Biology Topic B6: Preventing and treating disease

1. Non-specific defence systems	
Skin	Physical barrier
Nose	Hairs trap pathogens
Trachea and bronchi	Mucus traps pathogens
Stomach	Acid destroys pathogens

2. Specific defence by white blood cells	
Phagocytosis	Ingesting (take in) pathogens digesting and destroying them
Antibody production	Target a specific pathogen. Stick them together and target them for destruction. Gives you a 'memory' of that pathogen.
Antitoxin production	Cancel out toxins released by pathogens

3. Vaccination	
Vaccine	Small amount of dead or inactive pathogen to stimulate white blood cells to produce antibodies

How vaccines work:	
1	Weak or dead pathogen injected
2	White blood cells generate antibodies to destroy pathogen
3	White blood cells that make those antibodies remain and make you immune to future infections

4. Drug development	
Drug/medicine	A chemical which alters the body. Often extracted from plants (eg aspirin) and microorganisms (eg penicillin)
Toxicity	If it is toxic
Efficacy	How well it works
Dose	How much of a drug you need to take to make it work
Placebo	A pill without the drug in it. Taken to check drug effectiveness
Double blind trials	When the doctor does not know if they are giving the medicine or a placebo. Prevents **bias**

Stages of drug development			Time taken (yrs)
1	Drug discovery	New possible medicines are identified	4.5
2	Preclinical trials	New drugs are tested in lab for toxicity and efficacy on cells, tissues and sometimes animals	1.5
3	Clinical trials	Low doses tested on human volunteers. Then patients suffering with the disease over 3 phases. These are double blind trials	5.5
4	Publishing results	Findings are checked by other scientists (peer review) Drug is approved by NHS	1.5