

Stage 21 Anterior Footplate Indented; Marked Pinna

13 Days, 9–11 mm

Horizon XVIII–XIX
homo = 44–48 days
14–20 mm

Externally. The rapid development of the *pinna* is striking, and it now forms a crest at right angles to the head. Five rows of whiskers are present. The 4 upper rows of whiskers are shown in Fig. 202, as well as a prominent hair follicle above the eye and another in front of the ear. The indentation of the *handplate* is characteristic of this period. It is shallow in younger embryos of this stage (Fig. 200) and very distinct in older ones (Fig. 201). The footplate is just becoming indented.

Somites are clearly visible only in the distal part of the tail. Usually the tail is curved to the left (as in Fig. 202) rather than to the right.

Length. The length varies from 9–11 mm in unfixed embryos.

Sagittal section (Fig. 208). In the brain, the choroid plexus projects into the lateral and the 4th ventricle, forming finger-like evaginations. The tongue projects from the floor of the mouth [76].

Locomotive System

The extremities now differentiate rapidly [184]. As shown in Fig. 209, the skeleton of the forelimb already contains cartilage, while the “hand” still remains mesenchymous. The cranial vertebrae are chondrified, but not the more posterior ones.

Circulatory System

The aortic and pulmonary trunks are completely separated as shown in Fig. 208. The membranous part of the interventricular septum is not yet closed. Within the coronary sulcus, fine coronary vessels are visible. There is probably not yet a continuous circulation. All valves of the heart are now present in primitive form.

The inferior caval vein is represented proximally by a large hepato-cardiac channel. The venous system is essentially the same, as that shown in the reconstruction (Fig. 224) made for the next developmental phase (14 days).

Intestinal Tract

The *oral cavity* is in broad communication with the nasal cavity. The palatine processes consist of mesenchyme and are in a vertical position. The dental lamina of the future molars is clearly visible [73] (Fig. 210).

In sagittal sections (Fig. 208) the *epiglottis* is delimited by a discrete cleft from the rest of the larynx, which projects plug-like into the pharynx.

The *lungs* are clearly subdivided into lobes [61], and the segmental bronchi are continuing to branch.

The *thymus* has completely lost its connection with the pharynx. Numerous blood vessels are penetrating the thymus primordium, but the closely neighboring and considerably smaller *thyroid* is still a solid complex [147].

Within the abdomen, the *liver* is well developed and contains scattered blood-forming foci. The stomach does not yet have differentiated glands. In some places the epithelium is higher than in others, and there are some small lumina (Fig. 208). The spleen appears in cross sections as a triangular structure (Fig. 206).

The pancreas produces numerous sprouts, which considerably swell the dorsal mesentery (Fig. 208).

Urogenital Tract

The urogenital tract is characterized by the rapid development of the *kidney* and by *sexual differentiation*.

The mesonephros contains many regressing mesonephric tubules (Fig. 204). The slender ureter is continuous with the distended pelvis, which has well-marked primary calyces with caps of metanephric tissue (Fig. 206). The metanephric caps [100], in some places, form small vesicles, which are more intensely eosinophilic than the ureteric bud. The vesicles are sometimes transformed into S-shaped tubules, the free ends of which have differentiating glomeruli. The *Wolffian duct* is more developed in the male, the *Müllerian duct* more in the female. The cloaca is completely subdivided. The ureter has contact both with the Wolffian duct and with the urogenital sinus. It still ends blindly, slightly cranial to the lower end of the mesonephric duct.

The sex of the gonads can now be diagnosed. In the male, the future seminiferous tubules appear as solid, regularly arranged strands [118]. They are composed of small supporting and nourishing cells, and of large primordial germ cells (Fig. 207). The first suggestion of sexual differentiation appeared at 12 1/2 days. Male primordial germ cells were located centrally, and female germ cells were located peripherally. Some of the large female gonocytes (Fig. 205) are dividing.

Central Nervous System

There are pronounced changes in the diencephalic roof (Fig. 211). There are no longer pycnotic cells in the anterior portion of the roof [166]. The choroid plexus is fully developed. The *pineal gland* was recognizable at 12 days as a small evagination, and it is now very distinct. The posterior commissure is also well formed [160].

The *hypophysis* is developing very rapidly (Figs. 212–214).

The structure of the *eye* is very characteristic for this group: the lens vesicle has lost its lumen, and is a solid sphere. The vitreous body is exceedingly small. In the retina, the layer of nerve fibers forms a wide border with peripherally tapering ends. The nuclear layers of the retina are still predominantly indistinguishable from each other. However, the clear nuclei of the future ganglionic cells are discernible in some places. The ganglion cell layer is the first one to be delimited from the other layers.

Material	Age	
KT 615-16	12 days 23 h	7 embryos, 10-11 mm
KT 633-34	13 days 3 h	6 embryos, 10-10.8 mm
KT 1014-16	13 days 2 h	8 embryos + 1 resorption, about 10 mm
KT 901	12 days 20 h	7 embryos, 9.6-10.0 mm (after fixation)

FIG. 200. Embryo from the right. Younger stage of 12 days 6 h. Formalin fixed.

Ey = eye, *Tel* = cerebral hemisphere.

KT 952, 8.7 mm length. 8:1

FIG. 201. Embryo from the left, 13 days, 10 mm length, life photograph.

Si = sinus sigmoideus.

KT 634. 7:1

FIG. 202. Frontal view. Albino of control series. Bouin fixed, 13 days, 10 mm length.

O = pinna, *So* = tail somites, *N* = nostril, *H* = rudiments of hair follicles (whiskers). 10:1

FIG. 203. Eye, cross section, 13 days.

OL = upper lid, *L* = lens, *St* = optic stalk, *P* = pigment layer. 70:1

FIG. 204. Ovary and vicinity. Cross section, 13 days.

NN = suprarenal gland, *U* = mesonephric tubules, *M* = Müllerian duct, *Ma* = stomach.

KT 901/5. 100:1

FIG. 205. Detail of Fig. 204.

Oz = oocytes in meiotic prophase. 550:1

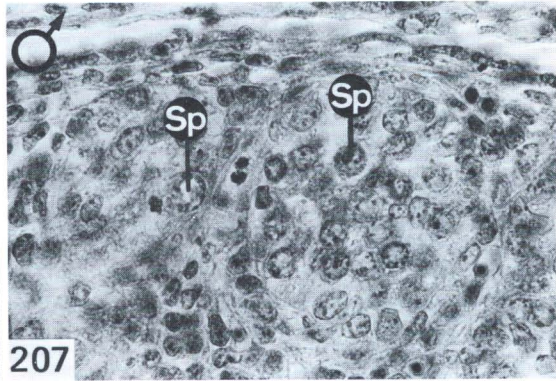
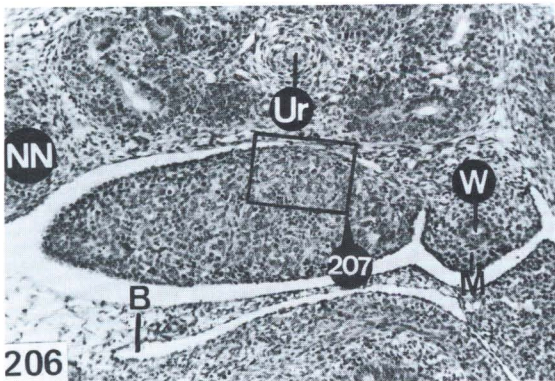
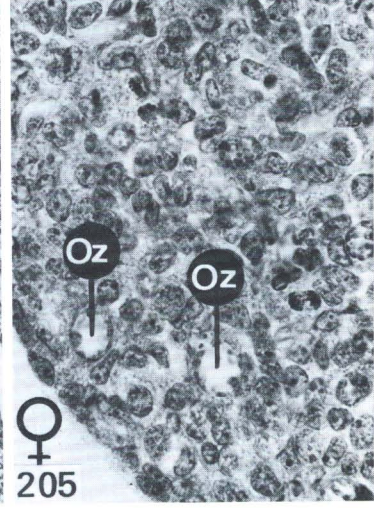
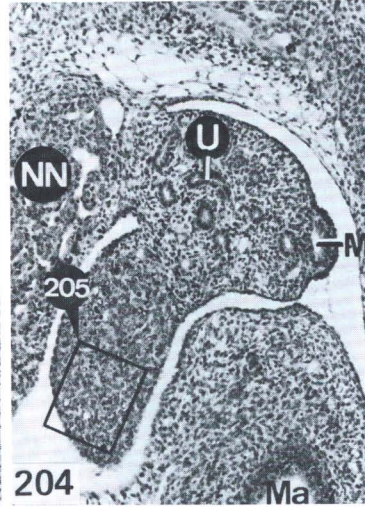
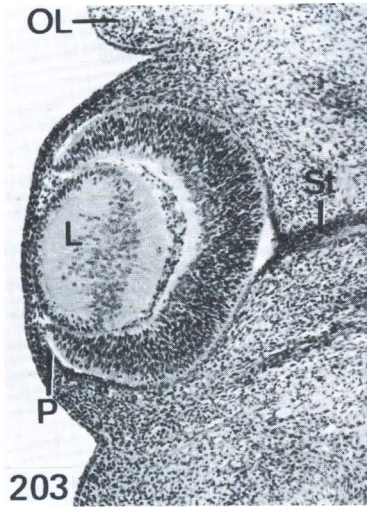
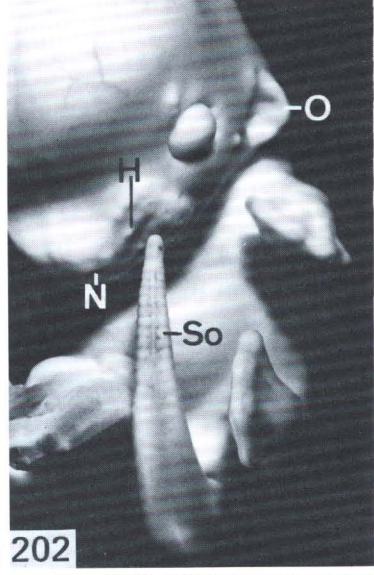
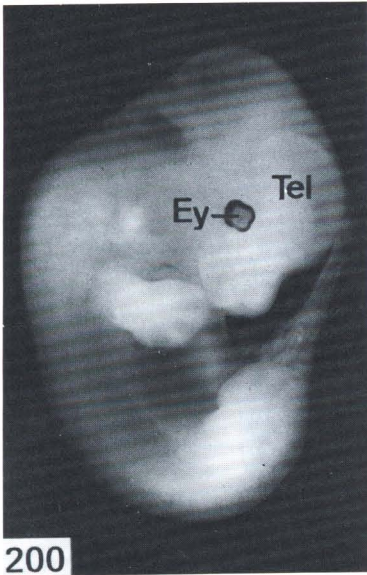
FIG. 206. Testis and vicinity, 13 days.

NN = suprarenal gland, *Ur* = ureter in kidney rudiment, *W* = Wolffian duct, *M* = Müllerian duct, *B* = omental bursa, bordering the triangular anlage of the spleen (*right*) and the stomach (*below*).

KT 901/2

FIG. 207. Detail of Fig. 206, testis.

Sp = Gonocytes. 550:1



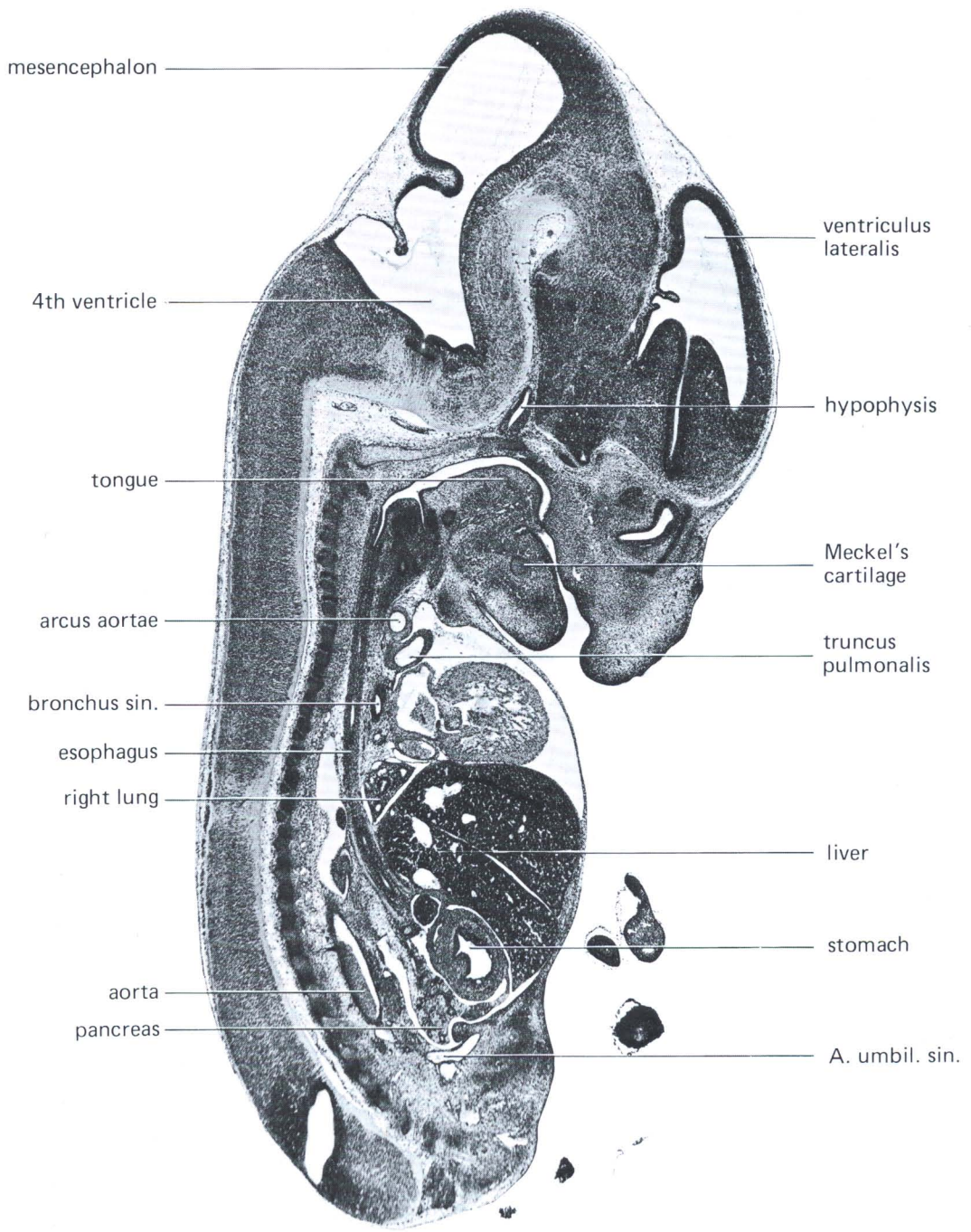


FIG. 208. Sagittal section, 13 days, 10 mm length.
KT 901/2

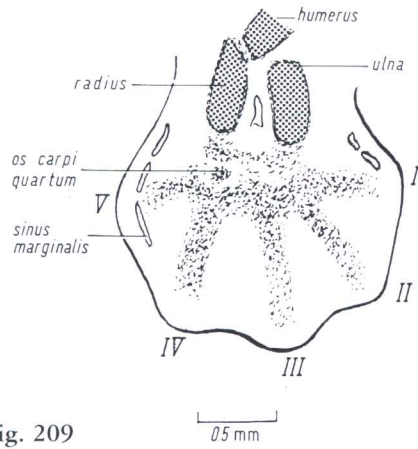


Fig. 209

FIG. 209. ▲

Right forefoot plate, 13 days.

Dark stippled area indicates precartilage (of "arm" skeleton); light stippled area indicates mesenchymal condensations.

KT 1014

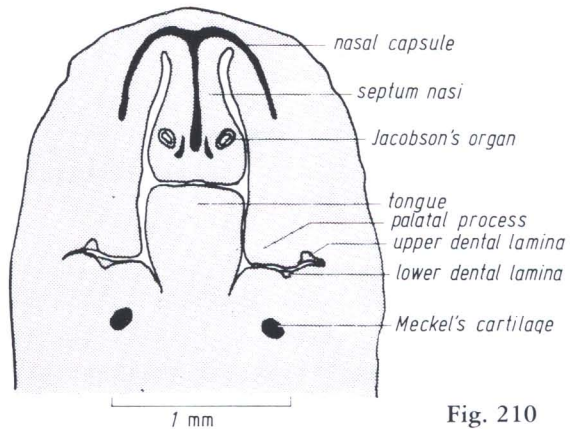


Fig. 210

FIG. 210. Cross section through oral and nasal cavities. Plane of section nearly horizontal, therefore the conchae are not visible.

Black area indicates cartilage and precartilage.

KT 901, 12 days 2 h

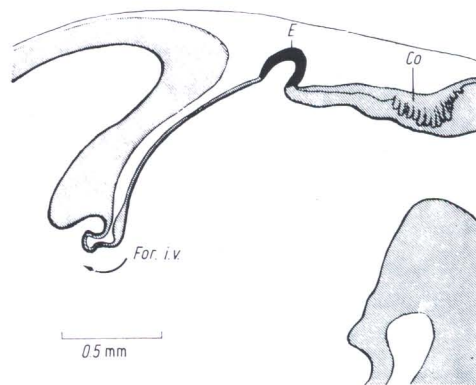


Fig. 211

FIG. 211. →

Sagittal section through roof of diencephalon.

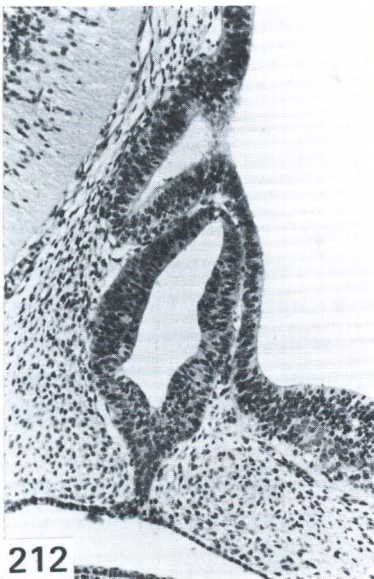
E = epiphysis, Co = commissura posterior, For i.v. = foramen interventriculare.

KT 633/b, 13 days

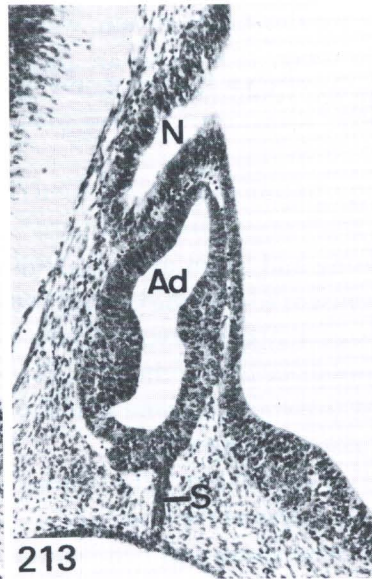
12 days

12 1/2 days

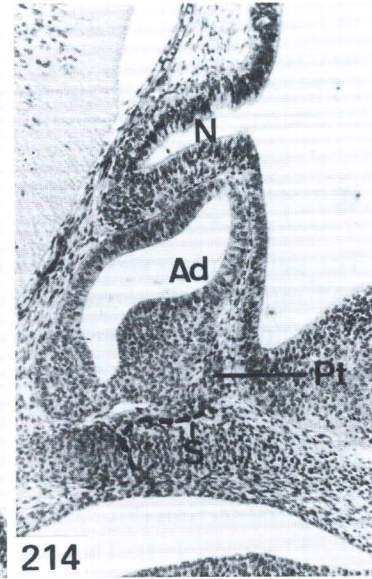
13 days



212



213



214

FIGS. 212-214. Development of hypophysis. Sagittal sections, 12-13 days.

N = neurohypophysis, Ad = adenohypophysis, Pt. = pars tuberalis, S = connecting stalk (with pharyngeal roof).