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| **[comparative anatomy of digestive tract of vertebrate]** |
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 COMPARATIVE ACCOUNT OF INTEGUMENTARY SYSTEM OF VERTEBRATES

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| Characters | Fish  | Amphibia | Reptiles | Aves | Mammalia |
| Skin surface & attachmentPigmentationEpidermisFunctions of teethBuccal cavityVestibulePalateTongueInternal naresPharynx GlottisOesophagusStomachIntestineSmall intestineDuodenumIleum Large intestine | Skin hard, rough, rigid , leathery and firmly attached to bodyPigment containing chromatophores and guanine containing iridophores located in dermisEpidermis many layered or stratified , but simple , thin and without a cornified stratum corneum , no moulting .Absent .Skull forms roof of buccal cavitySmall, non muscular , non glandular ,non protrusible , attached at base. Taste buds lacking.AbsentBuccal cavity merges insensibly into a large posterior pharynx .Absent since there is no trachea and no lungs .Short and wide tube with thick muscular wall, longitudinal mucous folds and opening into cardiac stomach with a sphincter or oesophageal valve.Large muscular ,U-shaped or S-shaped. Clearly divided into a long, broad, proximal cardiac stomach and short, narrow, distal pyloric stomach. Junction of the two marked by a blind sac and sphincter valve. Longitudinal mucous folds well developed in cardiac part.Short but straight and wide tube not differentiated into small and large intestine.No external differentiation between duodenum and ileum .AbsentNot differentiatedLast part of in testine forms a short rectum of narrow diameter, opening in to cloaca | Skin thin , moist , slimy , smooth, fitting loosely on body enclosing large subcutaneous lymph spaces beneath dermis.Chromatophores located in dermisMany layered or stratifiedAbsent .Skull forms roof of buccal cavityLarge muscular, sticky .Anterior end attached, posterior end free bifid. Highly protrusible and used for capturing insect prey . covered few taste buds .Small, two. Open on buccal roof anteriorly , just in front vomerine teeth.Buccal cavity passes without demarcation into a short pharynx .Floor carries a median slit-like opening or glottis leading into laryngo-tracheal chamber .Short, wide, muscular with longitudinal mucous folds highly distensible and not clearly demarcated from pharynx and stomach .Stomach large, broad, simple, curved , muscular sac, on left side of body cavity. Anterior cardiac and posterior pyloric parts not marked off externally. Blind sac and cardiac valve absent .Long , coiled and narrow tube differentiated into small and large I ntestine.Duodenum and ileum well marked .Straight tube forming “U” with stomach . receives biles and pancreatic ducts. Juice through a common hepatopancreatic duct.Small and coiledIt forms a short but broad rectum opening into cloaca . | Skin thicker, dry, rough, and loosely folded along the sides of neck and trunk.Chromatophores located in dermisGrasping and holding preyNarrow in front, but broad posteriorlyAbsentAbsent in lizard and snakes. A false or pseudopalate present in crocodilians . Large roughly triangular , muscular, glandular ,attached mid ventrally. Anterior tip free ,bifid and protrusible. covered with fine papillae having taste buds.Small, two rounded, open near anterior end on roof of buccal cavity.Buccal cavity merges posteriorly into a broad pharynx .A median slit-like glottis on floor leads into trachea.Long, narrow, muscular tube with longitudinal mucous folds. Highly distensible. without crop.Stomach long, tubular or spindle like, curved muscular tube lying on left side . cardiac and pyloric parts indistinct externally. Longitudinal mucous folds well developed in cardiac part.Long, coiled narrow and clearly differentiated into small and large intestine.Duodenum and ileum well marked .Straight tube receiving separate bile and pancreatic ducts.Small and coiled Short and forms an anterior thin walled narrow colon and a posterior thick walled broad rectum opening into cloaca | Skin thin ,dry, hard flexible and loosely attached to achieve maximum freedom of movement for flight .Pigment cells found in feathers , not in dermis . colours also due to reflection and refraction of light by feathersNarrow roughly triangularAbsentPalate incomplete , formed by lateral folds which do not meet mesiallyTongue large , narrow, somewhat triangular attached and non protrusible . covered with fine horny processes with scanty taste buds.Small, slit like, open rather posteriorly into buccal cavity or pharynx .Buccal cavity merges behind into pharyngeal cavity .Floor of pharynx carries an oval glottis with tumid lips .Long ,wide, muscular, thick-walled and distensible . in front of sternum, its middle part forms a large, bilobed , thin-walled elastic sac, crop or food reservoir.Stomach small and divided into 2 distinct parts: an anterior narrow ,tube-like glandular proventriculus , and a posterior broad , muscular, biconvex gizzard internally lined by thick , horny epithelium .Long, coiled, narrow and clearly marked into small and large intestine. Duodenum and ileum well marked .U- shaped tube receiving 2 bile ducts and 3 pancreatic ducts, separately .Long and coiledForms a short but broad rectum only which leads into cloaca . | Skin thickest, dry, elastic and loosely attached .Pigment granules located in hairs and epidermis , pigment cells in dermis .Mouth opens into a narrow space bounded by jaws, lips and cheeks ,called vestibule .A secondary palate present forming roof of buccal cavity.Large ,muscular attached mid ventrally. Groved mid dorsally. Anterior tip free, rounded and protrusible. Covered with 4 kinds of papillae containing taste buds.Do not open into buccal cavity but much posteriorly in the roof of pharynx.Pharynx is short, narrow and differentiated into nasopharynx , oropharynx and oryngopharynx .Floor of laryngopharynx has a median vertical slit-like glottis leading into larynx .Long, narrow, muscular, elastic tube ,without crop, of uniform diameter, opening into stomach . Stomach large, bean shaped, lying transversely on left side. distinguished into 3 regions: cardiac, fundic and pyloric .Long, coiled, narrow and well differentiated into small and large intestine. Duodenum and ileum well marked .Distinct U-shaped loop receiving 1 bile and pancreatic duct.Extremely long and coiled .Very long and forms an anterior sacculated colon and a posterior beaded rectum. |