terminology of microbe control

sterilization	removal or destruction of ALL microbes in or on an object
sterilant	sterilizing agent
aseptic	an environment or procedure that is free of all pathogenic contaminants
sepsis	microbial contamination
disinfection	using physical or chemical agents to destroy microbes/-viruses on NON LIVING surface
antisepsis	reduction of microbes on LIVING tissue
degerming	removing microbes by mechanical means (ex. washing hands with soap)
sanitization	removing pathogens from objects to meet public health standard
pateurization	use of heat to destroy pathogen
-stasis/--static	a chemical or physical agent PREVENTS microbial metabolism and growth
-cide/cidal	agents that destroy or permanently inactivate a particular type of microbe

physical microbe control

heat sterilization	uses heat at specific time and temp. to denature and destroy cell membranes can be used to pasteurize, sterilize, sanitize and disinfect
moist heat (boiling)	kills vegetative bacterial pathogens, fungi, protozoa, and some virus
dry heat (pressure chamber)	most effective sterilization is when the steam penetrates the object
pasteurization	not sterilization kills pathogens

physical microbe control (cont)

refrigeration and freeze	freeze - ice crystals puncture cell membranes
filtration (masks)	passing fluid through a sieve designed to trap particles (prevents airborne contamination by microbes)
X rays and gamma rays	kills microbes by creating oxygen radicals, breaking DNA, and ionizing.
ultraviolet light	nonionizing, kills microbes by being absorbed by DNA and creating mutations in DNA

resistance to drugs

cells can acquire resistance 2 ways	new mutations, acquiring genes on extra DNA
enzyme	destroys or deactivates drug
prevent entry	changes in structure to slow or stop entry of drug
alteration	alter target to the drug to affect binding
metabolic chemistry	resistant drugs can alter or abandon sensitive metabolic steps
resistance pumps	cell pumps antimicrobial out of cell
unusual proteins	resistance to fluoroquinolone drugs
cross resistance	resistance to one antimicrobial agent confers resistance to similar drugs

microbial death rates

microbial death	permanent loss of reproduction ability when in perfect environment
how to know if antimicrobial agent works	calculate microbial death rate(microbes die at constant rate)

action of antimicrobial agents

alteration of cell wall and membranes	in enveloped membranes when membrane is destroyed no way for viral attachments but non enveloped are have more tolerance to this method because of lack of cell wall.
damage to proteins and nucleic acid	extreme heat and chemicals are used to denature the DNA and proteins making the microbe inactive

chemical microbe control

chemical agents	destroy enveloped viruses, bacteria, fungi, protozoa, by affecting their cell walls and membranes, DNA and proteins
phenol	rarely used because irritates skin and smelly
phenolics	by product of phenol (less irritation) it is a low level disinfectant
alcohols	intermediate level microbe control that is ineffective against spores.

chemical microbe control (cont)

halogens	intermediate level effective agains bacteria/fungal cells and spores, some bacterial endospores, protozoan cysts and some viruses
oxidizing agents	high level release oxygen radicals (toxic oxygen). used to kill anaerobes in deep puncture wounds
surfac-tants (soap)	"surface active" chemicals
aldehydes	broad spectrum disinfectant (kills many microbe types) inactivate nucleic acids and enzymes
gaseous agents	cold sterilization for objects that are heat sensitive, penetrate objects readily destroying proteins and DNA
natural chemicals	microbial control produced by organisms

retarding resistance

- administer high concentrations of drug
- use antimicrobials in combination
- limit use of antimicrobials to necessary cases
- development of new variations of existing drugs (e.g. second generation, third genera-tion)

influences of antimicrobial treatment

1. number of microbes
2. environment
3. time of exposure
4. microbial characteristics

ideal microbe control

- inexpensive fast acting and stable agents
- controls growth of microbes
- harmless to humans animals and objects

3 things to consider

- site to be treated
- degree of susceptibility of microbes involved
- environment conditions

drugs

chemother-apeutics	drugs acting against a disease
antimicrobials	drugs used to treat infection
chemotherapy	the use of drugs to treat disease
antibiotics	naturally produced by an organism
semisynthesis	antibiotics chemically altered
synthesis	completely synthesized in a lab

spectrum of antibiotic

narrow spectrum of microbial activity	work against few types of pathogens
broad spectrum of microbial activity	drugs work against many different kinds of pathogens . when pathogen is not able to be identified broad spectrum drug will be used

safety and side effects

- toxicity
- allergies
- disruption of normal microbiota