

# ASC 406/606

## Lecture [6]

### Digestion in Different Species

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### The Small Intestine

- Long, tubular organ in which significant amount of digestion & absorption occurs
- Vary in length among species
  - Pigs (15 to 20 m)
  - Dogs (4 m)
- It is differentiated into 3 segments:
  - Duodenum
  - Jejunum
  - Ileum

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### The Small Intestine

- 1) Duodenum:*
- The anterior segment (adjacent to the stomach)
  - The site of production of various digestive secretions
  - The site at which the bile duct (from the gall bladder) and pancreatic ducts enter the small intestine (a variety of digestive secretions)
  - Some absorption may occur at the duodenum but most nutrients are absorbed from the jejunum and upper ileum

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## The Small Intestine

### 2) *Jejunum*:

The middle section

### 3) *Ileum*:

- The posterior section
- It ends at the ileo-cecal junction  
(where the S.I. meets the cecum)

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## The Small Intestine

- It accounts for most of the absorption in the GI tract
- It is lined with fingerlike projections (villi) which increase the absorptive surface area

### *Comparative Aspects:*

- It is the least diverse of all organs of the GI tract
- Its function is identical across species
- Some differences in size

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## The Functions of the Small Intestine

### 1) Regulation of digesta flow

(waves of contractions forcing the contents down)

### 2) Chemical & enzymatic digestion

### 3) Absorption of:

- Simple sugars
- Amino acids
- Fatty acids
- Minerals
- Water

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## The Large Intestine

- It is made up of:
  - The cecum
  - The colon
  - The rectum
- The relative sizes vary among species

### *The cecum:*

- Varies in size & relative importance across species
- The length and diameter in herbivores are much larger than in omnivores or carnivores

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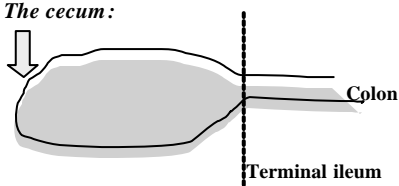
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## The Large Intestine

### *The cecum:*



- It is a blind pouch
- Birds have two ceca

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## The Large Intestine

### *The colon:*

- Posterior to the ileo-cecal junction

### *Variation among animals:*

*Herbivores:* have enlarged cecum & proximal colon

*Carnivores:* have a cecum that is small & insignificant

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## The Functions of the Large Intestine

### 1) Fermentation

- Cecum & proximal colon (fermentation chamber)
- Fermentation similar to that in the rumen
- Very important site of digestion in herbivores  
(e.g., horse & elephant)

### 2) Absorption

- Water
- Some minerals (Na & Cl)
- VFA

Amino acids & B-vitamins are not absorbed in significant amounts

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## Digestion & Digestibility

### *Digestion:*

- Preparation of food for absorption

### *Digestibility:*

- Disappearance of food from the GI tract
- A broad definition includes digestion and absorption
- Digestibility data (research) are used in animal nutrition to evaluate feedstuffs or study nutrient utilization
- Variable (food is not digested or utilized to the same extent even by the same animal)

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## Digestion & Digestibility

### *Extent of digestion is affected by several factors:*

- Level of feed intake
- Digestive disturbance
- Frequency of feeding
- Feed processing
- Associative effects

(non-additive effects of combining different feedstuffs)

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