



QI&CPD
Accredited Activity
CATEGORY 2

Questions for this month's clinical challenge are based on articles in this issue. The clinical challenge is endorsed by the RACGP Quality Improvement and Continuing Professional Development (QI&CPD) program and has been allocated four Category 2 points (Activity ID: 92043). Answers to this clinical challenge are available immediately following successful completion online at <http://gplearning.racgp.org.au>. Clinical challenge quizzes may be completed at any time throughout the 2017–19 triennium; therefore, the previous months' answers are not published.

Each of the questions or incomplete statements below is followed by four or five suggested answers or completions. Select the most appropriate statement as your answer.



Clinical challenge

Case 1

Mitchell, 40 years of age, has been a patient at your practice for more than 20 years. Until recently, all his visits had been for relatively minor, self-limiting problems. Unfortunately, investigations undertaken after his last visit for pallor and tiredness revealed acute myeloid leukaemia. He is currently between chemotherapy cycles and comes to see you as his readings about the latest developments in cancer treatment have left him confused. You try to answer each of his questions in turn.

Question 1

Molecular testing currently pertinent to clinical practice or research in oncology includes each of the following cellular components EXCEPT:

- A. RNA
- B. DNA
- C. protein
- D. lipid
- E. sugars.

Question 2

Which one of the following correctly describes the study of fats?

- A. Proteomics
- B. Metabolomics
- C. Phenomics
- D. Transcriptomics

Case 2

Chloe, 32 years of age, has longstanding problems with her bowel that have been diagnosed as irritable bowel syndrome (IBS). As the traditional treatments have not been very successful, she is constantly searching the internet for new options. She presents today with some printouts on probiotics to discuss with you.

Question 3

Which one of the following is NOT a recognised mechanism through which probiotics may exert beneficial effects?

- A. Enhancement of the physical natural intestinal barrier
- B. Stimulation of immunoglobulin A (IgA) secretion
- C. Increased inflammatory cytokine production
- D. Direct antagonism of pathogens

Question 4

Which one of the following is a proven effect of probiotics on IBS?

- A. Decreased abdominal pain
- B. Increased bloating
- C. Increased flatulence
- D. Decreased bowel frequency
- E. Decreased nausea

Question 5

Another option that Chloe has been investigating is faecal microbiota transplant (FMT). There is no evidence

that FMT is a helpful treatment for which one of the following diseases?

- A. Inflammatory bowel disease (IBD)
- B. *Clostridium difficile* infection (CDI)
- C. Metabolic disease
- D. Colorectal cancer

Further information

Chloe was also concerned that should she require antibiotics for an inter-current infection, she would be at risk of contracting CDI and then the treatment options would be limited.

Question 6

Which one of the following has been shown to be the most effective treatment for CDI?

- A. Rifaximin
- B. Probiotics
- C. Stop use of the offending antibiotic
- D. FMT

Case 3

Frank, 64 years of age, has recently been diagnosed with metastatic malignant melanoma. He has heard about developments in the treatment of melanoma and would like to learn more about current therapies.

Question 7

Which of the following statements about the history of immunotherapy in cancer is the most correct?

- A. The first clinician to use an immunotherapy approach was the Australian Nobel Laureate Macfarlane Burnet.
- B. Evidence of cancer immune surveillance came from international registries of chronically immunosuppressed solid organ transplant patients.
- C. Formal demonstration of immune surveillance in the absence of oncogenic viruses came in the 1950s.
- D. In humans with colorectal cancer, Galon et al found that infiltration of cancerous tissue with CD4+ T cells predicts long-term survival better than extent of anatomical spread of the tumour.

Question 8

Immune checkpoints are an important concept in cancer immunotherapy. Which of the following statements regarding immune checkpoints is the most correct?

- A. Checkpoints enable us to limit normal immune responses, both to pathogens and self-antigens.
- B. Two signals are required to activate a cellular immune response.
- C. Many cancers aberrantly express ligands for inhibitory CTLA-4 at high levels, thus imposing a strong negative signal.
- D. Therapeutic 'checkpoint inhibitor' antibodies disinhibit and amplify a pre-existing immune response to cancer.
- E. All of the above.

Question 9

Immune checkpoints targeting the programmed cell death protein 1 (PD-1) pathway have generated high interest, with overall response rates across tumour types averaging 20–30%. This includes responses in all of the following cancers EXCEPT:

- A. Melanoma
- B. Hepatocellular carcinoma
- C. Squamous cell carcinoma
- D. Hodgkin lymphoma
- E. Bladder cancer

Question 10

Which of the following statements regarding immune-based cancer preventives and therapies is the most correct?

- A. Specific immune stimulation by repeated BCG immunisation can be effective in advanced bladder cancer.
- B. Vaccines against oncogenic viruses are potent cancer preventives and effective therapeutically.
- C. Allogenic bone marrow transplantation provides donor T and natural killer (NK) cells that recognise residual cancer cells as 'foreign'.
- D. All of the above.

Case 4

Susan, 28 years of age, has a family history of hypertrophic cardiomyopathy and has been referred to the local familial cancer centre for further investigations. She has been doing some reading about genomic testing and presents with several questions regarding the subject.

Question 11

Which of the following statements regarding next generation sequencing (NGS) is the most correct?

- A. NGS has superseded all genetic testing.
- B. Gene panel testing is a type of NGS.
- C. NGS is labour-intensive and cost-intensive.
- D. NGS is performed only in private laboratories.

Question 12

Which one of the following statements regarding whole-exome sequencing (WES) is the most correct?

- A. The exons are the protein-coding regions of the genome.
- B. The exons make up 10% of the human genome.
- C. It involves the simultaneous sequencing of a fraction of the exons.
- D. Exons contain 25% of known disease causing mutations.