

16. Antibiotics: only treat bacterial infections – inhibit cell processes in bacterium

Kills/stops bacteria's: DNA replication / metabolism / protein production – to slow bacteria's reproduction/growth

Prevent bacteria from making cell wall (penicillins – 1928 Fleming)

Broad spectrum: may affect useful bacteria in gut

Narrow spectrum: only affects a couple bacteria

Can't fight virus: multiplies inside cell /different structure (no cell wall)

Too much antibiotic: bacteria becomes resistant

17. Laboratory aseptic techniques used in culturing microorganisms

Autoclave: to sterilise growth medium & Petri dishes – kills microorganisms

sterile inoculating loops passed through hot flame – kills microorganisms

keeping petri dishes and culture vials covered

sealed: prevent other microbes entering

upside down: stop condensation falling onto agar

25°: to grow – harmful pathogens less likely to grow

18. Core Practical: Investigate effects of antiseptics/antibiotics/plant extracts on microbial cultures

Grow bacteria in lab

Cultures grown in growth medium (solid agar jelly / nutrient broth solution) containing the

carbohydrates/minerals/proteins/vitamins they need to grow

Bacteria grown on agar plates form visible colonies on surface of jelly

Make agar plate

Hot agar jelly poured into Petri dish

When cooled/set: inoculating loop used to transfer microorganisms to agar jelly (zig-zag motion)

Or sterile dropping pipettes & spreader used to get even covering on plate

Antibiotics: kill bacteria inside body

Antiseptics: kill bacteria outside body

Plant extracts: many plants produce antiseptics as self defence

Place soaked paper discs of different types of test substances onto agar plate with even covering of bacteria

Control disc: hasn't been soaked – be sure that effects are down to anti-biotic only (not paper)

Leave plate for 48 hours at 25°C

Substances should diffuse into agar jelly

Antibiotic-resistant bacteria will continue to grow

Non-resistant ones will die – shown by clear area around paper discs: inhibition zone

More effective antibiotics: larger inhibition zone

19. Calculate cross-sectional areas of inhibition zones: πr^2

20. process of developing new medicines – antibiotics

Discovery: Researchers target disease – make multiple drugs that could potentially treat it

development

preclinical testing: cells/animals

Drug tested on human cells/tissue in lab – doesn't show full effect on body systems

Live animal testing: determines safety/effectiveness/dosage – inaccurate as animal/human physiology are different

clinical testing: human volunteers

Phase 1: Healthy males: test for harmful side effects in healthy body

Phase 2: Ill patients: see if it works & determine optimum dose (most effective / least side effects)

Placebo effect: Patients in 2 random groups

1 drug / 1 placebo – substance missing actual drug

Test if people recover by just thinking they've had the drug

Double-blind trial: Patients & doctor don't know who's who until results gathered – so all patients treated equally

Phase 3: drug tested in different countries & compared to best existing treatment

medical agency approval + production

Phase 4: long term effects/benefits analysed

21. monoclonal antibodies production

Produced by clones of **B-Lymphocytes** to produce mono specific antibodies to target one specific protein antigen