

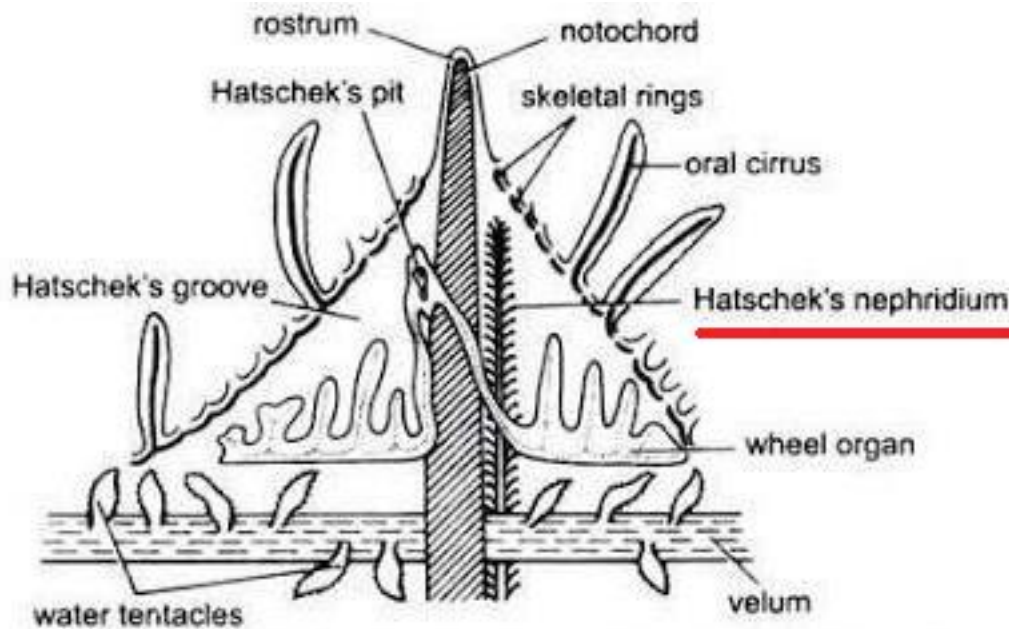


Hatschek's nephridium of *Branchiostoma*

By Dr. Rahul Ranjan

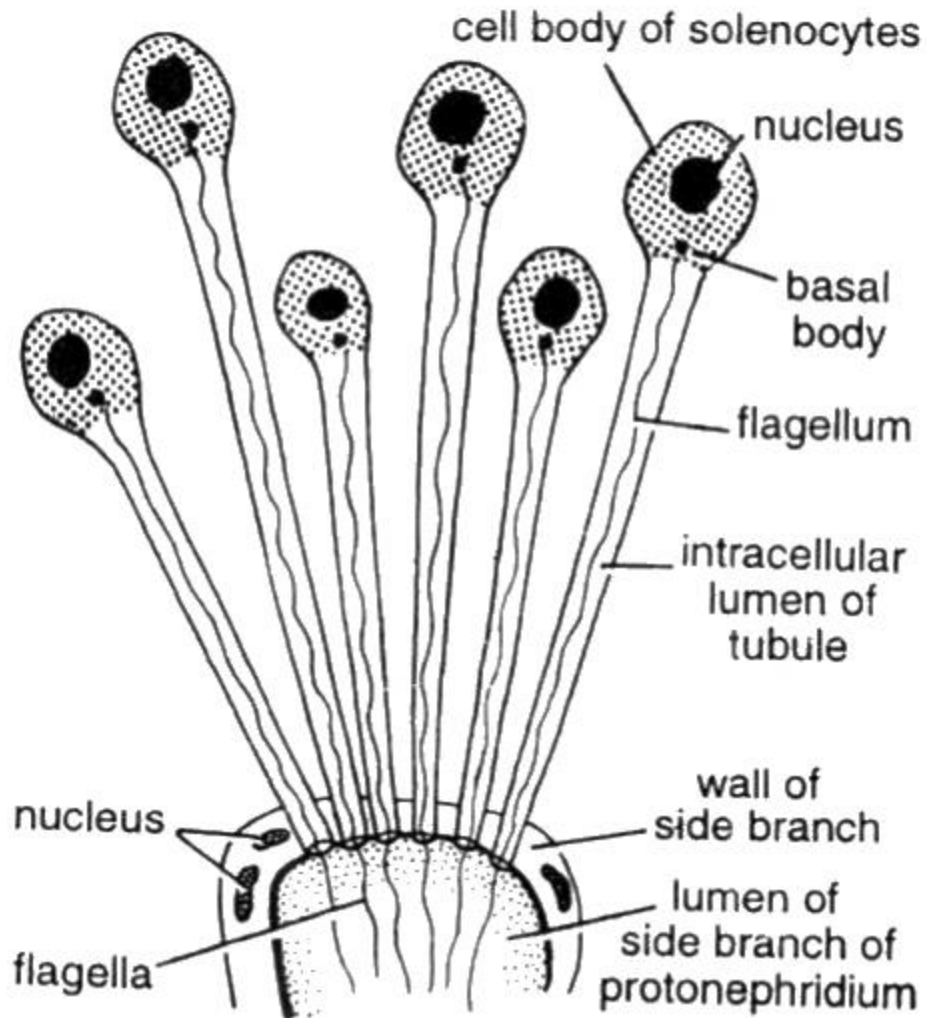
Hatschek's nephridium of *Branchiostoma*

Hatschek's nephridium, also known as the Hatschek nephridium or Hatschek organ, is a specialized excretory organ found in the larvae of some species within the genus *Branchiostoma*, commonly known as lancelets or amphioxus. These marine chordates belong to the subphylum Cephalochordata and are characterized by a close resemblance to the ancestral chordate body plan. Hatschek's nephridium is named after the Austrian zoologist Julius von Hatschek, who first described it in the late 19th century.



Branchiostoma. Ventral view of anterior end showing Hatschek's pit and groove.

A single long and straight tube called *the nephridium of Hatschek*, lies in the roof of oral hood slightly towards left and ventral to notochord. It's anterior blind end lies somewhat ahead of the Hatschek's pit, but the posterior end opens into the prebranchial sac of pharynx. It is ectodermal in origin and supplied blood by the dorsal aorta. Its surface is covered by a number of solenocytes each surrounded by a coelomic sac and extracting nitrogenous wastes.



Branchiostoma. An enlarged view of solenocytes.

Key points about Hatschek's nephridium:

Location: Hatschek's nephridium is located in the larval region known as the atrial chamber, which is a sac-like structure formed by invagination of the ectodermal layer during embryonic development. This structure is present in the pharyngeal region of the lancelet larva.

Structure: Hatschek's nephridium consists of a complex tubular network lined with ciliated cells. These ciliated cells facilitate the movement of fluid through the tubules. The nephridium opens into the atrial chamber, which serves as a reservoir for waste products and excess fluids.

Function: The primary function of Hatschek's nephridium is excretion and osmoregulation. It helps to remove metabolic waste products, such as ammonia and urea, from the body fluids of the lancelet larvae. Additionally, it regulates the balance of water and ions in the internal environment, helping to maintain osmotic balance.

Developmental Significance: Hatschek's nephridium is a temporary structure that is present only in the larval stage of certain *Branchiostoma* species. It plays a crucial role during larval development, aiding in the excretion and osmoregulation of the developing embryo and larva. As the larvae undergo metamorphosis into the adult form, Hatschek's nephridium degenerates and is eventually lost.

Evolutionary Implications: Hatschek's nephridium provides insights into the evolutionary history of chordates and the development of excretory systems. It is considered a primitive excretory organ, resembling the protonephridia found in some lower invertebrates such as flatworms. The presence of Hatschek's nephridium in lancelet larvae highlights their phylogenetic position as basal chordates and their resemblance to the ancestral chordate condition.

Overall, Hatschek's nephridium is an important excretory organ in the larval stage of certain *Branchiostoma* species, playing a vital role in larval development and osmoregulation. Its presence underscores the evolutionary and developmental significance of larval structures in the life cycle of lancelets and provides valuable insights into the evolutionary history of chordates.