

Answers to The Genomics Game (Online)

These notes are for educators using [The Genomics Game \(Online\)](#), which was created by NHS England's Genomics Education Programme.

Section: 'About DNA'

Question: In biology, what does DNA stand for?

Answer: **B)** Deoxyribonucleic acid

Question: What does the molecule 'DNA' do?

Answer: **A)** holds our genetic material AND **C)** passes on inherited traits

Question: In humans, where is DNA found?

Answer: **B)** In most of our cells

Question: Genetics is the study of all an individual's DNA

Answer: **False**

Section: 'Chromosomes'

Question: What is a chromosome?

Answer: **A)** Compact form of DNA

Question: How many chromosomes do most human cells contain?

Answer: **C)** 46



Section: 'Genes vs genomes'

Question: What are genes?

Answer: **A)** Specific parts of DNA

Question: What is a genome (gee-nome)?

Answer: **B)** A cell's entire genetic material

Question: How much of your genome is the same as everyone else's?

Answer: **D)** 99.8%

Section: 'Genomes to proteins'

Question: What does the 'central dogma' of biology explain?

Answer: **B)** How proteins code for genes

Question: Approximately how many protein-coding genes does the human genome have?

Answer: **B)** 20,000

Question: How much of your genome contains the instructions to make proteins?

Answer: **A)** 2%

Section: 'Inheritance and variation'

Question: Which word describes passing down genetic information?

Answer: **A)** Inherited

Question: In medicine, what word is preferably used to indicate that a gene is different than expected?

Answer: **A)** Variant

Question: The size of a change in our genome is directly linked to the potential impact it has on our health.

Answer: **False**

Question: It is certain that two patients, with the same genomic variants, will present with the same symptoms.

Answer: **False**

Question: Which are genetically inherited conditions?

Answer: **A)** Cystic fibrosis AND **B)** Huntington disease

Question: Some people have a perfect genome.

Answer: **False**

Section: 'Research and techniques'

Question: Genomic sequencing is:

Answer: **B)** reading a genome

Question: Why do people want to study the genome?

Answer: All four correct - **A)** Scientific research AND **B)** Health reasons AND **C)** To trace ancestry AND **D)** Lifestyle reasons

Question: The variation in our genome can tell us:

Answer: All four correct - **A)** if you will develop a condition AND **B)** if you may develop a condition AND **C)** how you may react to a drug AND **D)** your ancestry

Question: Now that we've 'read' the human genome, we know everything about it.

Answer: **False**

Section: 'Diagnostics'

Question: To investigate an individual's genome, we need a sample of their DNA. What biological samples will give us DNA?

Answer: Multiple correct answers including: **bile**, **blood** (though not mature red blood cells or platelets by themselves), **bone marrow**, **breast milk**, **hair roots** (though not hair fibres), **cerebral spinal fluid**, **faeces** (stool or poo), **saliva** (spit), **skin cells** (though not fingernails or toenails), **sputum** (phlegm), **tumour** cells, **urine** and any cells derived from taking **tissue samples** or **swab samples**. Tears are not expected to have DNA due as it has enzymes that act to break it down.

Question: Genomic tests are available through the NHS, only.

Answer: **False**

Section: 'Infections and genomics'

Question: Only humans have a genome.

Answer: **False**

Question: Genomics is used in infectious disease outbreaks.

Answer: **True**

Question: Antibiotic resistance comes from mutations in bacteria's DNA.

Answer: **True**

Question: In an outbreak, we sequence the pathogen's genome to:

Answer: **B)** identify the outbreak's source AND **C)** identify the drug to use AND **D)** identify the type of pathogen

Section: 'Cancer genomics'

Question: Cancer is a disease of the genome.

Answer: **True**

Question: A cancer cell's genome looks the same as a healthy cell's genome.

Answer: **False**

Question: Sequencing a tumour's genome tells us:

Answer: **B)** The type of cancer AND **C)** Suitable treatment options AND **D)** The stage the cancer is at

Section: 'Family history'

Question: The word 'familial' in familial disease means the disease:

Answer: **B)** is related to family

Question: In a clinical context, what is a family history?

Answer: **A)** Health details of an individual and their close relatives

Question: A patient is worried about an inherited condition. Do you:

Answer: **A)** draw a family history

Question: In a family history, which has the least clinical value?

Answer: **C)** Relatives' names

Question: Which clinical clues may hint at a genetic condition?

Answer: **A)** An unusual presentation, for instance multiple symptoms AND **B)** Young person with a condition that usually presents later in life AND **D)** A condition that 'runs' in families

Section: 'Results are far reaching'

Question: Results from a genetic test will have clinical implications for the patient, only.

Answer: **False**

Question: Angelina Jolie chose to have a double mastectomy based on a genetic diagnosis.

Answer: **True**

Question: A patient's genomic information should always be handled sensitively. How can sensitive data be protected?

Answer: Multiple correct answers including: **Firewalls** and **encryption, storing data away from personal identifiers, restricting access** and **monitoring access** to data, robust **consent process** and others.

Section: 'Precision medicine'

Question: Which best defines the word 'pharmacogenomics'?

Answer: **D)** Using genomics to tailor drug treatment for individuals

Question: A patient's genomic information is the only factor considered for precision medicine.

Answer: **False**