



# ASMR Medical Research Week® 2007

## Victorian Secondary Schools Medical Research Quiz

### 1. Medical Researchers.

**BEAUTIFUL MINDS**  
**THE CENTENNIAL EXHIBITION**  
**OF THE NOBEL PRIZES**  
 18 APRIL - 30 JUNE

The University of Technology, Sydney is hosting an exhibition of the Nobel prizes in 2007

<http://www.nobel.uts.edu.au/index.html>

The 2005 Nobel Prize in Physiology or Medicine was awarded to

- A) Peter C. Doherty
- B) Sir Frank Macfarlane Burnet
- C) Barry J. Marshall & J. Robin Warren
- D) Sir Howard Florey

### 2. Medical Researchers

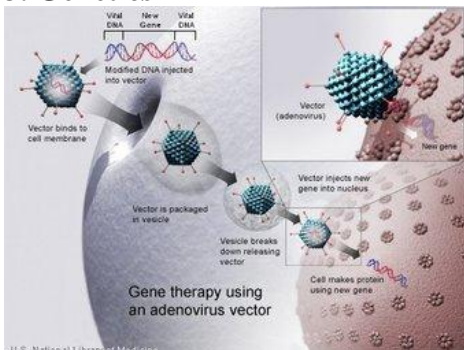


*Professor Tien Wong*

Professor Tien Wong was awarded the 2006 Commonwealth Health Minister's Award for Excellence in Medical Research for

- A) the discovery of the genetic cause of abnormal blood vessel formation in the eye.
- B) the invention of retinal vascular imaging.
- C) the discovery of the bacterium *Helicobacter pylori* and its role in gastritis and peptic ulcer disease.
- D) the discovery that narrowing of blood vessels in your eyes can predict your risk of cardiovascular disease, stroke, diabetes & high blood pressure.

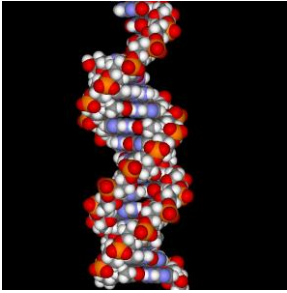
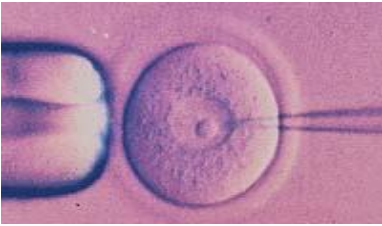
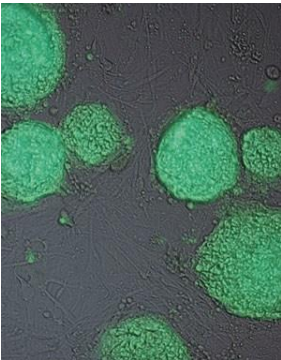
### 3. Genetics



Gene therapy using an adenoviral vector

Gene therapy involves delivering a new gene into a patient with a genetic disorder to replace a faulty or missing gene. Which of these opinions about gene therapy is supported by current medical research?

- A) gene therapy may be unsafe because a viral vector can reproduce out of the target cells and cause the patients to suffer an infectious disease.
- B) gene therapy is a beneficial application because the cured patients will be able to pass the functional genes in their affected tissues on to their children.
- C) it is unfair to offer hope for a cure to individuals with genetic disorders because DNA that is injected is not easily taken up by human cells.
- D) the safety of the patient is at risk from gene therapy because an inserted gene may disrupt the existing DNA and consequently the expression of the existing alleles.

<p><b>4. Genetics</b></p>  <p><b>A 3D model of deoxyribonucleic acid (DNA)</b></p>	<p><b>Which 3 amino acids does the following DNA sequence encode for?</b>  <b>GTT ATG CGT</b></p> <p>A) Phe Met Arg  B) Val Met Arg  C) Phe Lys Arg  D) Phe Met Val</p>
<p><b>5. Stem Cells</b></p>  <p><i>SCNT is a form of cloning that involves removing the DNA from an adult human egg cell and replacing it with the DNA from another person</i></p>	<p><b>Somatic Cell Nuclear Transfer (SCNT) also known as therapeutic cloning</b></p> <p>A) will be used in the future to repair organs or tissues that are damaged by disease, aging or trauma.  B) does not require the production or destruction of human embryos.  C) can overcome the problem of graft rejection.  D) all of the above.</p>
<p><b>6. Stem Cells</b></p>  <p><i>Human embryonic stem cells with a fluorescent marker</i></p>	<p><b>Stem cells are unlike normal cells because they</b></p> <p>A) are pluripotent and self-renewing.  B) have twice as much DNA as normal cells.  C) are only found in embryonic tissue.  D) divide by the process of meiosis.</p>

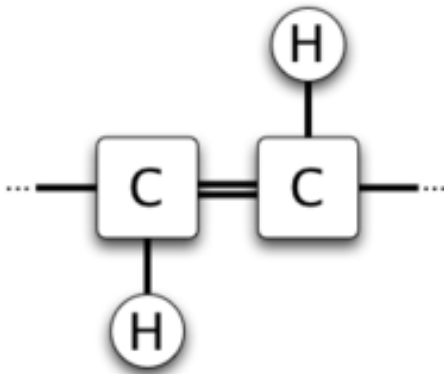
## 7. Health



The name given to the study of factors affecting the occurrence, distribution, prevention and control of disease, injury and other health-related events in a defined human population is

- A) entomology
- B) oncology
- C) epidemiology
- D) gynaecology

## 8. Health



*The molecular structure of a trans fat*

**Trans fats are present in deep-fried fast food, bakery products, many snack foods and margarines. Which statement about trans fats is NOT true?**

- A) Trans fats are produced during hydrogenation of vegetable oil.
- B) Trans fats are produced naturally in some dairy products.
- C) Trans fat consumption increases your chances of coronary heart disease and diabetes.
- D) In Australia, food manufacturers are required to list food trans fat content on the nutrition facts panel of the food packaging.

## 9. Viral infection and immunization



*Electron Microscopy (128.000x):  
Epstein-Barr Virus inside multinuclear cells*

**Which of the following viral infections has not been linked to cancer?**

- A) Epstein-Barr Virus
- B) Hepatitis B virus
- C) Human Rhinovirus 1A
- D) Human Papillomavirus


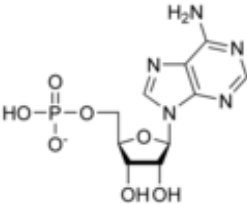
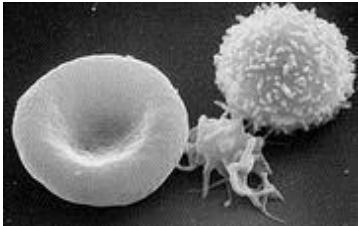

## 10. Viral infection and immunization



*Immunise Australia National  
Infoline: 1800 671 811*

**The link between human papilloma virus (HPV) and cervical cancer was first established by Australian scientist Ian Frazer. Which of the following statements about HPV is NOT true?**

- A) Free HPV vaccinations are now available for 12 and 13 year old girls.
- B) The GARDASIL vaccine will protect against about 80% of cervical cancers in Australia.
- C) The GARDASIL vaccine will also protect against about 90% of genital warts.
- D) Human papillomavirus type 16,18,6 and 12 are targeted by GARDASIL.

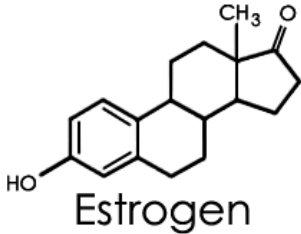
<p><b>11. Genome Biology</b></p>  <p><i>The DNA sequence or “genome” holds the instructions for life.</i></p>	<p><b>Which organism's genome has not yet been sequenced?</b></p> <p>A) <i>Drosophila Melanogaster</i>  B) <i>Bufo marinus</i>  C) <i>Gallus gallus</i>  D) <i>Caenorhabditis elegans</i></p>
<p><b>12. Genome Biology</b></p>  <p><i>The molecular structure of Adenosine phosphate, one of the four nucleotides found in DNA</i></p>	<p><b>How many nucleotides are there in the human genome?</b></p> <p>A) 3,000,000  B) 25,000  C) 3 billion  D) 46</p>
<p><b>13. Blood</b></p>  <p><i>Normal blood cells, from left: Red cell, Thrombocyte, White cell.</i></p>	<p><b>A patient with the symptoms: pale skin, fatigue, sore joints and jaundice is suspected of having a blood disease. Which is most likely?</b></p> <p>A) Malaria.  B) Sickle-cell anaemia.  C) Leukaemia.  D) Hodgkin's disease.</p>
<p><b>14. Blood</b></p>  <p><i>A Sickle shaped red blood cell</i></p>	<p><b>Which of the following common blood diseases does not have a genetic cause?</b></p> <p>A) Thalassaemia.  B) Sickle-cell anaemia.  C) Leukaemia.  D) Mononucleosis.</p>
<p><b>15. Reproduction</b></p>	<p><b>Human twins arising from two zygotes</b></p>



Sketch by Leonardo DaVinci

- A) may share a single placenta.
- B) may be identical.
- C) will be the same gender.
- D) will have the same blood group.

### 16. Reproduction

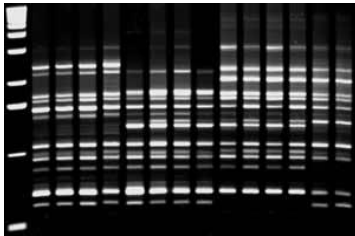


The molecular structure of estrogen

### Estrogen is a steroid hormone

- A) only present in women.
- B) synthesized in the brain.
- C) required for male fertility.
- D) that regulates bone synthesis.

### 17. Molecular Biology

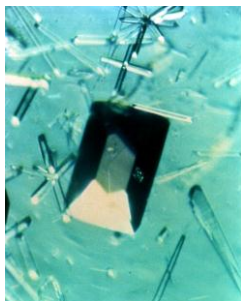


A DNA fingerprint

### A restriction endonuclease is an enzyme that

- A) synthesizes RNA from a DNA template.
- B) joins two pieces of DNA together.
- C) restricts the breakdown of other molecules.
- D) cuts DNA molecules at specific sites.

### 18. Molecular Biology



Highly purified proteins often form crystals like this elastase protein crystal.

### Which of the below correctly describes the sequence of protein synthesis?

- A) Nucleus, cytoplasm, DNA, RNA.
- B) mRNA, tRNA, golgi apparatus, endoplasmic reticulum.
- C) DNA, RNA, ribosome, cytoplasm.
- D) Nucleolus, nucleus, cytoplasm, RNA.

### 19. Science and technology

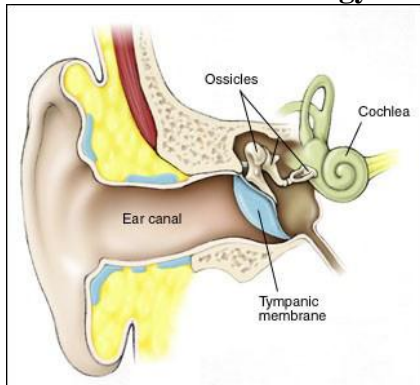


The Cochlear implant

### The Cochlear implant, developed by Australian Scientist Graeme Clark restores hearing loss by

- A) electrically stimulating nerves inside the inner ear.
- B) replacing the damaged or malformed cochlea.
- C) amplifying sound entering the ear.
- D) using vibration to stimulate the auditory nerve.

## 20. Science and technology



*The anatomy of the ear*

**Please direct your any queries to the ASMR quizmaster at [hart@wehi.edu.au](mailto:hart@wehi.edu.au)**

**What part of the inner ear is required for balance?**

- A) The eustachian tube.
- B) The semicircular canal.
- C) The cochlea.
- D) The tympanic membrane.

**Many Thanks to Tamara Cooper, Belinda Griffiths and Theo Mantamadiotis for assistance with production and editing of the 2007 quiz.**

### **Some generic health, science and medical research websites**

[Molecular Biology of the Cell](#)

<http://www.betterhealth.vic.gov.au/>

<http://www.abs.gov.au/>

<http://www.health.gov.au/>

<http://www.abc.net.au/science/>

<http://www.science.org.au/nova/index.htm>

[http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page)

<http://www.bbc.co.uk/sn/>

**ASMR 2007 QUIZ Answers and Web links:**

1. C

[http://nobelprize.org/nobel\\_prizes/medicine/laureates/2005/](http://nobelprize.org/nobel_prizes/medicine/laureates/2005/)

2 D

<http://cera.unimelb.edu.au/aboutus/staff/bio/wong.html>

<http://www.asmr.org.au/media/ComMin06.pdf>

3 D

[http://en.wikipedia.org/wiki/Gene\\_therapy](http://en.wikipedia.org/wiki/Gene_therapy)

4 B

5 D

[http://www.stemcellcentre.edu.au/public-education\\_faqs.aspx?page=3](http://www.stemcellcentre.edu.au/public-education_faqs.aspx?page=3)

6 A

[http://en.wikipedia.org/wiki/Stem\\_cell](http://en.wikipedia.org/wiki/Stem_cell)

7 C

<http://en.wikipedia.org/wiki/Epidemiology>

8 D

<http://content.nejm.org/cgi/content/full/354/15/1601>

9 C

10 D

<http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/hpv-vac-prog>

<http://www.cancercouncil.com.au/editorial.asp?pageid=253>

<http://www.immunise.health.gov.au/>

11 B

<http://www.sanger.ac.uk/>

12 C

13 B

<http://www.webmd.com/>

14 D

15 A

16 C

17 D

18 C

19 A

<http://www.bionicear.org/bei/index2.html>

20 B