

Solutions

2.1 Skin – physical barrier and scab formation; nose – hairs and mucus trap pathogens; trachea/bronchi – mucus traps and cilia waft it away; stomach – hydrochloric acid kills swallowed pathogens.

2.2 Phagocytosis, antibody production, antitoxin production.

2.3 The cold is caused by a virus; antibiotics only kill bacteria, and killing viruses inside cells would damage body tissue.

3.1 Small quantities of dead or inactive pathogen are introduced; white blood cells are stimulated to produce antibodies specific to its antigens; memory cells remain; if the live pathogen re-enters, antibodies are produced rapidly, preventing infection and illness.

3.2 Vaccinated people cannot catch and so cannot pass on the pathogen; the pathogen has fewer hosts to replicate in; so unvaccinated people are much less likely to meet the pathogen – herd immunity.

3.3 Preclinical testing on cells, tissues and live animals checks toxicity and potential effectiveness; clinical trials then give the drug to healthy volunteers at a low dose to check safety; then to patients to find the optimum dose and test effectiveness; a double-blind trial with a placebo separates the drug's real effect from psychological effects; the results are peer-reviewed before publication and use.