

### QUESTION

A 65-year-old male patient with a long history of hypertension and a recent diagnosis of type 2 diabetes mellitus is being treated with lisinopril and metformin. He has been experiencing increasing fatigue and weakness over the past few weeks. His blood pressure is well-controlled, and his blood glucose levels are stable. The patient has no other significant medical history and is on no other medications. Physical examination is unremarkable. Laboratory tests show a hemoglobin of 10 g/dL, hematocrit of 30%, and a reticulocyte count of 0.5%. The patient's renal function is normal. The most likely cause of the patient's symptoms is:

- A. Iron deficiency anemia
- B. Vitamin B12 deficiency
- C. Folate deficiency
- D. Hemolytic anemia
- E. Acute kidney injury

ANSWER: B

EXPLANATION: The patient's symptoms of fatigue and weakness, along with the laboratory findings of a microcytic anemia (hemoglobin 10 g/dL, hematocrit 30%) and a low reticulocyte count (0.5%), are most consistent with a deficiency of a nutrient involved in red blood cell production. The patient's long history of hypertension and recent diagnosis of type 2 diabetes mellitus are not directly related to the anemia. The patient's renal function is normal, ruling out acute kidney injury. The patient is on no other medications, ruling out drug-induced anemia. The patient's blood pressure is well-controlled, and his blood glucose levels are stable, ruling out iron deficiency anemia. The patient's symptoms and laboratory findings are most consistent with a deficiency of vitamin B12, which is a common cause of microcytic anemia. Folate deficiency is also a possible cause of microcytic anemia, but the patient's symptoms and laboratory findings are more consistent with vitamin B12 deficiency. Hemolytic anemia is characterized by a high reticulocyte count, which is not seen in this patient. Acute kidney injury is characterized by abnormal renal function, which is not seen in this patient.

### QUESTION



ANSWER: B

EXPLANATION: The diagram shows a protein channel in a cell membrane. A large arrow labeled 'Na+' points towards the channel from the left, indicating the direction of sodium ion movement. A smaller arrow labeled 'K+' points away from the channel to the right, indicating the direction of potassium ion movement. The channel is shown as a pore through the membrane. The diagram illustrates the movement of ions across a membrane through a specific protein channel.

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