### Menstrual Cycle & Hormones

The **contraceptive pill** contains oestrogen which inhibits FSH so no egg can mature. **Fertility treatment** gives extra FSH.

### HSW Word | Definition
---|---
Hypothesis | A possible explanation of a problem that can be tested experimentally.
Evidence | The data or observations that are used to support a given hypothesis or belief.
Theory | An idea that might explain the results which is based on scientific results.
Hearsay | A rumour or idea with no evidence to back it up.
Control | An experiment to show what would have happened if you had not changed the independent variable.
Precision | Small divisions on the measuring device gives high precision.
Accuracy | An accurate measurement is one which is close to the true value.
Reliability | The results of an investigation may be considered reliable if they can be repeated.
Ethical | Whether something is considered morally right or wrong.
Validity | Valid data answers the question asked by the investigation. Data are only valid if the experiment is a fair test.

### Homeostasis = controlling internal conditions including water, ions, blood sugar and temperature.

- **Water and ions** → kidneys & urine
- **Temperature** → skin and brain (so enzymes work properly)
- **Blood Sugar** → Pancreas

### Metabolic Rate = how fast reactions take place in cells.
- High in athletes, young, men

### Obesity linked with arthritis, diabetes, high blood pressure & heart disease.

### Starvation (or Anorexia nervosa) causes thinness, wasting muscles, poor immune system & periods to stop.

### Body mass index

\[
\text{BMI} = \frac{\text{weight (kg)}}{\text{height}^2 (m)}
\]

### Stimulus

- Receptor
- Sensory neurone
- Relay neurone
- Effector
- Motor neurone
- Synapse

### Stimuli

![Stimuli Diagram](image)

### HPLP

- Fat
- Fibre
- Protein
- Carbohydrates
- Vitamins
- Minerals
- Water

If you don’t get them all in the right amounts you are **malnourished**.
### Substance Causes

<table>
<thead>
<tr>
<th>Substance</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Damage to liver &amp; brain</td>
</tr>
<tr>
<td></td>
<td>Slows reactions, loss of self control</td>
</tr>
<tr>
<td>Cannabis</td>
<td>Can lead to hard drugs</td>
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<tr>
<td></td>
<td>Psychological (mind) problems</td>
</tr>
<tr>
<td>Nicotine</td>
<td>Addiction</td>
</tr>
<tr>
<td>Tar</td>
<td>Emphysema</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Low birth mass in babies</td>
</tr>
<tr>
<td>Carcinogens</td>
<td>Cancer</td>
</tr>
<tr>
<td>Thalidomide</td>
<td>Limb abnormalities in babies</td>
</tr>
<tr>
<td></td>
<td>Now treats leprosy &amp; cancer</td>
</tr>
</tbody>
</table>

**Drugs** → change the chemical process in your body making you **addicted** to them. When addicts stop they have **withdrawal symptoms**.

Some **recreational** drugs are **legal** and others are **illegal**. The overall impact of legal drugs on health is much greater.

**Stimulants** → e.g. caffeine, cocaine & nicotine make you more alert by increasing the speed the nervous system works at.

**Depressants** → e.g. cannabis and alcohol slow your nervous system down by stopping nerve impulses.

### Bacteria
- Produce **toxins**. E.g. salmonella and MRSA. Antibiotics kill them by damaging the cell wall.

### Viruses
- **Damage cells** and release **toxins**. They cannot be killed by antibiotics as they hide in human cells in order to reproduce.

### Semmelweiss
- Realised that doctors need to washing their hands.

### Infectious Diseases
- Are caused by **pathogens**. Bacteria and viruses.

### Skin, Blood Clotting and Mucus
- In the breathing system stop pathogens entering the body.

### Your White Blood Cells
- Help to defend you against pathogens by **ingesting** them, making **antitoxins** and making **antibodies**.

### New Medicines
- Are extensively tested and trialled to make sure they work and are not toxic. Alexander Flemming discovered penicillin.

### Vaccines
- Contain dead or weakened microorganisms.
- Your white blood cells produce **antibodies** as a practice. This makes you immune to bacteria and viruses.

### Naturally Occurring Pathogens
- Many types of bacteria have developed **antibiotic resistance** as a result of natural selection.

### If Bacteria or Viruses Mutate
- New strains can appear which spread rapidly to cause **epidemics** (one country) and **pandemics** (several countries).
white appearance for camouflage
thick layers of fat and fur for insulation
a small surface area to volume ratio, to minimise heat loss
a greasy waterproof coat
large furry feet to distribute weight

slit-like nostrils and two rows of eyelashes
thin fur to allow easy heat loss
a large surface area to volume ratio to maximise heat loss
Hump which stores fat
large, flat feet to spread weight

A cell nucleus contains 46 Chromosomes, which carry genes and are made of DNA. Different versions of genes are called alleles.

Scientific names (binomials) provide info. on evolutionary relatedness

Genus Species
Pan paniscus

Temperature
Monitored by thermoregulator y centre in brain and receptors in skin.

Too Hot
-hair lies flat
-blood vessels dilate so heat lost through skin
-sweat produced

Too Cold
-goosebumps & hairs trap air
-blood vessels constrict
-no sweat
-shiver, respiration releases heat

Cacti adaptations:
Stems that can store water. Widespread root systems = collect water from a large area; support/anchor the plant. Spines not leaves = reduced water loss & protection. Fewer stomata = less water loss

Survival of the fittest!

Extinction, Evolution, Darwin, Natural Selection, Mutation, Vertebrate, Pollution, Acid Rain, FSH, LH, Hormone, Oestrogen, Mutualist

Sexual Asexual

Reproduction

2 Parents; fusion of gametes
1 Parent

Lots of Variation No Variation; clones

Competition

Animals
-food
-water
-territory
-mates

Plants
-light
-water
-nutrients

What is the sequence of changes in the menstrual cycle?

1. The pituitary gland releases FSH
2. Oestrogen causes the uterus lining to thicken
3. FSH stimulates egg maturation and oestrogen release
4. The ovaries release oestrogen
5. LH stimulates egg release
6. Oestrogen switches FSH off and stimulates LH release
7. The egg is unfertilized – period occurs
8. The pituitary gland releases LH
Theories of Evolution

Evolution = random progressive change over period of time
- Lamarck - inheritance of acquired characteristics
- Darwin - natural selection & survival of the fittest

Fossils show how organisms have changed, but don’t often form and are usually fragmented

Extinction due to:
- Changes in environment
- New predators
- New competitors
- Disease

Pyramids of Biomass
Show amount of material at each stage

What is the source of all energy?

Pyramids of numbers show the number of organisms at each level; not always a pyramid shape

Immune Response (1 of 3)
White blood cells > produce antibodies > recognise foreign pathogens > faster response next time

Adult cell cloning: new individual is an exact replica of just one parent
Embryo transplant: two parents’ gametes, artificial insemination, embryo formed, split into several and each placed in a surrogate uterus

What are the concerns with these procedures?
E.g. Believed that the offspring of mice who had their tails chopped off would also have no tails…WRONG

Adult Cell Cloning

What are the sequence of events in making bacteria produce a human protein?
1. The gene is removed with enzymes.
2. The bacteria produce the required protein.
3. The gene for the human protein is identified.
4. A bacterial plasmid is cut open with enzymes.
5. The modified plasmid is inserted into the bacterium.
6. The gene is inserted into the plasmid.
7. The bacterium is added to a fermenter and replicates.