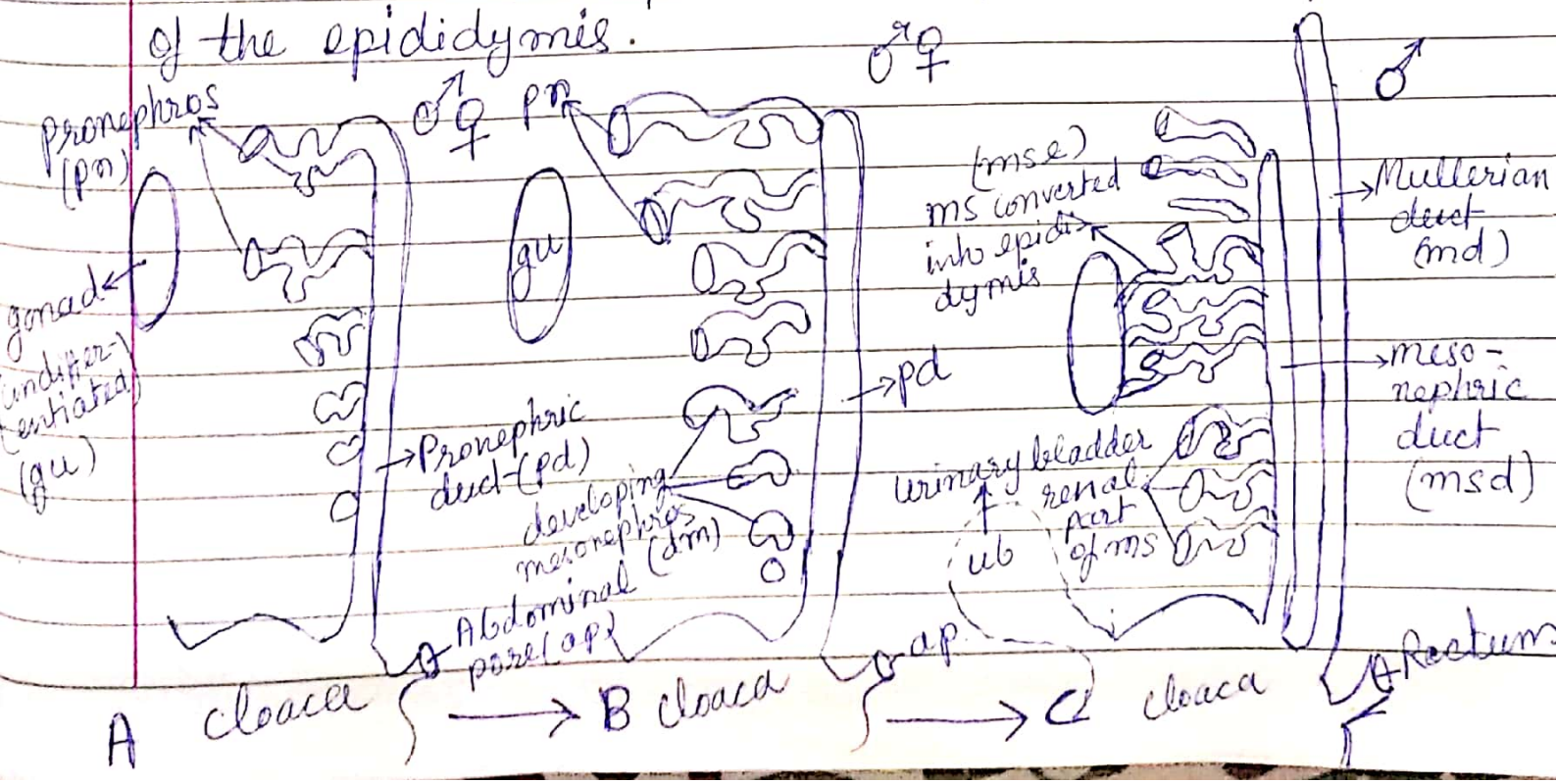
Evolution and Fate of Gonads in Vertebrates – Part -1

Male and Female genital ducts

In lower vertebrates like Elasmobranchs a second duct (Mullerian duct) become differentiated from the primary mesonephric duct, which becomes an important part of female reproductive organ by serving as an oviduct for conveying the sexual products to the exterior. It remains in connection with the coelom anteriorly by means of an aperture derived from the anterior nephrostome. But in males only vestiges of this duct is found.

The remaining part of the mesonephric duct or Wolffian duct still serves as a urinogenital duct in male Elasmobranchs and Amphibians.

In the Amniota, in which mesonephros gives up its function as a urinary organ (replaced by metanephros) it serves exclusively as a spermiduct (Vas deferens). It's coiled anterior portion takes part in the formation of the epididymis.



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Anamniotes (Fish, Amphibia) — Pronephros develops but donot persists as a permanent excretory organ. In Elasmobranch and some Amphibians pronephric duct subdivids to give mesonephric (Wolffian) and Mullerian ducts. In all anamniotes mesonephros serves as urinary gland. In Ganoids, Dipnoans and Amphibians a certain portion of it becomes related to the male genital apparatus, the remaining part persist as permanent kidney. In female whole part in form of kidney.

Mesonephric duct serves merely as urinary duct in Teleosts while in Ganoids, Dipnoans & Amphibians it serves as urinogenital duct. In females it is exclusively urinary duct.

Mullerian Duct — It degenerates in post-embryonic life in Elasmobranchs but vestiges of its anterior portion is retained. In Dipnoans & Amphibians it is retained for its whole length in functionless condition for some time. In female, it gives rise to whole genital duct.

Metanephros and Ureter — not present

Amniotes — Pronephros — Develops but as an excretory organ undergoes entire degeneration in the embryo.

Pronephric duct — Persist as mesonephric (Wolffian) duct and contributes to some extent in the formation of Mullerian duct

Mesonephros — Loses its renal function in all Amniotes embryo and becomes vestigial except in the males where it becomes an accessory gland of the gonad.

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The anterior end of it becomes Vasa efferentia, Epididymis and stalked hydatid, the posterior end becomes the paradidymis in male and in female anterior (greater part) becomes par-ovarium and posterior the paroophoron.

Mullerian Duct — The anterior part becomes unstalked hydatid, the posterior, in some mammals form uterus masculinus (Prostatic vescicle)

Metanephros and Ureter — Ureter and collecting duct arises from the posterior end of the mesonephric duct and secreting elements as a caudal extension of the mesonephros