies (TSE)			
Sheep scrapie	Prions (abnormally folded proteins)	• TSE in sheep	-
Chronic wasting disease		• TSE in deer and elk	
Creutzfeldt-Jakob disease		• TSE in humans	
Kuru		• TSE in humans caused by cannibalism	
Bovin spongiform ecephalopathy (“Mad cow disease”)		• possibly due to cattle eating feed containing bone meal from scrapie-infected sheep	

CARDIOVASCULAR AND LYMPHATIC SYSTEMS

BACTERIAL DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Sepsis and Septic shock			
- Gram-Negative sepsis (“endotoxin shock’)	*Gram-negative bacteria*	• endotoxin causes a severe drop in blood pressure • antibiotics can worsen the condition by killing the bacteria	Neutralizing the LPS components and inflammatory-causing cytokines
- Gram-Poistive sepsis	*Gram-positive bacteria*	• potent exotoxin causes toxic shock syndrome • hospital-acquired infections	
- Puerperal sepsis (“puerperal fever/childbirth fever”)	*Streptococcus pyogenes*	• transmission: from mother to child during childbirth • infects the uterus and progresses to an infection of the abdominal cavity (peritonitis)	
Bacterial Infections of the Heart			
- Endocarditis	*Streptococcus marcescens*	• inflammation of the endocardium	Penicillin Methicillin Vancomycin
- Subacute bacterial endocarditis	*Streptococcus viridians*	• impairs the function of the heart valves	
- Acute bacterial endocarditis	*Streptococcus aureus*	-	
- Pericarditis	*streptococci*	• inflammation of the sac around the heart	

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DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Rheumatic Fever	*Streptococcus pyogenes*	• inflammation of the heart valves • subcutaneous nodules at the joints • Sydenham's chorea: purposeless, involuntary movement	Amoxicillin
Tularemia	*Francisella tularensis*	• zoonotic diseases • transmission: rabbits, ticks, and insects by deer flies • creates ulcer at the site of entry • mortality: <30%	Streptomycin Doxycycline
Brucellosis (Undulant Fever)	*Brucella spp*	• transmission: via milk from infected animals, contact w/ infected animals • persists in the reticuloendothelial system and evades phagocytes • undulant fever (malaise, night sweats, muscle aches)	Doxycycline Streptomycin Rifampin
Anthrax	*Bacillus anthracis*	• found in soil • primarily affects grazing animals	Ciprofloxacin Doxycycline
Cutaneous anthrax		• endospores enter through a minor cut • 20% mortality rate w/out treatment	
Gastrointestinal anthrax		• ingestion of undercooked, contaminated food	
Inhalational (pulmonary) anthrax		• inhalation of endospores • bacteria enter the bloodstream, progresses into septic shock • nearly 100% mortality rate	
Gangrene	*Clostridium perfringens*	characterized by: • ischemia: loss of blood supply to tissue • necrosis: death of tissue • gangrene: death of soft tissue	Surgical removal of necrotic tissue Use of a hyperbaric chamber

SYSTEMIC DISEASES CAUSED BY BITES & SCRATCHES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Cat-Scratch Disease	*Bartonella henselae*	• cat claws contaminated with flea feces scratch human • forms a papule at the infection site and swollen lymph node • self-limiting	Azithromycin
Rat-Bite Fever			
- Streptobacillary rat-bite fever	*Streptobacillus moniliformis*	• found in North America	Penicillin
- Spirillar fever	*Spirillum minus*	• similar to streptobacillary rate-bite	

VECTOR-TRANSMITTED DISEASES

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Plague	*Yersinia pestis*	Bacteria: • blocks the flea's digestive tract • enter the bloodstream and proliferate in the lymph tissue	Penicillin
- Bubonic plague		• bacterial growth in the blood and lymph • most common form • 50-75% mortality rate	

- Septicemic plague **- Pneumonic plague**		• septic shock due to bacteria in the blood • bacteria in the lungs • easily spread by airborne droplets • near 100% mortality rate	
Relapsing fever	*Borrellia spp*	• transmitted by soft ticks that feed on rodents • high fever, jaundice, rose-colored skin spots • successive relapses are less severe	Tetracycline
Lyme disease ("Lyme borreliosis")	*Borrelia burgdorferi*	• most common tickborne diseases in the US • reservoir: field mice • ticks on deer but are not infected • ticks must attach 2-3 days to transfer bacteria: First phase: bull's eye rash, flu-like symptoms Second phase: irregular heartbeat, encephalitis, facial paralysis, memory loss Third phase: arthritis due to an immune response	Pen V Doxycycline
Ehrlichiosis and Anaplasmosis			
- Human monocytotropic ehrlichiosis (HME) **- Human granulocytic anaplasmosis (HGA)**	*Ehrlichia chaffeensis* *Anaplasma phagocytophilum*	• form aggregates (morulae) in monocytes • vector: Lone star tick • reservoir: white-tailed deer • vector: ixodes tick	Doxycycline
Typhus	*Rickettsia spp.*	• obligate intracellular parasites • infect the endothelial cells of the vascular system • transmission: louse feces are rubbed into the bite wound from the louse • prolonged fever and rash of red spots due to subcutaneous hemorrhaging	Tetracycliine Chloramphenicol
- Typhus fever (Epidemic louseborne typhus) **- Endemic murine fever** **- Rocky mountain spotted fever**	*Rickettsia prowazekii* *Rickettsia typhi* *Rickettsia rickettsii*	• carried by the body louse: *Pediculus humanus corporis* • transmission: rat flea *X.cheopis* • hosts: rodents • mortality rate: <5% • clinically indistinguishable from typhus fever -	

VIRAL DISEASES OF THE CARDIOVASCULAR AND LYMPHATIC SYSTEMS

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Burkitt's Lymphoma	*Epstein-Barr virus (Human herpesvirus 4)*	• tumor of the jaw • most common childhood cancer in Africa • malaria suppresses the immune system response	-
Infectious monocleosis	*Epstein-Barr virus (Human herpevirus 4)*	• asymptomatic childhood infections • transmission: saliva • incubation: 4-7 weeks • fever, sore throat, swollen lymph nodes, enlarged spleen (more in the Lecture module)	-

Cytomegalovirus Infections	*Cytomegalovirus (human herpesvirus 5)*	• latent in WBC • infected cell swells • asymptomatic or mild in adults • transmission: sexually, via blood, saliva, or by transplanted tissue <u>Cytomegalic inclusion disease (CID):</u> Transmission: across the placenta Causes: mental retardation, hearing loss in newborns	-
Chikungunya Fever	*Chikungunya virus*	• Aedes mosquitoes • high fever, severe joint pain, rash, blisters • low death rate (more in the Lecture module)	-
Yellow fever	*Yellow fever*	• Aedes aegypti • fever, chills, headache, nausea, vomiting, jaundice • endemic in tropical areas	-
Dengue	*Dengue virus*	• milder than yellow fever • endemic to Caribbean and tropical environments • no animal reservoir • no vaccine or effective drug treatment	-
Emerging Viral Hemorrhagic Fever			
- Marburg virus ("green monkey virus")		• African monkeys • Headache, high fever, vomiting blood, profuse bleeding internally and externally	-
- Lassa fever	*Arenavirus*	• found in rodent urine, West Africa	-
- Ebola hemorrhagic fever	*Ebolavirus*	• reservoir: cave-dwelling fruit bat near the Ebola river in Africa	-

PROTOZOAN DISEASES OF THE CARDIOVASCULAR AND LYMPHATIC SYSTEMS

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Chagas' Disease ("American Trypanosomiasis")	*Trypanosoma cruzi*	• vector: reduviid bug (kissing bug) • chronic form causes megaesophagus and megacolon (death due to heart damage)	Nifurtimox Benznidazole
Toxoplasmosis	*Toxoplasma gondii*	• contact with cat feces or under-cooked meat introduces oocysts to the intestines • primary danger is congenital infection	
Malaria (more in the Lecture module)	*Plasmodium vivax*	• mildest and most prevalent form • dormant in the liver	Amiodaquine Primaquine
	P. Ovale & P. malariae	• benign • restricted geographically	Ovale: Primaquine Malariae: Chloroquine
	Plasmodium falciparum	• most deadly • sever anemia, blocks capillaries, affects the kidneys, liver, and brain	Chloroquine Quinine
Leishmaiasis		• transmitted via Female sandflies	Stibogluconate
- Visceral leishmaniasis	*Leishmania donovani*	• invades the internal organ	

- Cutaneous leishmaniasis	*Leishmania tropica*	• forms a papule that ulcerates and leaves a scar	Stibogluconate
- Monocutaneous leishmaniasis	*Leishmania braziliensis*	• affects the mucous membranes	
Babesiosis	*Babesia microti*	• carried by ixodes ticks • resembles malaria (parasites replicate in RB	Atovaquone Azithromycin

HELMENTHIC DISEASE OF THE CARDIOVASCULAR & LYMPHATIC SYSTEMS

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Schistomasiasis	*Schistoma*	• feces carrying eggs get into the water supple • intermediate host: snails • cercariae released from the snail penetrate the skin of humans	Metrifonate Oxamniquine
	Schistosoma haematobiu *Schistosoma japonicum* *Schistosoma mansoni*	• urinary schistosomiasis • intestinal inflammation, found in Asia • intestinal inflammation, found in South America	
Disease of Unknown Etiology			
Kawasaki Syndrome		• acute febrile illness • most often affects younger children • high fever, widespread rash, hand & feet swelling, swollen lymph glands	Aspirin

RESPIRATORY SYSTEM

BACTERIAL DISEASES OF THE UPPER RESPIRATORY SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Streptococcal pharyngitis ("strep throat")	*Streptococcus pyogenes*	• local inflammation, fever, tonsillitis, enlarged lymph nodes	Amoxicillin
Scarlet fever	*S. pyogenes*	• erythrogenic toxin	Amoxicillin
Diphtheria	*Corynebacterium diphtheriae*	• forms a tough grayish membrane in the throat • endotoxin produced by lysogenized bacteria • cutaneous diphtheria (forms skin ulcer)	Amoxicillin Prevented by DTaP vaccine
Otitis Media	*Streptococcus pneumoniae (35%)* *Haemophilus influenzae (20-30%)* *Moraxella catarrhalis (10-15%)* *Streptococcus pyogenes (8-10%)* *Staphylococcus aureus (1-2%)*	• infection of the middle ear (pus puts pressure on the eardrum) • common in childhood due to smaller auditory tube	Broad spectrum penicillin

VIRAL DISEASES OF THE UPPER RESPIRATORY SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Common cold	*Over 200 different viruses*	• Rhinoviruses (30-50%): thrives in temperatures lower than body temp • Coronavirus (10-15%) • sneezing, nasal secretion, congestion	Relief via cough suppressants and antihistamines

BACTERIAL DISEASES OF THE LOWER RESPIRATORY SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Pertussis ("Whooping cough")	*Bordetella pertussis*	• pertussis toxin enters the bloodstream • Stage 1: catarrhal stage (like common cold) • Stage 2: paroxysmal stage, violent coughing, gasping for air • Stage 3: convalescence stage (may last for months)	Azithromycin Erythromycin
Tuberculosis	*Mycobacterium tuberculosis* *Mycobacterium bovis* *Bovine tuberculosis*	See Lecture Module for information	• First line drugs: Isoniazid Ethambutol Pyrazinamide Rifampin • Second line drugs: Aminoglycosides Fluoroquinolone Para-aminoslicyclic acid (PAS)
Bacterial Pneumonia	*Streptococcus pneumoniae*	• **Atypical pneumonia:** caused by other microorganisms • **Lobar pneumonia:** infects the lobes of the lungs • **Bronchopneumonia:** infects the alveoli adjacent to the lungs • **Pleurisy**: pleural membranes inflamed	Amoxicillin Tetracycline Amphicillin Gentamycin
Pneumococcal Pneumonia	*Streptococcus pneuomoniae*	• infected alveoli of the lung fill with fluids and RBCs • interferes with oxygen uptake	Macrolide Fluoroquinolone
Haemophilus influenzae pneuomonia	*Haeophilus influenzae*	• predisposing factors: alcoholism, poor nutrition, cancer, diabetes • symptoms: resemble those of pneumococcal pneumonia	Cephalosphorin
Mycoplasmal Pneumonia ("atypical/walking pneumonia")	*Mycoplasma pneumoniae*	• mild but persistent respiratory symptoms (low fever, cough, headache) • Fried-egg appearance on media	Tetracycline
Legionellosis ("Legionnaire's disease")	*Legionella pneumophila*	• transmission: inhalation of aerosols • symptoms: high fever and cough (similar to Pontiac fever)	Erythromycin Macrolides
Psittacosis ("Ornithosis")	*Chlamydia psittaci*	• transmission; humans by elementary bodies from bird droppings, air • symptoms: fever, headache, chills, disorientation	Tetracycline
Chlamydial Pneuomiona	*Chlamydophila pneumoniae*	• transmission: person to person • mild respiratory illness common in young people • resembles mycoplasmal pneumonia • possible association w/ atherosclerosis	Tetracycline

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Q Fever	*Coxiella burnetii*	• Acute Q fever: high fever, muscle aches, headache, coughing • Chronic Q fever: edocarditis • tick bites to farm animals • inhalation of aerosols from animals and unpasteurized milk to humans	Doxycycline Chloroquine (for chronic infections)
Melioidosis	*Burkholderia pseudomallei*	• Southeast Asia and Northern Australia (in most soils) • commonly affects those with lowered immune systems • transmission: inhalation, puncture wounds, ingestion	Ceftazidime

VIRAL DISEASES OF THE LOWER RESPIRATORY SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Viral pneumonia - SARS-associated coronavirus (emerged in Asia in 2003) - Middle East respiratory syndrome (MERS-CoV) (reported in Saudi Arabia in 2012)		• occurs as a complication of influenza, measles, or chickenpox	
Respiratory Syncytial Virus (RSV)	*Paramyxovirus*	• most common viral respiratory disease in infants • causes cell fusion in cell culture • symptoms: coughing and wheezing for more than a week	Ribavirin Palivizumab
Influenza (Flu)	*Influenza virus*	• chills, fever, headache, muscle aches • avian, swine, and mammalian strains • Hemagglutinin (HA) spikes: recognize and attach to host cells • Neuraminidase (NA) spikes: help the virus separate from infected cells	Zanamivir (Relenza) Oseltamivir (Tamiflu)

FUNGAL DISEASES OF THE LOWER RESPIRATORY SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Histoplasmosis	*Histoplasma capsulatum*	• forms lung lesions • acquired from airborne conidia in areas with bird or bat droppings	Amphotericin B Itraconazole
Coccidioidomycosis ("Valley/San Joaquin Fever")	*Coccidioides immitis*	• most infections are not apparent; fever, coughing, weight loss	Amphotericin B Imidazole drugs
Pneumocystis pneumonia	*Pneumocystis jirovecii*	• no universal agreement if it is a protozoan or fungus • asymptomatic in the immunocompetent, causes pneumonia in immunocompromised • primary indicator of AIDS	Trimethropim-Sulfamethoxazole
Blastomycosis ("North American Blstomycosis")	*Blastomyces dermatitidis*	• symptoms resemble bacterial pneumonia, cutaneous abscesses, extensive tissure damage	Amphotericin B
Not Necessarily in the Lower Respiratory System			
Aspergillosis	*Aspergillus fumigatus*	• airborne conidia, grows in compost piles	
	Rhizopus and Mucor	• mold spores	

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DIGESTIVE SYSTEM

BACTERIAL DISEASES OF THE MOUTH

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Dental Carries ("Tooth Decay") **- Dental plaque** **- Carries** **- Decay**	*Streptococcus mutans* *Actinomyces israelii* Gram-positive rods and filamentous bacteria	• Dental plaque: biofilms involved in the formation of dental carries • 700 species of bacteria found in the oral cavity • Plaques attract other cariogenic bacteria • Caries penetrate from enamel into the dentin • Decay can reach pulp, which contains the blood supply and nerve cells • Table sugar in the diet = level of dental carries	Removal of plaque/carries Amoxicillin Alternative: Metronidazole Clindamycin
Periodontal Diseases			
- Gingivitis	*Streptococci, Actinomycetes, Anaerobic gram-negative bacteria*	• inflammation and infection of the gums	
- Periodontitis	*Porphyromonas gingivilis*	• bone and tissue supporting the teeth are destroyed	Amoxicillin/periodontal surgery Tetracycline
- Acute necrotizing ulcerative gingivits (trench mouth)	*Prevotella intermedia*	-	

BACTERIAL DISEASES OF THE LOWER DIGESTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Staphylococcal Enterotoxicosis ("Staphylococcal Food Poisoning")	*Staphylococcus aureus*	• Enterotoxin produced by *S. aureus*: Serological type A (coagulates blood plasma) Toxin not killed by boiling • Toxins produced when the organism is allowed to incubate in food (temperature abuse) • Phage typing traces sources of contamination	Methicillin Oxacillin Dicloxacillin Cloxacillin
Shigellosis ("Bacillary Dysentery")	*Shigella dysenteriae*	• produces Shiga toxin • Small infectious dose - Attaches to M cells, invades, and spreads to other cells - damage the intestinal wall - can invade the bloodstream	Oral rehydrating salt (ORS) Fluoroquinolone
Salmonellosis ("Salmonella Gastroenteritis")	*Salmonella enterica*	• Incubation: 12-36 hours • Symptoms: fever, nausea, pain and cramps, diarrhea • Cases: 1.4 million with 400 deaths annually • associated w/ commercial chicken and egg production (bacteria survives in the albumin) • Diagnosis: stool or by PCR	Oral rehydration salt (ORS)/therapy
Typhoid fever	*Salmonella typhi*	• spreads via human feces • bacteria spread throughout body in phagocytes (organism released into bloodstream) • Symptoms: high fever, headache, intestinal wall ulceration	Chloramphenicol Quinolones Cephalosporins

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Cholera	*Vibrio cholerae*	• causes "rice water stools" • lose 12-20 liters of fluid per day • increases when sanitation and sewage disposal systems are compromised • <u>strategies for disaster preparedness:</u> - oral rehydration solutions (salt, sugar, & water) - stockpiling vaccines • <u>ultimate solution:</u> - proper sanitation, water storage, handwashing	IV fluid replacement ORS
Noncholera vibrios	*Vibrio parahaemolyticus*	• common cause of gastroenteritis • mostly adapted to salty coastal waters • found in saltwater estuaries • raw osyters and crustaceans • require early antibiotic therapy	ORS. Water replenishment
E. Coli Gastroenteritis			
Traveler's Diarrhea	*Enteropathogenic E. coli (EPEC)* *Enteroinvasive E. coli (EIEC)* *Enteroaggregative E. coli (EAEC)* *Enterohemorrhagic E. coli (EHEC)* Most common cause: ETEC Secondary cause: EAEC Alternative causes: *salmonella, shigella, campylobacter*	• diarrhea in developing countries • causes the host cells to form pedestals where the bacteria attach • causes shigella-like dysentery • only in humans • produce an enterotoxin causing watery diarrhea • produces shiga-like toxin (released upon cell's lysis) • most outbreaks are due to serotype O157:H7 • <u>Reservoir:</u> cattles • causes hemorrhagic colitis and hemolytic uremic syndrome • <u>Diagnosis:</u> inability to ferment sorbitol and pulsed-field gel electrophoresis	Oral rehydration therapy Bismuth-containing preparations
Campylobacter Gastroenteritis	*Campylobacter jejuni*	• leading cause of foodborne ilness in US (common in the intestines of poultry) • <u>Symptoms:</u> fever, cramping, abdominal pain, diarrhea, dysentery • 1 in 1000 cases lead to Guillain-Barre syndrome	Quinolones
Helicobacter Peptic Ulcer Disease	*Helicobacter pylori*	• infects 30-50% population in developed countries • CA grows in the stomach acid by producing urease (converts urea to alkaline ammonia) • CA disrupts stomach mucosa (causes inflammation) • diagnostic tests require: biopsy, culture, and urea breath test	Antimicrobial drugs Bismuth sabsalicylate Multidrug therapy: - Prevpac®: Lansprazole + Clarithromycin + Amoxicillin -Helidac®: Bismuth subsalicylate + Tetracycline + Metronidazole

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Yersinia Gastroenteritis	*Yersinia enterocolitica* *Yersenia pseudotuberculosis*	• Symptoms: diarrhea, fever, abdominal pain • often misdiagnosed as appendicitis	Antibiotics Oral rehydration Fluoroquinolones and Cotrimoxazole
Clostridium perfringens Gastroenteritis	*Clostridum perfringens*	• causes Gas Gangrene • associated w/ foods containing animal intestinal contents • creates low oxygen level • produces an exotoxin • Usually mild symptoms (8-12 hours after ingestion)	Pen G Metronidazole Clindamycin
Associated Diarrhea	*Clostridium difficile*	• causes more deaths than all other intestinal infections combined (mostly in health care settings) • life-threatening colitis (ulceration and perforation of the intestinal walls) • precipitated by extended use of antibiotics (eliminates competing intestinal bacteria)	Metronidazole
Bacillus cereus Gastroenteritis	*Bacillus cereus*	• common in soil and vegetation • spore survives heating (germinate and produce toxins)	Pen G

VIRAL DIEASES OF THE DIGESTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Mumps	*Paramyxovirus (Mumps virus)*	• targets the parotid glands • painful swelling 16-18 days after exposure • Transmission: saliva and respiratory secretions • CA multiplies in respiratory tract and reaches the salivary glands via the bloodstreams • Causes: orchitis (swelling of testes), meningitis, ovary inflammation, pancreatitis	Prevented with MMR Vaccine
Hepatitis		• inflammation of the liver • may result from drug or chemical toxicity, Epstein-Barr virus (EBV), cytomegalovirus (CMV), hepatitis viruses	
Viral Gastroenteritis			
- Rotavirus **- Norovirus**	*Caliciviruses*	• common in children • low mortality • Incubation: 2-3 days • Symptoms: low-grade fever, diarrhea, vomiting • Transmission: fecal-oral • low infectious dose • Incubation: 18-48 hours • Symptoms: diarrhea and vomiting • PCR and EIA tests	Prevented with a Live Oral Vaccine

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Table 18-5 Common Types of Viral Hepatitis

Name of Disease	Name and Type of Virus	Mode of Transmission	Type of Disease
Type A hepatitis (also known as HAV infection, infectious hepatitis, and epidemic hepatitis)	HAV, a nonenveloped, linear ssRNA virus in the genus Hepatovirus, family Picornaviridae	Fecal–oral transmission; person-to-person; infected food handlers; fecally contaminated foods and water	Abrupt onset; varies in clinical severity from a mild illness lasting 1–2 wk to a severe, disabling disease lasting several months; no chronic infection
Type B hepatitis (also known as HBV infection and serum hepatitis)	HBV, an enveloped, circular dsDNA virus in the genus Orthohepadnavirus, family Hepadnaviridae; the only DNA virus that causes hepatitis	Sexual or household contact with an infected person; mother-to-infant before or during birth; injected drug use; tattooing; needlesticks and other types of healthcare-associated transmission	Usually has an insidious (gradual) onset; severity ranges from inapparent cases to fulminating, fatal cases; chronic infections occur; may lead to cirrhosis or hepatocellular carcinoma
Type C hepatitis (also known as HCV infection and non-A, non-B hepatitis)	HCV, an enveloped, linear ssRNA virus in the genus Hepacivirus, family Flaviviridae	Primarily parenterally transmitted (e.g., via blood transfusion); rarely sexually transmitted	Usually an insidious onset; 50%–80% of patients develop a chronic infection; may lead to cirrhosis or hepatocellular carcinoma
Type D hepatitis (also known as delta hepatitis)	HDV or delta virus, an enveloped, circular ssRNA viral satellite (a defective RNA virus) in the genus Deltavirus	Exposure to infected blood and body fluids; contaminated needles; sexual transmission; coinfection with HBV is necessary	Usually has an abrupt onset; may progress to a chronic and severe disease
Type E hepatitis	HEV, a spherical, nonenveloped, ssRNA virus in the genus Calcivirus, family Caliciviridae	Fecal–oral transmission; primarily via fecally contaminated drinking water; also from person to person	Similar to type A hepatitis; no evidence of a chronic form
Type G hepatitis	HGV, a linear ssRNA virus in the genus Hepacivirus, family Flaviviridae	Parenteral	Can cause chronic hepatitis

FUNGAL DISEASES OF THE DIGESTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Ergot and Aflatoxin Poisoning			
- Ergot poisoning	*Claviceps purpurea*	• occurs in grains • restricts blood flow (gangrene) and causes hallucinations	No antidote
- Aflatoxin poisoning	*Aspergillus flavus*	• likely found on peanuts • causes liver cirrhosis and liver cancer	

PROTOZOAN DISEASES OF THE DIGESTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Giardiasis	*Giardia instestinalis*	• Symptoms: prolonged diarrhea, malaise, weight loss, flatulence, cramps • Hydrogen sulfide detected in the breath or stools • String test, ELISA, FA test	Metronidazole Nitazoxanide

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Cryptosporidiosis	*Cryptosporidium parvum* *C. hominis*	• Symptoms: cholera-like diarrhea for 10-14 days • Transmission: drinking water (resistant to chlorination) • FA test or Immunoassay test	Nitazoxanide
Cyclospora Diarrheal Infection	*Cyclospora cayetenensis*	• Symptoms: days or weeks of watery diarrhea • oocytes are ingested from drinking water contaminated with feces • no satisfactory diagnostic test	Trimethoprim Sulfamethoxazole
Amebic Dysentery ("Amebiasis")	*Entamoeba histolytica*	• feces contain blood and mucus • CA can perforate the intestinal wall, causing abscesses (organisms invade the liver) • Diagnostic test: Latex agglutination, FA tests	Metronidazole + Iodoquinol

HELMENTHIC DISEASES OF THE DIGESTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Tapeworms	*Taenia saginata (BEEF)* *Taenia solium (PORK)* *Diphyllobothrium latum (FISH)*	• Taeniasis: adult tapeworm infects the intestines • Cysticercosis: infection with the larval stage by ingesting eggs • Ophthalmic cysticercosis: larvae lodge in the eye • Neurocysticercosis: larvae develop in the central nervous system • Diagnostic test: eggs or segments in the feces	Praziquantel Albendazole
Hydatid Disease	*Echinococcus granulosus* (Tapeworm)	• eggs are ingested and migrate to the liver, lungs, or brain • develops a hydatid cyst • Diagnostic test: Serological test, X-rays, CT scan, MRI	Surgical removal Albendazole
Pinworms	*Enterobius vermicularis* (Tiny nematode)	• lays eggs around the anus, causing local itching	Pyrantel pamoate Mebendazole
Hookworms	*Necator americanus* *Ancylostoma duodenale* (Nematode)	• attaches to intestinal wall and feeds on blood and tissue • Symptoms: anemia, lethargic behavior, craving for peculiar foods (pica) • from human feces in soil that contact bare skin	Mebendazole Albendazole
Ascariasis	*Ascaris lumbricoides* (Nematode)	• 30% worldwide population is infected • eggs shed in the feces and are ingested by another person	Mebendazole Albendazole
Whipworm	*Trichuris trichuria*	• CA is 30-50 mm in length • distribution similar to *A. lumbricoides* • Symptoms: fever, eye swelling, gastrointestinal upset	Mebendazole Albendazole

URINARY SYSTEM

BACTERIAL DISEASES OF THE URINARY SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Cytisis	*Escherichia coli* *Staphylococcus saprophyticus*	• Symptoms: dysuria (difficult or painful urination), pyuria (pus in urine) • Diagnostic test: >100 CFU/ml potential pathogens + LE test	Trimethoprim-sulfamethexazole
Pyelonephritis	*Escherichia coli*	• Symptoms: fever, back or flank pain • Diagnostic test: 10^4 CFUs/ml + LE test	Cephalosporin
Leptospirosis	*Leptospira interrogans*	• Reservoir: dogs and rats • Transmission: skin/mucosal contact from urine-contaminated water • Symptoms: headaches, muscular aches, fever, kidney failure • Diagnostic test: Serological test	Doxycycline

REPRODUCTIVE SYSTEM

BACTERIAL DISEASES OF THE REPRODUCTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Gonorrhea	*Neisseria gonorrheae*	• CA attaches to oral or urogenital mucosa by fimbriae • Anal gonorrhea, Pharyngeal gonorrhea • may result in endocarditis, meningitis, arthritis, and opthalmmia neonatorum if left untreated • Symptoms: - Men: painful urination & discharge of pus - Women: few symptoms but possible complications such as PID • Diagnostic test: Gram stain, ELISA, PCR	Ceftriaxone Cefixime
Nongonococcal Urethritis (NGU) **- Nonspecific urethritis**	*Chlamydia trachomatis* *Mycoplasma hominis* *Ureaplasma urealyticum*	• Symptoms: painful urination, watery discharge • Diagnostic test: Culturing, PCR	Doxycycline Azithromycin
Pelvic Inflammatory Disease (PID)	*N. Gonorrheae* *C. trachomatis*	• Salipingitis (infection of uterine tubes) • Symptoms: chronic abdominal pain	Doxycycline Cefoxitin
Syphilis	*Treponema pallidum*	• CA invades mucosa or through skin breaks • Stages: - Primary: chancre at site of infection - Secondary: skin and mucosal rash - Tertiary: damage to CNS, cardiovascular system and other organs	Benzathine penicillin

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Lymphogranuloma Venereum (LGV)	*Chlamydia trachomatis*	• initial lesion on genitals heals • bacteria spread through lymph • Symptoms: swelling in lymph nodes in groin • Diagnostic test: Microscopic, Culture	Doxycycline
Chancroid ("Soft Chance")	*Haemophilus ducreyi*	• Symptoms: painful ulcers of genitals, swollen lymph nodes in groin • Diagnostic test: Culture	Erythromycin Ceftriaxone
Bacterial Vaginosis	*Gardnerella vaginlais*	• Symptoms: copious fishy, gray-white, thin, frothy discharge • pH: >4.5 • Diagnostic test: Clue cells	Metronidazole

VIRAL DISEASES OF THE REPRODUCTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Genital Herpes	*Herpes simplex virus 2 (Human herpesvirus 2/HSV-2)*	• painful vesicles on genitals • neonatal herpes transmitted to fetus or newborns • recurrences from viruses latent in nerves	Suppression: Acyclovir
Genital Warts	*Human papillomaviruses*	• warts in genital area • HPV 16 causes cervical cancer and cancer of the penis	Podofilox Imiquimod Prevention: Vaccination against HPV strains

FUNGAL DISEASES OF THE REPRODUCTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Candidiasis	*Candida albicans*	• grows on mucosa of mouth, intestinal tract, and genitourinary tract • NGU in males • causes vulvovaginal candidiasis and yeast dischagre • ph: <4 • Diagnostic test: Microscopic, Culture	Clotrimazole Fluconazole

PROTOZOAN DISEASES OF THE REPRODUCTIVE SYSTEM

DISEASES	CAUSATIVE AGENT	SHORT DESCRIPTION	DOC/TREATMENT
Trichmoniasis	*Trichomonas vaginalis*	• found in semen or urine of male carriers • vaginal infection causes irritation and profuse foul, greenish yellow frothy discharge • pH: 5-8 • Diagnostic test: Microscopic identification, DNA proble	Metronidazole

The **TORCH Panel of Tests**
- **T**oxoplasmosis
- **O**ther (syphilis, hepatitis B, enterovirus, Epstein-Barr virus, Varicella-zoster virus)
- **R**ubella
- **C**ytomegalovirus
- **H**erpes simplex virus

  Treatment: Fluoroquinolone

REFERENCES:
- PHA 046 Pharmaceutical Microbiology and Parasitology Lecture Modules (8, 9, and 10)
- Burton's Microbiology for the Health Sciences

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