Understanding Cancer: How does cancer start and spread?

Objectives

Questions with answers in this document will help teacher in providing a guideline for students to have correct solutions for the problems in all the activities of the topic. To ensure that students achieve higher levels of teaching standard.

Activity 1 – Comparing Normal Cells to Cancerous Cells

Expected answers for Task A Results

	Inter-phase	Pro-phase	Meta-phase	Ana-phase	Telo-phase	Percentage of cells dividing	Percentage of cells at rest
Normal lung	*19*	*1*	*0*	*0*	*0*	*5%*	*95%*
Cancerous lung	*18*	*0*	*0*	*1*	*1*	*10%*	*90%*
Normal stomach	*18*	*0*	*1*	*0*	*1*	*10%*	*90%*
Cancerous stomach	*14*	*2*	*1*	*1*	*0*	*20%*	*80%*
Normal ovary	*19*	*0*	*0*	*1*	*0*	*5%*	*95%*
Cancerous ovary	*11*	*2*	*2*	*3*	*2*	*45%*	*55%*

Expected answers for Task A Discussion

Question 1: Based on your data and observations, what are some of the differences between normal cells and cancer cells?

There is a higher number of cancerous cells undergoing cell division vs. the non-cancerous cells

Question 2: Which type of cancer shows the most aggressive growth? Explain.

Cancerous ovary: greater numbers of rapid cell division

Question 3: When studying cell division in tissue samples, scientists often calculate a mitotic index, which is the ratio of dividing cells to the total number of cells in the sample. Scientists often calculate the mitotic index to compare the growth rates of different types of tissue. Which type of tissue would have a higher mitotic index, normal tissue or cancerous tissue? Explain.

Calculations for Mitotic Index = number of cells undergoing division ÷ total number of cell x 100
Cancerous tissue, as there is a greater number of cells undergoing cell division and therefore a higher mitotic index

Expected answers for Task B Discussion

	Normal cells	**Cancer cells**
Differences	*Highly organised*	*Varying degree of disorganisation*
	Specific function and structure	*Loss of specific structure and function*
	Cell attached to extracellular fluid	*Cell detached from extracellular fluid*

	Basement membrane intact	*Basement membrane / ECM broken*
Similarities	*Still have chromosomes containing the DNA of genes*	
	Appearance can sometimes be similar	

ACTIVITY 2 - Interpreting Graphs and Drawing conclusions

Expected answers for Discussion

Question 1. Referring to number of new cases per 100, 000 population, which 2 cancer types show relatively few new cases per 100,000 population?

Cervix and lung

Question 2. New cases of cervical cancer show a slight decrease from 1990 - 2010. Can you explain this decrease?

Cervical cancer is a well-known preventable cancer, and there is a lot of research occurring worldwide

Question 3. The number of new cases of melanoma of the skin showed an increasing trend between 1982 – 2002. Calculate the percentage increase over this time. Can you explain this increase?

Calculations: difference between two numbers ÷ original number x 100

80%, this may be due to the lack of knowledge surrounding the growth of melanomas and the importance of sun safety.

Question 4. Research the causes of melanoma of the skin.

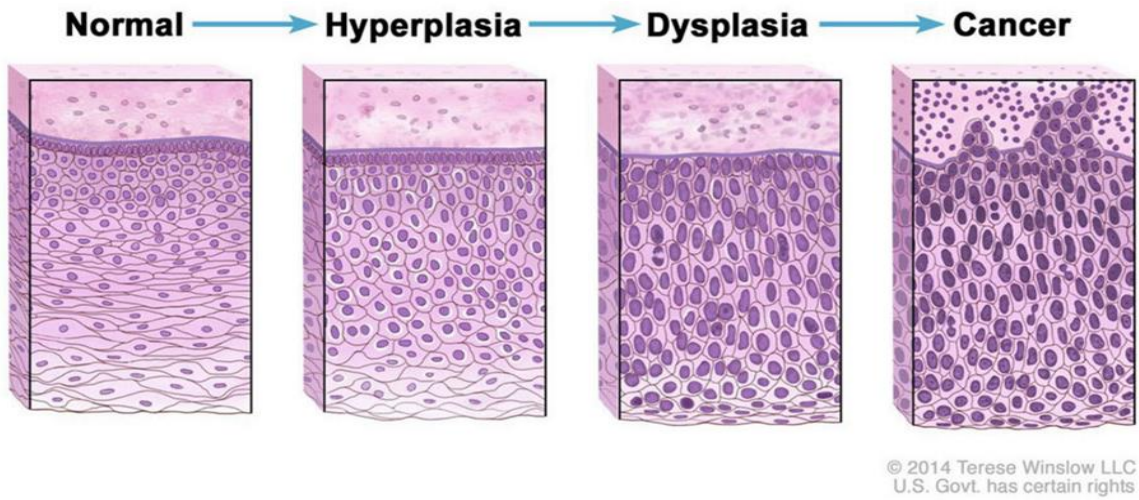
Caused by the genetic changes in melanocytes. These genetic changes are caused by UV radiation from the sun

ACTIVITY 3 - Representation of Skin Cell with Cancer

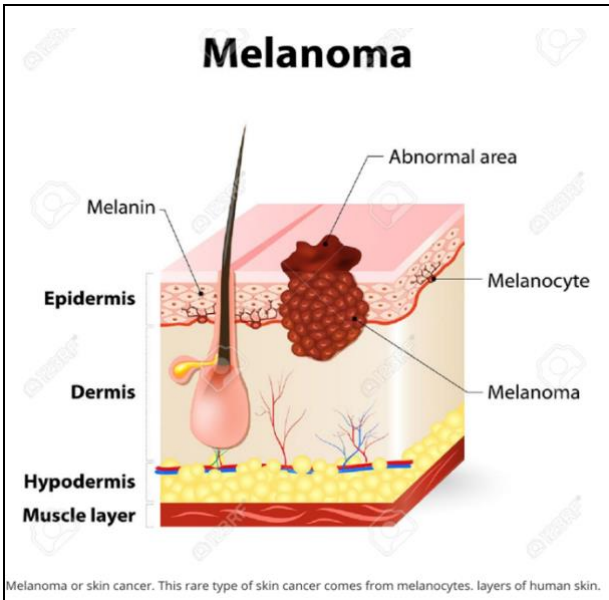
Expected answers for Methods

The labelling of the healthy skin tissue should include:

- *The various cell layers: superficial and deep layers. The epidermis, dermis and hypodermis. Basement membrane*
- *Highlight the nucleus*
- *Different cell types: epithelial cells and squamous epithelium cells*
- *Junctions*
- *Blood vessels*



Expected answers for Discussion



Melanoma or skin cancer. This rare type of skin cancer comes from melanocytes. layers of human skin.

Things to include:

- *Layers of the skin tissue*
- *Abnormal area and the cancerous cells. Ensure key characteristics are shown. Such as, the darkness of cancerous area, the irregular cell division and the impact upon the skin tissue*

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