Unit 2 Metabolism & Survival

Key Area 5:   Metabolism and Adverse conditions

Many environments vary beyond the tolerable limits for normal metabolic activity for any particular organism. Some animals have adapted to survive these adverse conditions while others avoid them.

Surviving Adverse conditions by Dormancy

Dormancy is part of some organism' lifecycle to allow survival during a period when the costs of continued normal metabolic activity would be too high.

The **metabolic rate** can be **reduced** during **dormancy** to **save energy.**

During **dormancy** there is a **decrease in metabolic rate, heart rate, breathing rate and body temperature.**

Dormancy can be **predictive or consequential**.

Predictive Dormancy :   **occurs before the onset of adverse conditions**. This is common in environments which have predictable seasons where the temperature and photoperiod (number of hours of daylight) can be used as triggers.

E.g. Many trees shed their leaves in Autumn and winter buds remain dormant until the Spring.

dormant
winter
bud of
horse chestnut

dormancy broken
in spring
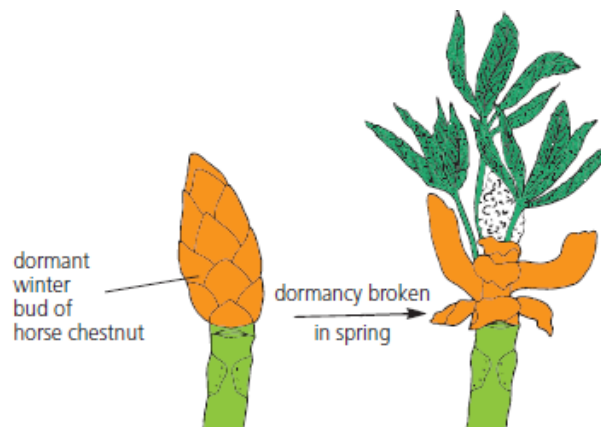
Consequential Dormancy: **occurs after the onset of adverse conditions**. This is common among organisms living in unpredictable environments. The advantage of this type of dormancy is that the organism may remain active for longer and continue to make use of the available resources. Unfortunately they run the risk of being killed off in the event of a sudden and severe environmental change.

Type of Dormancy

The main types of Dormancy include:

- **Hibernation** - Some mammals survive during **Winter/Low temperatures** by hibernating.

  E.g Hedgehogs slow their heart rate, breathing rate, body temperature and levels of activity so that the minimum amount of energy is expended to maintain vital cell activity.

- **Aestivation** - This allows survival in periods of **High temperature** or **Drought**.

  E.g. Lungfish buries itself with a cocoon of dried mucus while ex changing gases through a breathing tube. It can remain dormant for many months until the arrival of the next rainy season.

- **Daily Torpor** - This is a period of reduced activity in some animals with **high metabolic rates** (e.g. small birds & mammals).

Avoiding Adverse Conditions by Migration

Migration **avoids metabolic adversity** by **expending energy** to **relocate to a more suitable environment**.

Migratory behaviour can be **innate** (inherited) and **learned** (gained by experience).

Tracking Migration

Specialised techniques are used to study long-distance migration.

Examples include:

- Satellite tracking

- Leg rings