OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE **2858/01/CS**

HUMAN BIOLOGY

Case Studies

Pre-release Case Study – Candidate Instructions

For issue on or after

THURSDAY 14 FEBRUARY 2008

CUP/T39240

This document consists of **7** printed pages and **1** blank page.

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Notes for Guidance

1. This pre-release case study contains two articles, which are needed in preparation for the externally assessed Case Studies examination **2858/01**.

2. You will need to read the articles carefully and also have covered the learning outcomes for Module 2856 (Blood, Circulation and Gaseous Exchange) and Module 2857 (Growth, Development and Disease). The examination paper will contain questions on the two articles. You will be expected to apply your knowledge and understanding of the work covered in the two Modules to answer these questions. There are 45 marks available on the paper.

3. You can seek advice from your teacher about the content of these articles and you can discuss them with others in your class. You may also investigate the topic yourself using any resources available to you.

4. You will **not** be able to bring your copy of the case study material, or other materials, into the examination. The examination paper will contain fresh copies of the two articles as an insert at the back of the paper.

5. You will not have time to read these articles for the first time in the examination if you are to complete the examination paper within the specified time. However, you should refer to the articles when answering the questions.

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Case Study 1

FOOD FOR THOUGHT

The importance of a balanced diet in the maintenance of health is well understood. The official dietary advice given by Government bodies such as the Food Standards Agency is based on recommendations from standing committees. The Committee on Medical Aspects of Food and Nutrition Policy (COMA) was established in 1963. This was replaced by the Scientific Advisory Committee on Nutrition (SACN) in 2000. These committees consist of, amongst others, eminent scientists who critically review the scientific evidence available and then formulate their advice based on this evidence.

It was COMA who recommended that no more than 35% of food energy intake should come from fat. No more than 11% should come from saturated fat.

So how much fat is 35%? For women with an average energy intake of 8100 kJ (approximately 2000 kilocalories) per day, 35% of food energy intake would be

$$\frac{35}{100} \times 8100 = 2835\,\text{kJ}.$$

Since 37 kJ are provided by 1 g of fat, 2835 kJ are provided by

$$\frac{2835}{37} = 76.6\,\text{g of fat}.$$

Therefore, to meet COMA recommendations at this typical energy intake for women, total fat intake should not exceed 76 g per day. The food energy intake recommendations are exclusive of alcohol intake. Alcohol is also an energy source and will contribute to total energy intake, hence the concept of ‘beer bellies’! The advice to limit alcohol intake however, is based on other health concerns.

The COMA targets are set for populations rather than for individuals. The National Diet and Nutrition survey published in 2003 showed that, in 2000/2001, the average daily intake of fat was 87 g for men and 62 g for women. This indicates that fat now contributes a significantly lower proportion of energy in the UK diet than when the previous survey was carried out in 1986/1987 and that, on average, women are meeting the recommended target for dietary fat of 35% of food energy. However, the survey also showed that saturated fatty acids provide 13% of food energy for both men and women, which still exceeds the recommended 11%.

The benefits of reducing fat intake have subsequently been demonstrated in several studies. For example, in a 1997 American study, a sample of 459 adults, some with normal blood pressure and some with hypertension, was split randomly into three groups. Group one followed a diet which was low in fruit and vegetables and contained dairy products with a high fat content. This was assessed to be typical of an average diet in the USA. The second group was given the same diet but with increased fruit and vegetables. The third group was given the DASH diet (Dietary Approaches to Stop Hypertension) which contained low fat dairy products, low levels of saturated fats and high levels of fruit and vegetables.

The DASH diet was found to reduce the mean blood pressure by 5.5 / 3.0 mmHg. In the hypertensive group, the reduction was even more marked, 11.4 / 5.5 mmHg.

In an effort to make it easier to put healthy eating advice into practice, the Food Standards Agency has devised a labelling traffic lights system. This system uses a red, amber or green coding to denote whether the food has high, medium or low levels of fat, saturated fat, sugar or salt.

The recommendation regarding salt is very much in line with the SACN report published in 2003. This concluded that the evidence for a direct association between salt intake and high blood pressure has increased since this issue was last considered by COMA, eight years previously. High blood pressure is a serious public health problem and raises the risk of developing heart disease and strokes. SACN concluded that reducing the average intake of salt in the population would help to reduce high blood pressure. This would contribute to lowering the burden of cardiovascular disease.

On average, people consume 9 g of salt per day. SACN have recommended that consumption of salt should be reduced to no more than an average of 6 g per day for the adult population. One of the studies which influenced this decision was carried out in 2001. This was a follow up study to the 1997 study. The 2001 study found that a DASH diet combined with low salt resulted in a reduction in hypertension greater than either intervention on its own.

As 75% of salt intake is from processed foods, a reduction of salt levels in processed foods is necessary to make a significant impact on the average intake of the population. This will not happen overnight, but by providing informative labelling, consumers should be able to make informed decisions when they purchase processed foods.

However, the FSA has no power to force its traffic lights or any other food labelling system on anyone. Perhaps this is indeed ‘food for thought’!

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Case Study 2

LIGHTS, CAMERA, ACTION!

Holly is 14 years old and has Turner's syndrome. She is seeing a cardiologist at a teaching hospital. The cardiologist wishes to present Holly's case at a medical conference and Holly and her parents have consented to photographs being taken and then used at the conference. Holly is talking to Peter, who is Head of Photography at the hospital.

Holly: *I didn't know that photographers could work in hospitals. Are you a doctor?*

Peter: No. I'm what is called a medical illustrator but I do work closely with doctors and other people around the hospital. Photography is my passion but I was always interested in human biology. When I saw there was a degree in medical illustration I jumped at the chance and I have never looked back.
Now, what I need to do is to get some photographs of yourself and your mum and dad.

Holly: *I know why you need one of me, but why one of my parents beside me?*

Peter: Well, as you realise, one of the aspects of your condition is that without help, you might not be as tall as you could be. One way of estimating how tall you should be is the use of growth charts. Another way is to look at the height of your parents as a guide to how tall you might become. I understand that your consultant will be using these photos in his talk – it will be good to see real people rather than data on a chart.

Holly: *So, are you the person who took the photos of my heart?*

Peter: Ah, now those were probably not photos. Let me look to see what other images have been ordered for the talk and then I can answer your question.
Here we are – you have had an MRI scan and an echocardiogram, courtesy of our radiography department.

Holly: *An echo what?*

Peter: An echocardiogram is the picture taken using sound waves. The MRI scan was the one with the magnet, remember? (Holly nods) Well you've got pictures of your inside now, to go with the outside.

Holly: *(laughs) It's worse than that. I'm sure there'll even be pictures of the inside of my insides! The problems I've had with my aorta and my height and everything else are all because of the chromosomes in my cells. I suppose you take the chromosome pictures as well, do you?*

Peter: Well, not me very often. Those need to be done down the microscope and that's a bit of a specialist job. Now, I need pictures of your face, head and neck – are you happy with this?

Holly: *Yes that's fine. The doctor did explain exactly what he wanted the pictures for. Nobody spotted anything was wrong until I was quite old so I'm happy to be part of teaching other people what to look for. I'd better stop talking now so you can get on – mum and dad are signalling to me to get a move on!*

Peter: Thanks Holly. I wish all my subjects were as interested as you've been.