

# A Diversity of Guts Case Study #1

## The Vertebrate Digestive System

A. John is a 27 year old male who begins to experience stomach pain while mowing his yard. The cramping and pain seem to be located near his belly button and the right lower quadrant of his abdomen but he can't say for sure. Over the past 48 hours he experienced loss of appetite, bloating, pain and constipation. Mowing the yard however has caused the pain to go from mild to severe. John decides to ask his friend to drive him to the hospital. Once at the hospital John is assessed by the medical team. His bloodwork shows a high white blood cell count, his temperature is 37.8°C. Pain and tenderness continues to affect his abdomen and clinically John is experiencing rebound tenderness. John has no history of gastrointestinal disorders.

- a. What do you believe is wrong with John?
  - b. What anatomical region of the gastrointestinal tract that is affected? Where is it found and what is its shape?
  - c. What are common reasons for inflammation in this region?
  - d. What methods of treatment are most commonly used for patients like John? Treatments vary based on the severity of the case. Describe one treatment for a less serious case that was caught early and a treatment for a patient with a more serious case.

# A Diversity of Guts Case Study #2

## The Vertebrate Digestive System

**In the case study below you will explore the causes of B12 deficiency in three patients.**

A. Patient A is a college student who has become increasingly tired over the last six months. She thought it was because of her tough schedule but since she noticed tingling in her feet, she thought she should see a doctor. Patient A also has hyperparathyroidism, an autoimmune disorder that affects 100,000 people in the U.S. every year. She is not a vegetarian and eats milk, eggs and meat - all great sources of B12. The doctor ran some blood work and found very low levels of B12. The patient also had parietal cell antibodies present in her blood.

a. What do you think is the cause of her B12 deficiency? Why is her body not able to absorb the necessary B12?

b. What is the treatment and prognosis for this patient?

B. Patient B had gastric bypass surgery three years ago. He is a vegetarian and sees a nutritionist who ensures his diet is adequate to meet his nutritional needs. Despite this, on a recent trip to his doctor, his blood work showed declining levels of vitamin B12.

a. Why does this patient have low B12 even though his diet should be providing enough?

b. Why didn't Patient B have low B12 until three years after surgery?

C. Patient C suffers from Crohn's disease and had a 60 cm terminal ileal resection 4 months ago.

a. What is a terminal ileal resection?

b. What is Crohn's disease and what complication led to the need for an ileal resection?

c. What is absorbed by the ileum?

d. Will amino acid and glucose uptake be affected by the ileal resection? Explain.

e. What is the treatment and prognosis for this patient to ensure she receives necessary nutrition?

# A Diversity of Guts Case Study #3

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Talbia went into labor early for unknown reasons and gave birth to a baby boy at 32 weeks. While in the neonatal intensive care unit (NICU) the baby received parenteral nutrition to prevent necrotizing enterocolitis, a disease common in preterm babies with 20% to 50% morbidity.

- A. What is parenteral nutrition? How is it administered?
- B. What is enteral nutrition? How is it administered?
- C. What is necrotizing enterocolitis?

Use the journal article below to answer the following questions and better understand the development of the gastrointestinal tract in preterm babies.

Neu, Josef. "Gastrointestinal development and meeting the nutritional needs of premature infants." *The American journal of clinical nutrition* 85.2 (2007): 629S-634S.

- D. Describe three reasons why enteral nutrition is not used as a primary feeding method for Talbia's baby.
  - A. How does the gastrointestinal tract physically change in the last trimester of pregnancy?
  - A. Beyond nutrition, what are three major functions of the gastrointestinal tract in infants?

# A Diversity of Guts Case Study #4

## The Vertebrate Digestive System

Liz recently relocated her young horse from Illinois to a small boarding farm in Wake County, North Carolina. Her horse is a cribber and it known to bolt its feed. Since its relocation the horse has been acting unusual and although Liz first thought it was related to the relocation, she now believes it something more serious. Symptoms include loss of appetite, repeated stretching, yawning, bloating, and abdominal distention. An abdominal ultrasound was performed and it was noted that the horse had fluid build up in its small intestine. The horse was provided fluids via a nasogastric tube and mineral oil was prescribed by the veterinarian.

- A. What was the diagnosis for Liz's horse? How common is this diagnosis?
- B. What is happening anatomically that is causing discomfort in horses with this diagnosis?
- C. Why was surgery not necessary for Liz's horse?
- D. Pysllium fiber is often added to feed for horses that live in sandy areas. What is the function of the pysllium fiber?