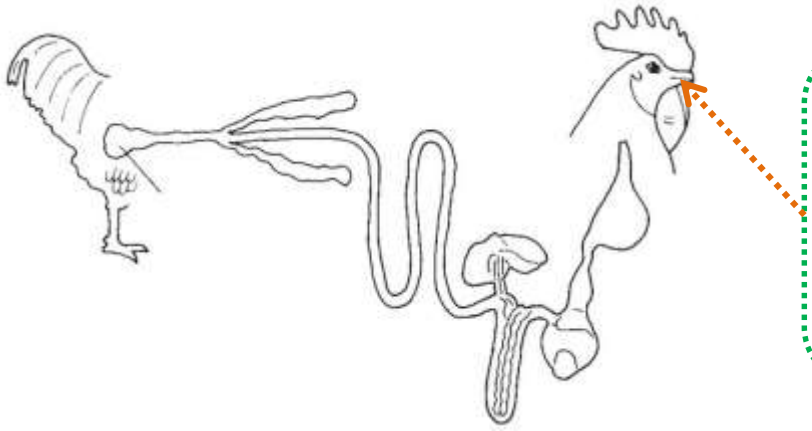
ANATOMY & PHYSIOLOGY

Poultry Gut

POULTRY GI TRACT

Beak & Mouth



BEAK & MOUTH

Feed picked up by the beak enters the mouth. Chickens do not have teeth, so they cannot chew their food. The chicken uses its tongue to push the feed to the back of the mouth to be swallowed.

- **Secrete saliva**

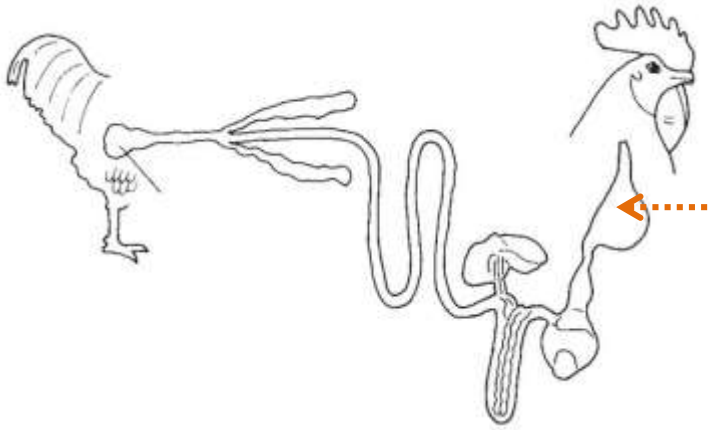
rich in mucus (7-30 ml/day) allow feed lubrication to make it easier to swallow.

- **Highly Sensitive to Temperature & pH**

Should allow water with best suited in temperature & pH

POULTRY GI TRACT

Esophagus & Crop



ESOPHAGUS & CROP

Crop is the out-pocketing of the esophagus. Swallowed feed and water are stored in the crop until they are passed to the rest of the digestive tract.

- **Temporary storage pouch**

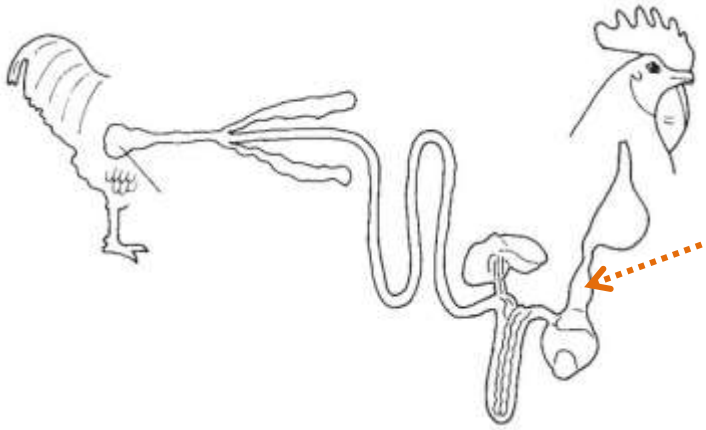
Bird can store feed for up to 10-12 h, allow continuous feeds to avoid this. Crop is responsible to send hunger signals to the hypothalamus.

- **Fermentation**

Feed goes some bacterial fermentation, main bacterial specie is Lactobacillus.

POULTRY GI TRACT

Proventiculus



PROVENTICULUS

This organ is called proventriculus because its location in the digestive tract is before the ventriculus. Proventriculus is the glandular stomach where digestion primarily begins.

- **Hydrochloric acid**

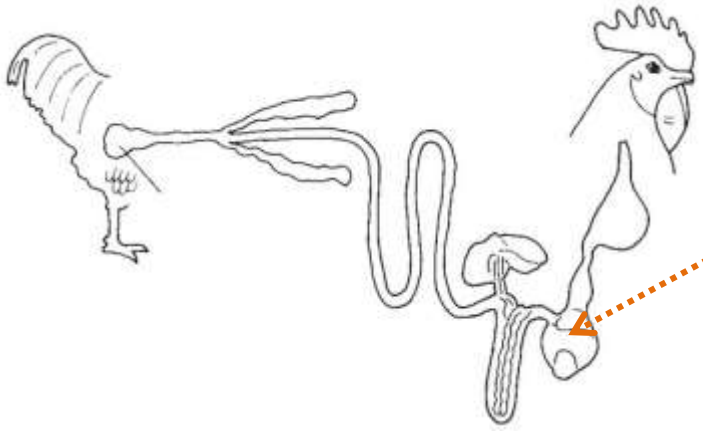
from oxyntico peptic cells to solubilize mineral salts ($CaCO_3$ & Phospate)

- **Gastric juice (pepsin)**

Contributes to protein hydrolysis within the cavity of the gizzard.

POULTRY GI TRACT

Gizzard



GIZZARD

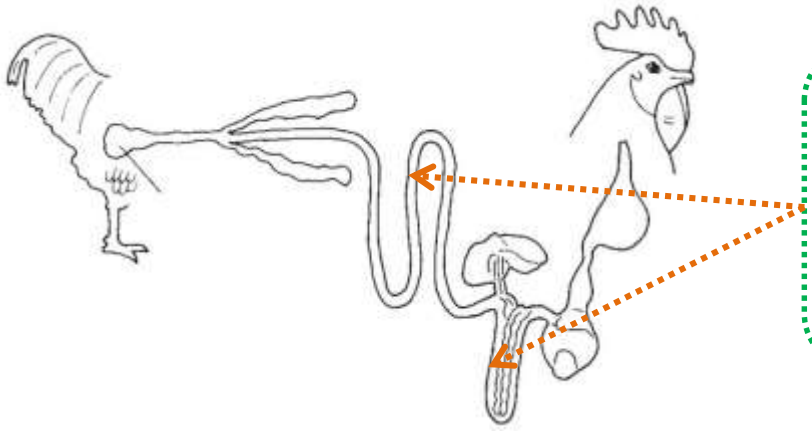
The ventriculus or gizzard, is referred to as the mechanical stomach; it is made up of two sets of strong muscles for grinding, mixing & mashing of feed with the help of grit.

- **Gizzard erosion**

Mycotoxin, biogenic aminines, Coper Sulphate, adenovirus.

POULTRY GI TRACT

Small Intestine



SMALL INTESTINE

The small intestine is made up of the duodenal loop & the lower small intestine (jejunam & ileum). The Meckel's diverticulum marks the end of the jejunum & the start of the ileum

- **Duodenum**

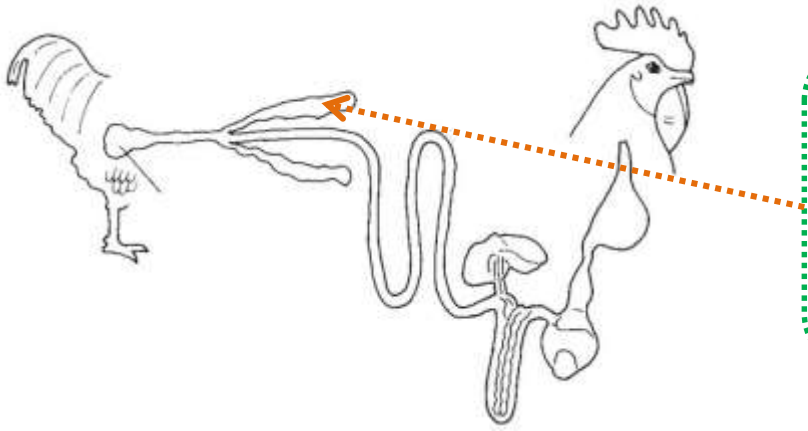
receives pancreatic enzymes (protein, CHO, Lipid digestion) & bicarbonate (neutralize HCl) & bile (lipid digestion)

- **Lower small intestine**

Major absorption sites of nutrients

POULTRY GI TRACT

Ceca



CECA

The ceca are two blind pouches located where the small & large intestines join. Cecal tonsils is found in the distal region of each cecum about 3 cm from the ileo-cecal junction

- **Water reabsorption**

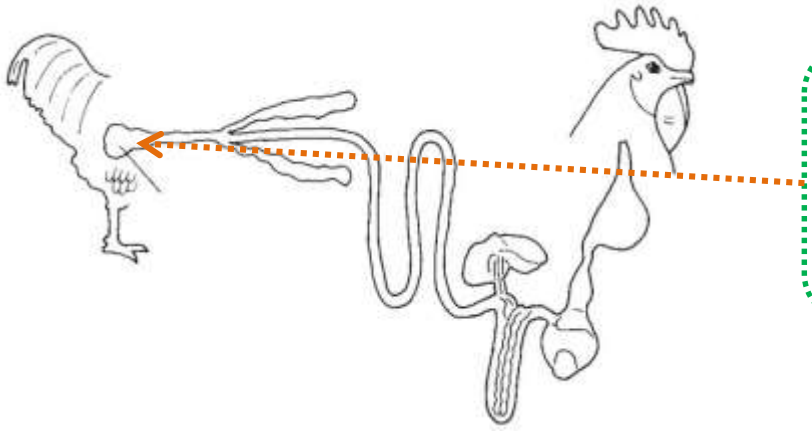
Some of water remaining in the digested material is reabsorbed here.

- **Fermentation of coarse materials**

produces several fatty acids, B vitamins (thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, biotin, folic acid, and vitamin B12).

POULTRY GI TRACT

Cloaca & Vent



CLOACA & VENT

Urinary tract & reproductive tract exits through this area. The bursa develops as a Dorsal diverticulum of the proctadael region of the cloaca.

- **Digestive wastes mix with wastes from the urinary system (urates).**
- **Reproductive systems also open this area.**

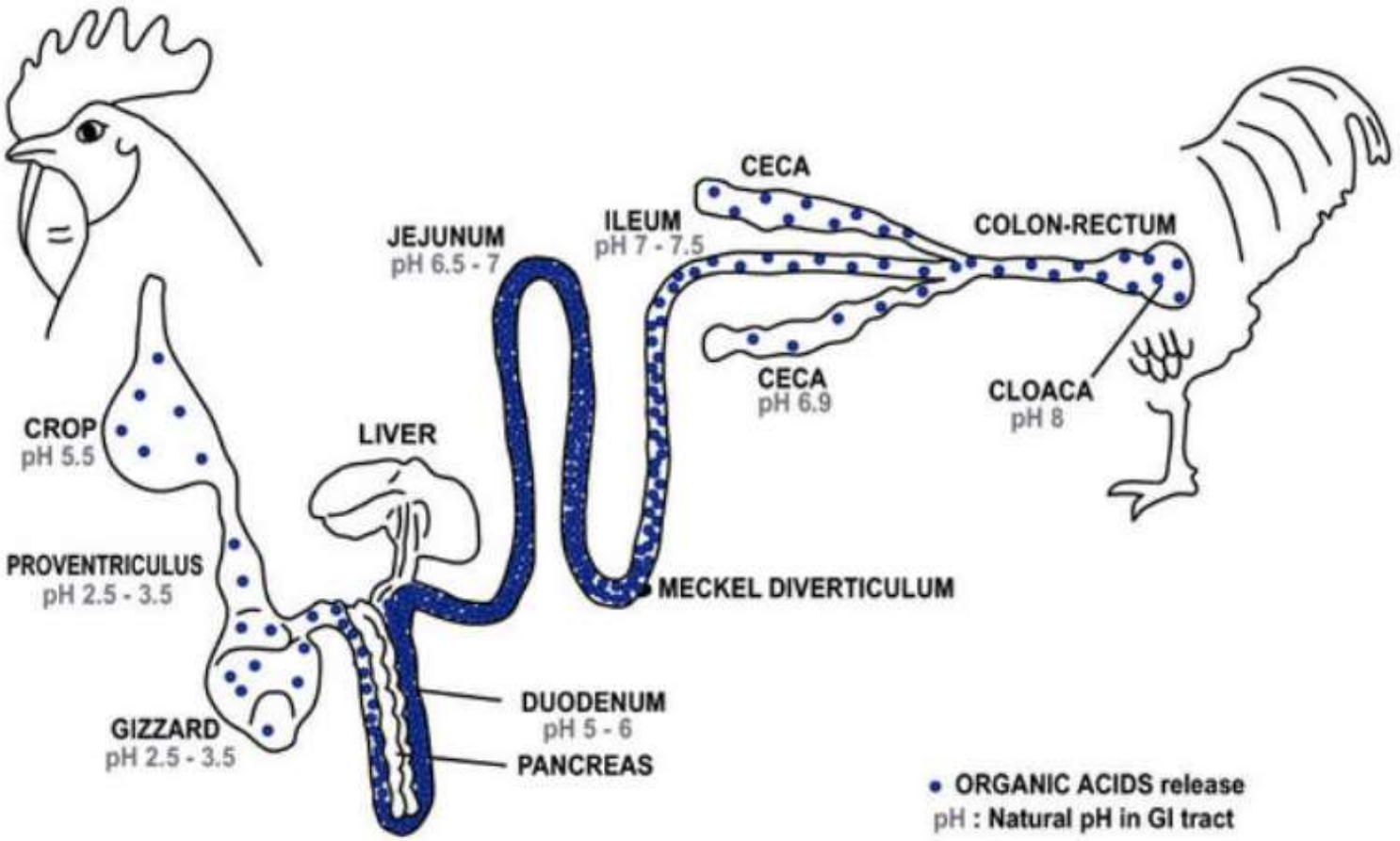
POULTRY GI TRACT

Mean duration of transit time

GIT compartment	Duration of transit time (min.)
Crop	50
Proventriculus & gizzard	90
Duodenum	5-8
Jejunum	20-30
Ileum	50-70
Rectum	25

POULTRY GI TRACT

Neutral pH & protected acid dissociation level



Adapted and redrawn from Riis & Jokobsen, 1969 Hill, 1971, Simon & Versteeg, 1989 and Herpol and Van Grembergen, 1967

POULTRY GI TRACT

Digestive enzyme & Activity

Location	ph	Enzyme	Substrate	Product
Mouth	7.0-7.5	Saliva (Amylase)	Lubricates feed Starch Dextrin	 Dextrin Glucose
Crop	4.5	Mucus	Soften feed	
Gizzard and Proventriculus	2.5	HCL	Lower digesta pH, initiates protein cleavage	
		Pepsin	proteins	Polypeptides
		Lipase	triglyceride	Fatty acids, monoglycerides
Duodenum	6.0-6.8	Amylase	Starch, dextrin	Maltose, glucose
		Trypsin, chymotrypsin and esterase	Proteins, peptides	Peptides and amino acids
		Carboxypeptidases collagenase	Peptides collagen	Amino acids, peptides

POULTRY GI TRACT

Digestive enzyme & Activity

Duodenum		Lipase	Fats	Fatty acids, monoglycerides, diglycerides
		Cholesterol esterase	Cholesterol esters	Fatty acids, cholesterol
Jejunum	5.8-6.8	Maltase and isomaltase	Maltose, isomaltose	Glucose
		Sucrase	sucrose	Glucose, fructose
		Lactase	lactase	Glucose, Galactose
		Polynucleotidase Peptidases	Nucleic acids peptides	Mononucleotides mononucleotides
Ceca	5.7-5.9	Microbial activity	Cellulose, polysaccharides Starches, sugars	Volatile fatty acids Vit. K, B vitamins

APPETITE

Factor affecting appetite

- **Shape, Color & Smell of Feed**

mouth is highly sensitive to shape, comparatively less to color & odour.

- **Light & intensity**

Birds consume modest amounts under dim conditions & constant at continuous lighting.

- **Metabolic/Nutritional**

ME balance, Amino acid balance, Mineral intake, Anti-nutritional factors.

- **Ambient Temperature**

The major ones influencing feed intake.

THANKS