Levels Of Organisation And Mitosis

This essay will discuss the levels of organisation within animal and plant kingdoms by giving definitions and examples. It will also explain how mitosis is seen within the growth, repair and renewal of tissues, as well as asexual reproduction with examples from both animal and plant kingdoms.

Nakate (2017) explains how the levels of organisation start with atoms that make up molecules which make up organelles, that together, form into cells, which are the building blocks of all living things. There are different types of cells that carry out different functions (Roberts et al, 2016). For example, in animals' sperm and egg cells are used to reproduce, whereas leukocytes which are white blood cells, fight against infection. Plants also have different types of cells for different functions. For example, the palisade cell is designed to absorb carbon dioxide and light, whereas the root hair cells are used to absorb water and minerals (Gannon,1998).

The number of cells then increases as a result of mitosis (see appendix one), which is associated with tissue growth in animals (Adds et al, 2003). For example, the cells within the tissues of babies undergo cell division (see appendix one) until they are adults. Once they become adults, their cells mainly undergo mitosis (see appendix one) for repair and renewal of tissues. For example, when humans shed dead skin, the basal layer of the epidermis then produces new daughter skin cells to replace the old ones (Roberts et al, 2016).

Plants also undergo mitosis for growth. For example, trees and branches increase in diameter year after year. This is because they have secondary growth which is where the cambium cells divide (see appendix one) to produce new layers of wood (Boyle and Senior 2008). Plants like animals also use mitosis for repair and renewal of tissues. For example, when flowering plants are wounded mitosis is used (see appendix one) to form callus cells that cover the wound (Adds et al (2003).

A group of similar cells with similar purposes are organised into tissues to perform a unique function (Adds et al, 2003). For example, the heart tissue is made up of constituent cells which all work together to ensure the heart is pumping (Roberts et al, 2016). The same methodology is applied to plants. For example, the epidermal tissue of plants is made up of parenchyma cells which both prevent water loss and protect its tissues (Kratz, 2011).

Boyle and Senior (2008) explain that an organ is different tissue formed together to carry out a particular function. For example, eyes are made up of the four basic tissues: muscle, epithelial, connective and nervous which allow animals to see (Boyle and Senior, 2002). The same methodology is applied to plants. For example, leaves are made up of the three basic tissues: epidermis, mesophyll which is a ground tissue and vascular so they can photosynthesise (Johnson and Losos, 2009).

Multiple organs with different functions then work together to form an organ system (Roberts, et al 2016). For example, the respiratory system within humans is made up of multiple organs such as the lungs, bronchi and nose which provides the body with oxygen and removes carbon dioxide (Boyle and Senior (2008). Plants also use different organs to make an organ system.

For example, the shoot system is made up of leaves, stems and flowers which are used for reproduction and transporting water (Johnson and Losos (2009).

When an animal or plant has all the organ systems needed to survive, they would become an organism which is an individual of their species. Multiple organisms of a similar species would then become a population such as dogs.

For there to be multiple organisms asexual or sexual reproduction needs to have taken place. Some plants use mitosis (see appendix one) as a means to reproduce asexually. For example, strawberries use vegetative propagation as one method to reproduce. This is where cells divide (see appendix one) to send runners through the soil, which then grow as roots (Johnson and Losos 2009). Another example of mitosis (see appendix one) and asexual reproduction in plants is sporangia. For example, fungi such as mushrooms produce specialised cells known as spores these then explode and travel great distance until the conditions are right and then re-grow as daughter mushrooms (Johnson and Losos 2009).

Some animals also use mitosis (see appendix one) to reproduce asexually. For example, hydras and flatworms use budding. Hyrdas have a small outgrowth which expands from cell division (see appendix one) and then detaches as a newly formed organism, whereas flatworms' splits part of its body off allowing the newly fragmented part to regenerate by means of mitosis (see appendix one) into worms (Jr, Richard 2019).

In conclusion, every level of organisation builds up and works together to carry out a particular function, such as breathing or photosynthesising. Cells undergo mitosis to ensure the growth, renewal and repair of tissues occur and some animals use mitosis to reproduce asexually through mitosis.