

Varying aspects of tick bites

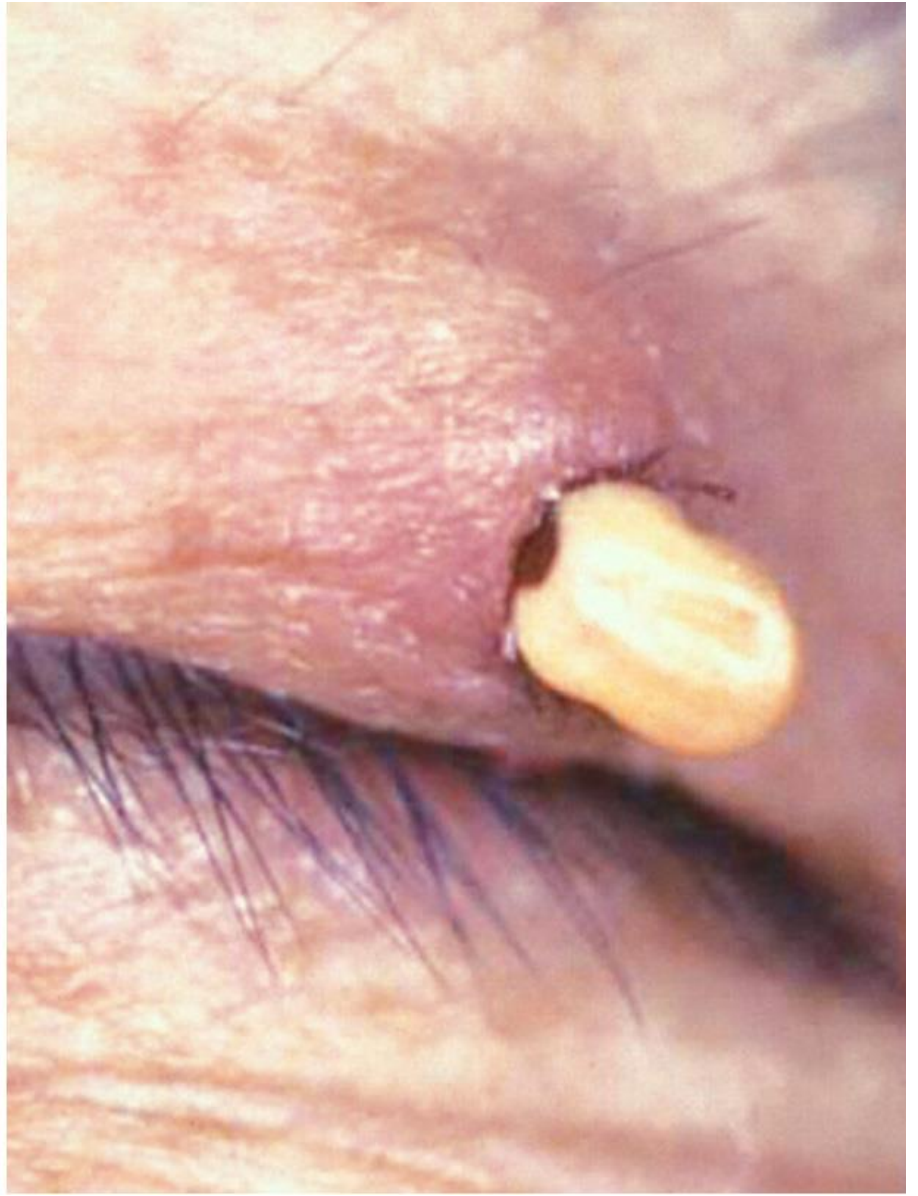
Tick clings onto a blade of grass in the field or mountain, and waits for a person or animal to brush by so it can climb aboard. Once on board, the tick migrates to a warm and moist location on the body, often hidden from view. The tick commonly bites a person on the thigh, waist or abdomen, but they can attach themselves to any part of the body, including the genital and perianal regions. The tick bites the skin, and starts feeding. The tick will not detach from a host's skin until it's completed a blood meal. The period of blood suckling is 1 to 2 weeks. Tick bites are commonly painless. The salivary gland of the tick characteristically secretes substances with anticoagulative and anesthetic activities. There are four developmental stages: ovum, larva, nymph and adult. The larva (around 0.2 mm in size) and nymph (around 1 mm in size) have 3 pairs of legs, while adults (around 2-5 mm in size) have 4 pairs of legs. After suckling the blood, the size of the adult tick doubles.

Tick-borne diseases include Q fever, ehrlichiosis, Rocky mountain spotted fever, Japanese spotted fever, severe fever thrombocytopenia syndrome (SFTS), Russian tick-borne encephalitis, Crimea-Congo hemorrhagic fever, tularemia, relapsing fever, Lyme disease and babesiosis.

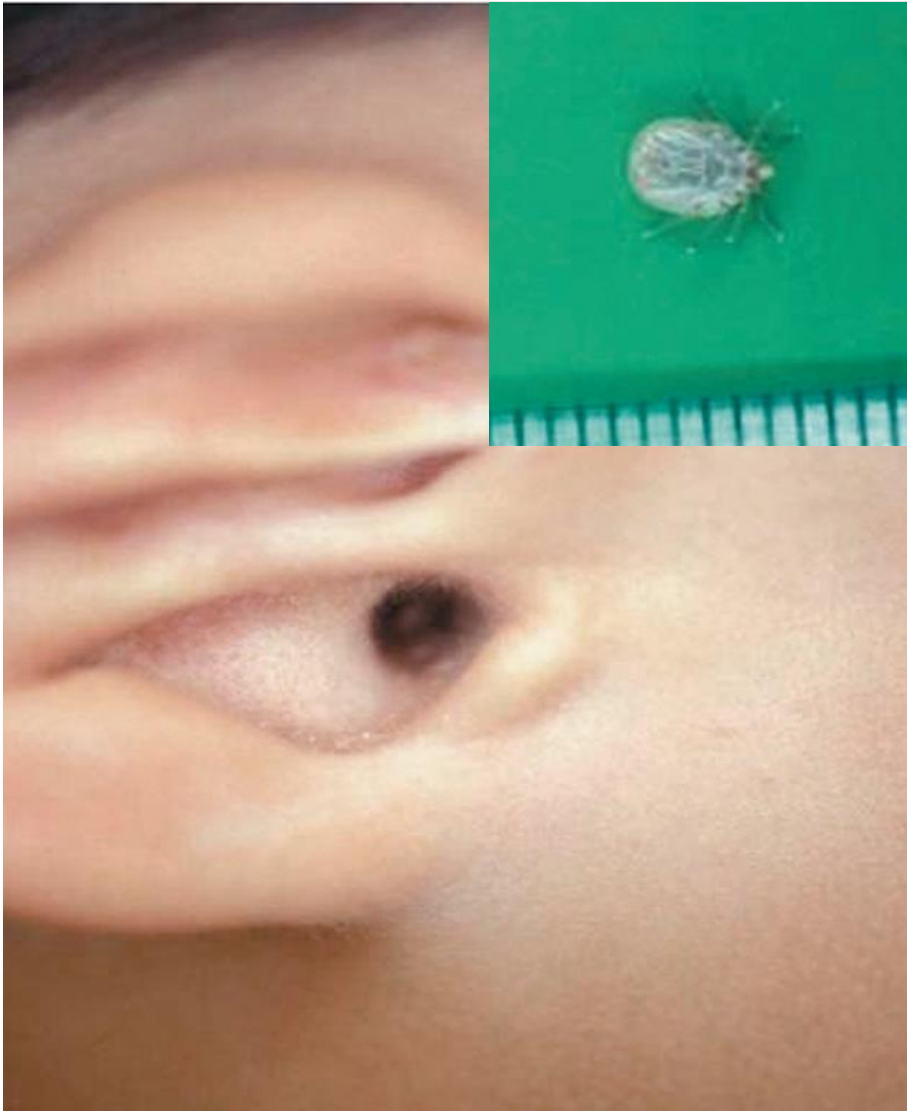
Ref.: Sullivan D. Tick bites: identification, symptoms, and treatment options. Healthline 2023. <https://www.healthline.com/health/tick-bites>



Amblyomma testudinarium stuck on the vulva (left) and *Ixodes persulcatus* stuck on the abdomen (right). Adult ticks after blood sucking, 2.5 cm in size (left) and 1.5 cm in size (right). *A. testudinarium* often sticks the genitalia or around the anus. *I. persulcatus* mediates Lyme disease.



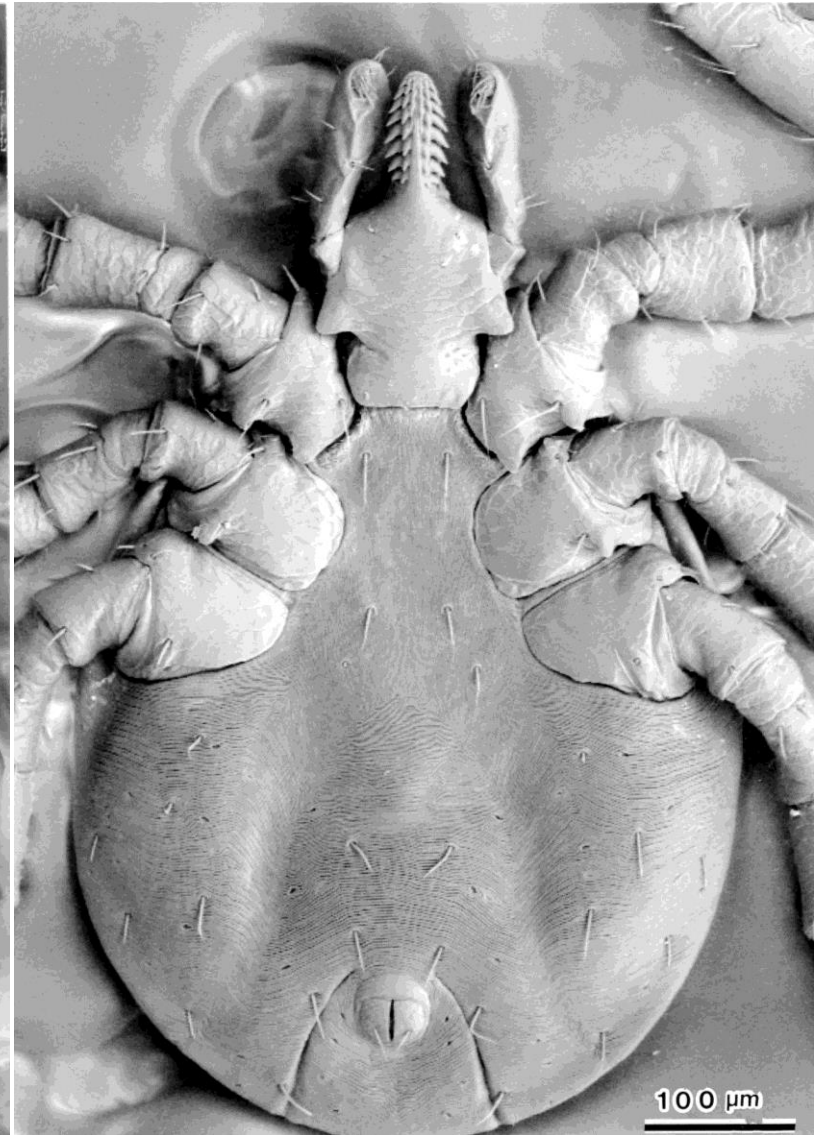
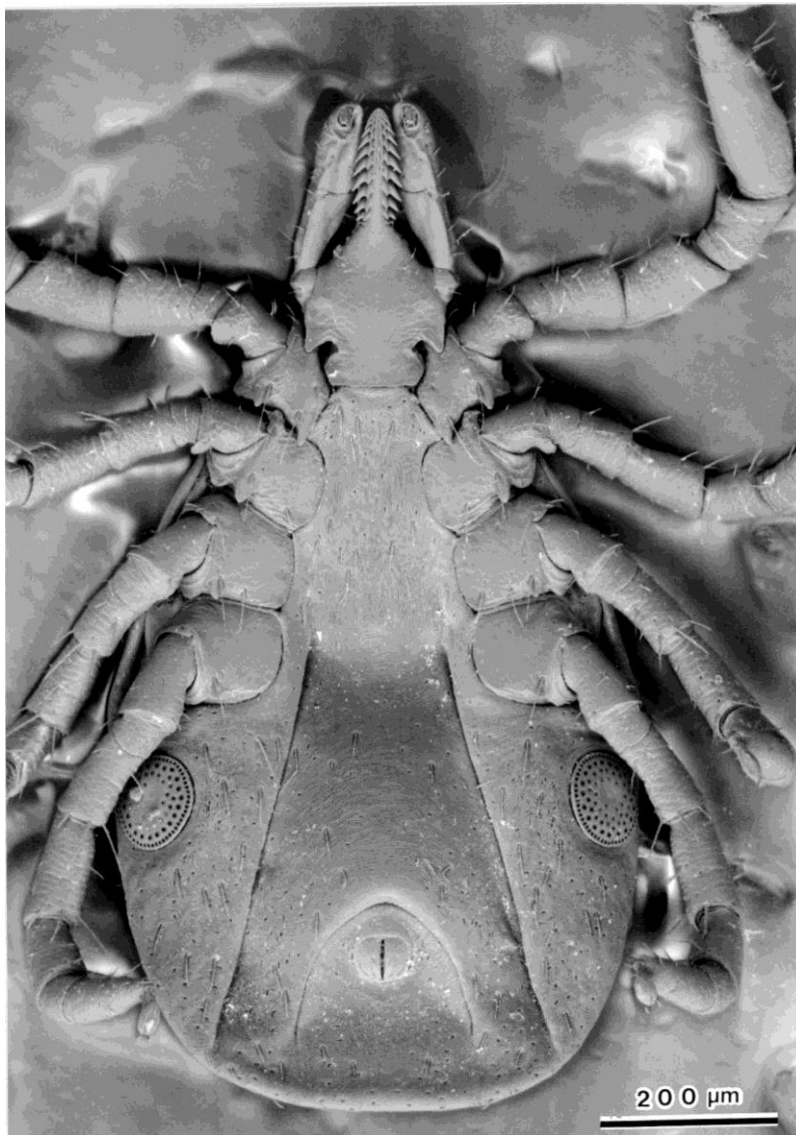
Two types of ticks. Left: *Turdus celaenops*, right: *Ixodes ovatus*



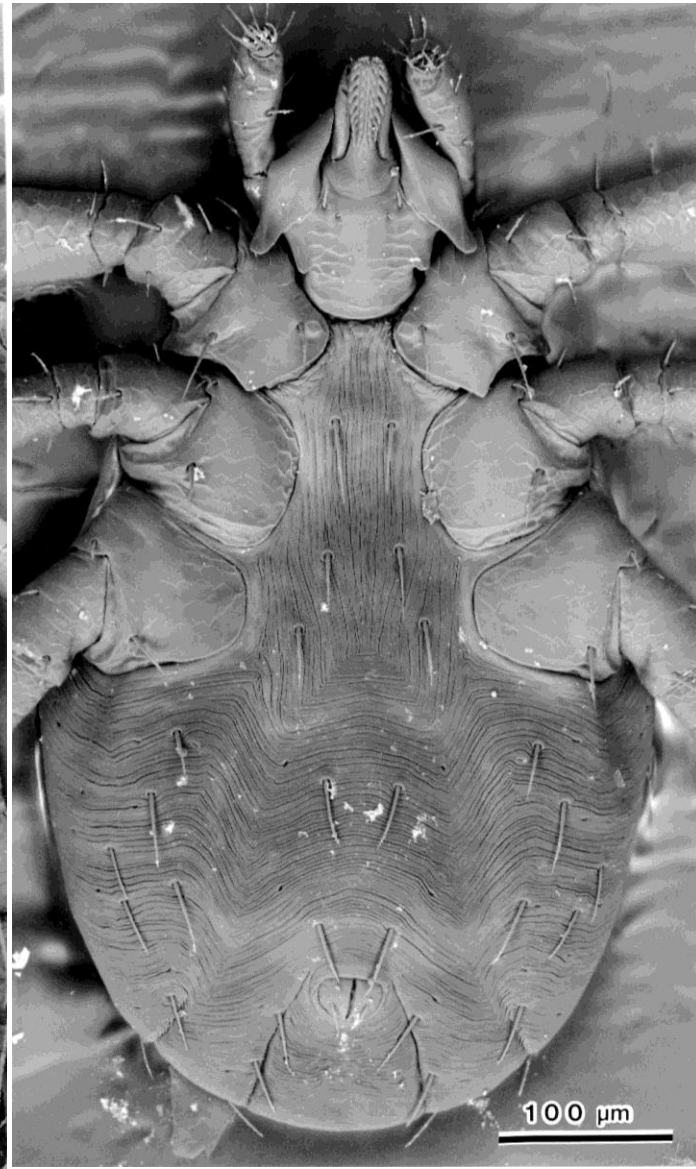
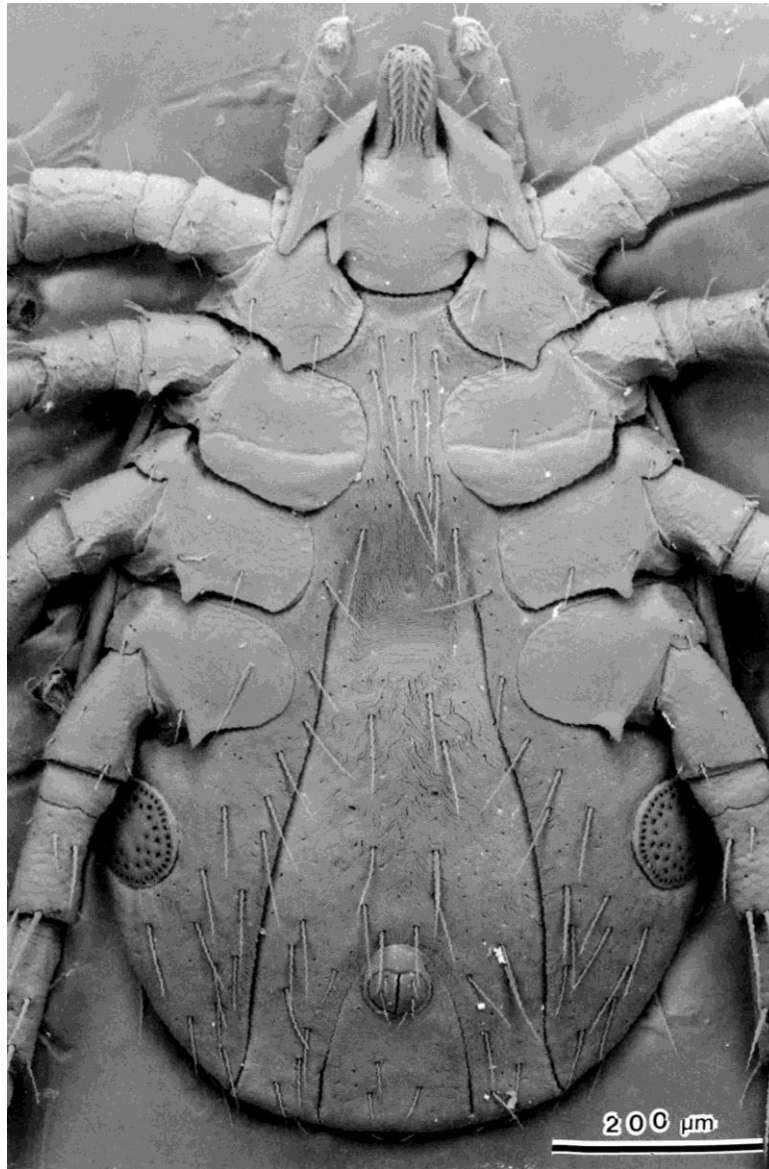
Haemaphysalis longicornis (4 mm in size) sticking the ear of a child (left) and *Haemaphysalis flava* (2 mm in size) sticking the abdomen of an adult (right). The larva of *H. flava* (1 mm in size) may transmit Japanese spotted fever.



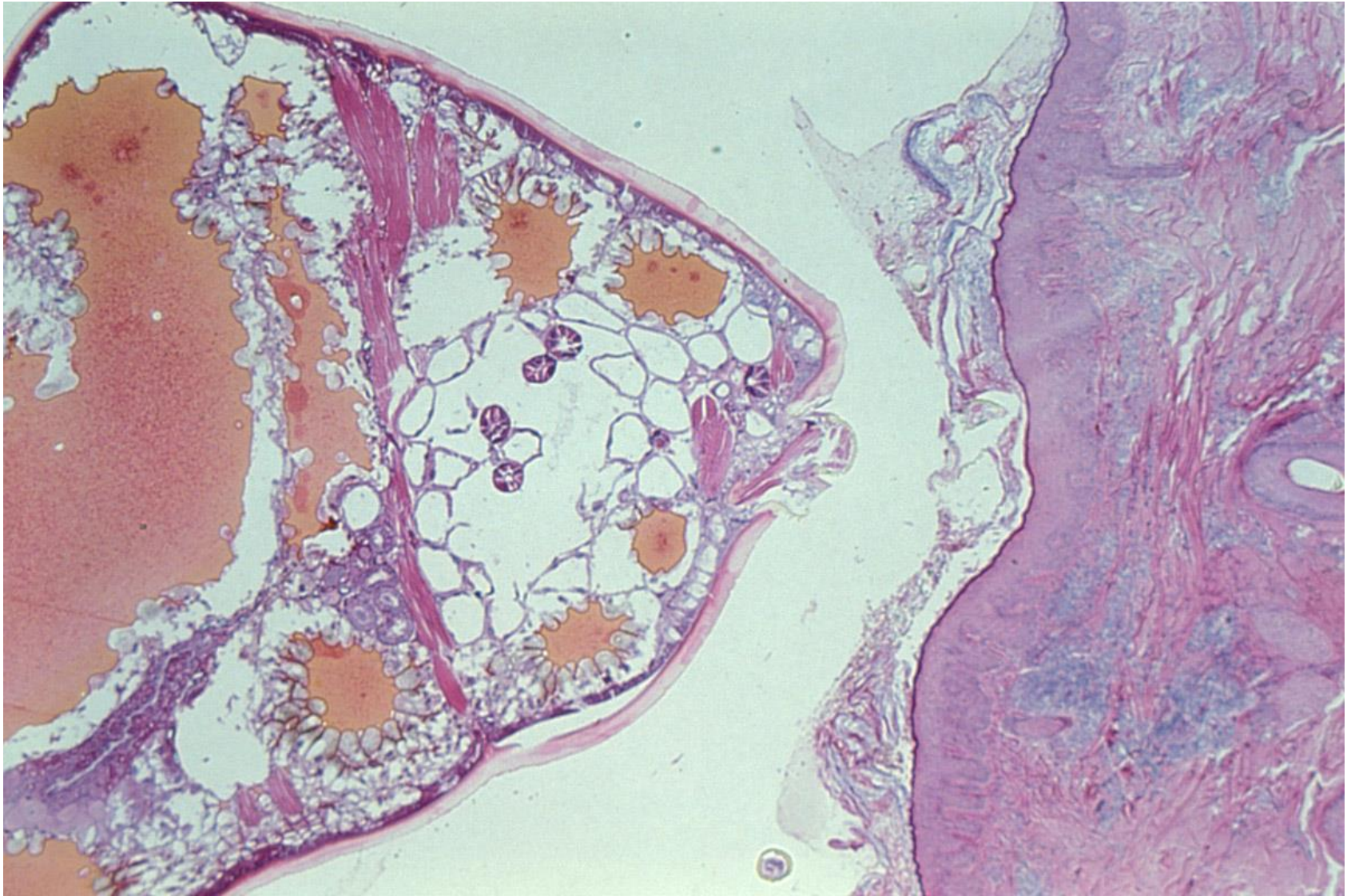
Ixodes holocyclus bite in Australia. Australian paralysis tick causes paralysis by injecting a neurotoxin (holocyclotoxin) into its host. It is usually found in a 20-kilometer-wide band following the eastern coastline of Australia. The Japanese female patient shows facial paralysis caused by the tick bite on the scalp. Inset displays an adult tick.



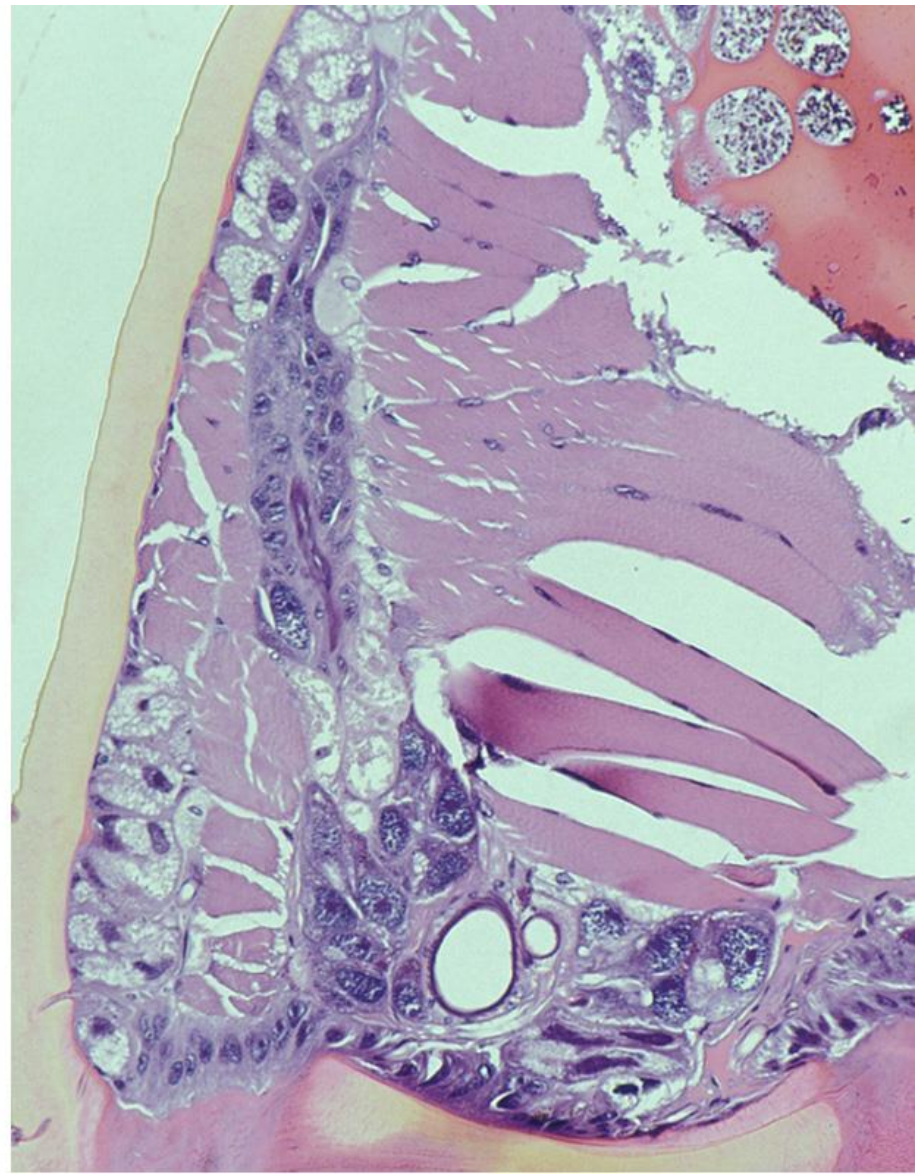
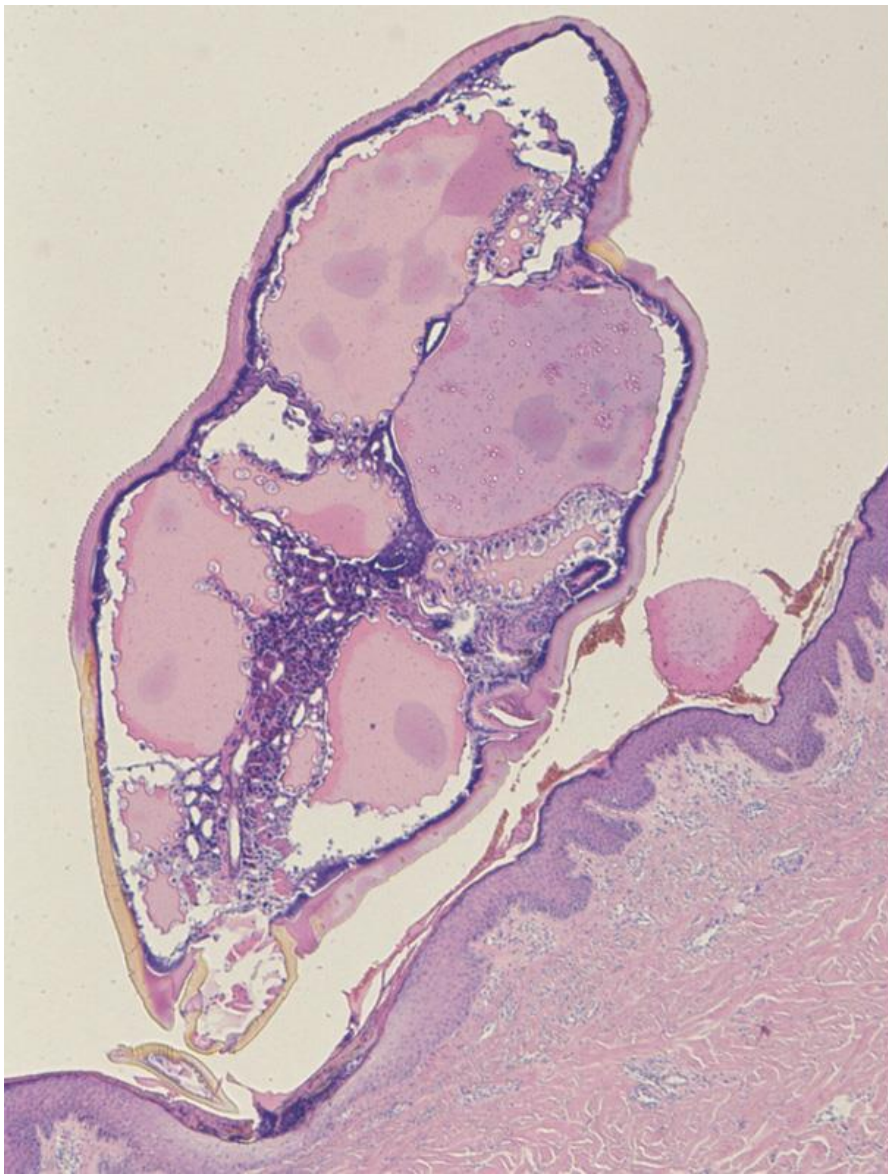
Scanning electron micrographs of *Ixodes persulcatus*. Left: nymph, right: larva. The nymph has four pairs of legs, while the larva has three pairs of legs.



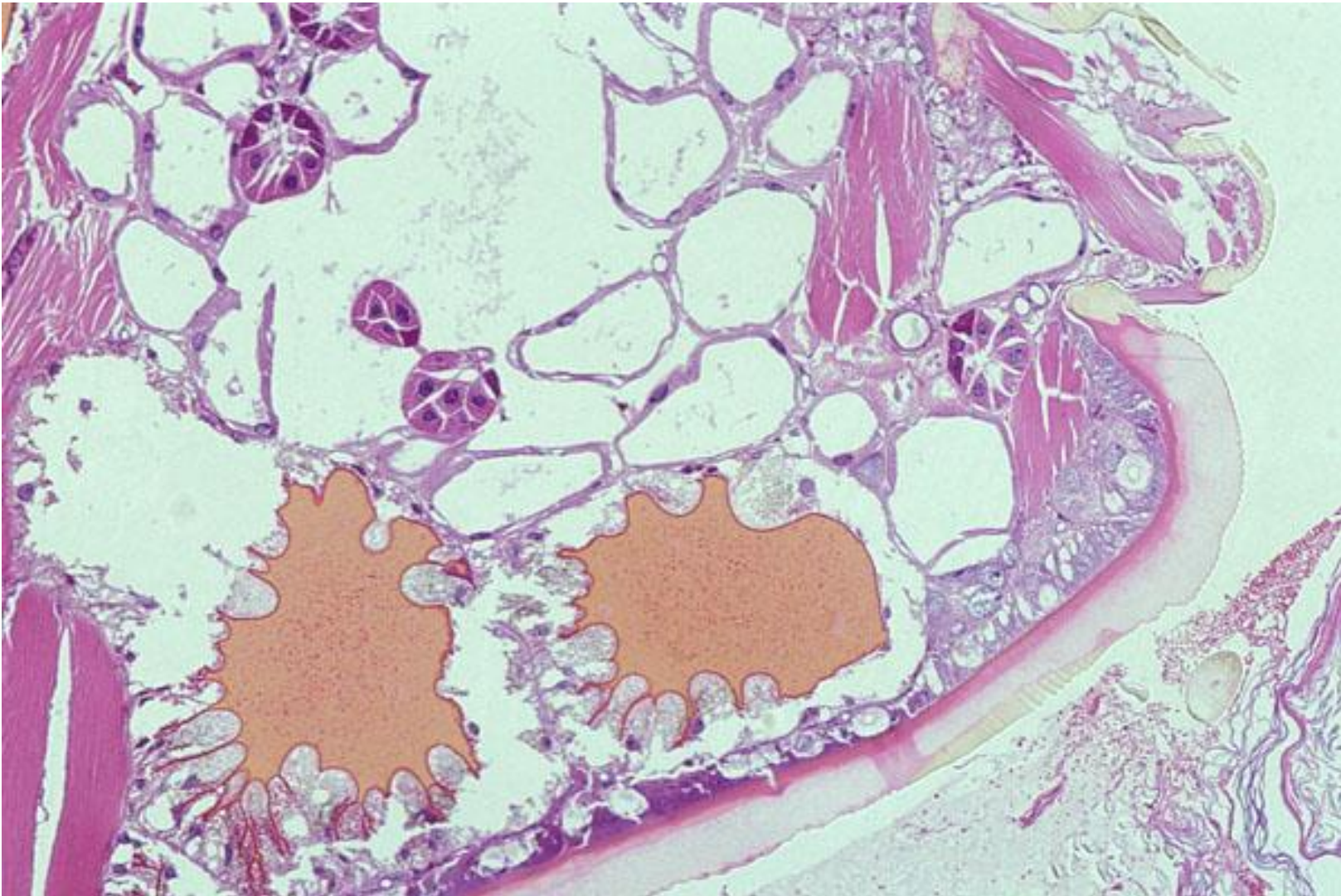
Scanning electron micrographs of *Ixodes ovatus*. Left: nymph, right: larva. The nymph has four pairs of legs, while the larva has three pairs of legs.



Skin biopsy of tick bite (H&E). The gut lumen of the tick is filled with red blood cells. The tick secretes anticoagulant termed madanin (Madani means the tick in Japanese).



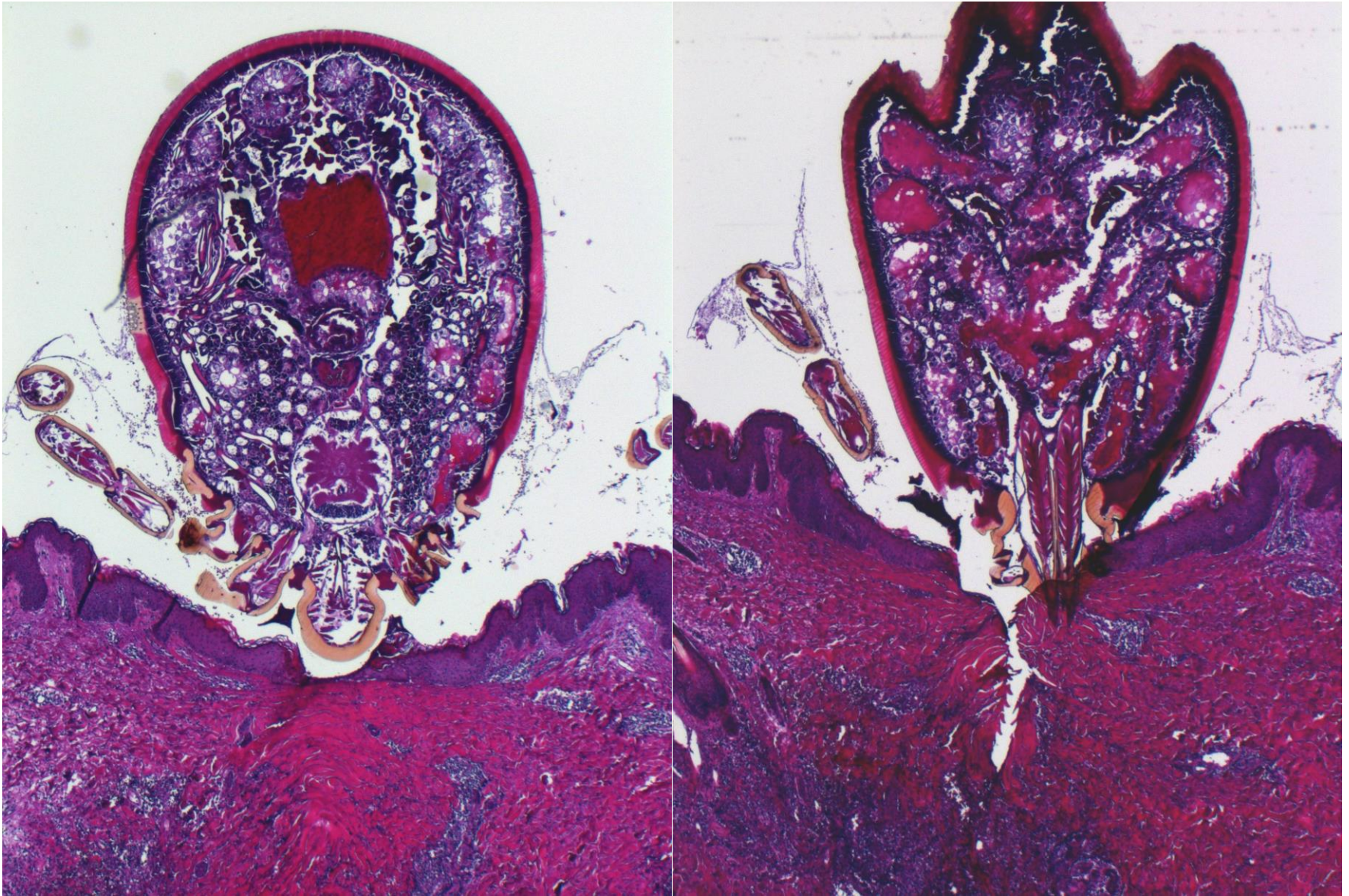
Skin biopsy of tick bite (H&E). The gut lumen of the tick is filled with red blood cells. The gnathostoma part of the tick contains a hypostome to stick the skin. Striated muscles are well developed in the gnathostome. Note that the cells of the tick are very large in size.



Skin biopsy of tick bite (H&E). The gut lumen of the tick is filled with red blood cells. In the gnathostoma part of the tick, striated muscles are well developed. Note that the cells of the tick are very large in size.



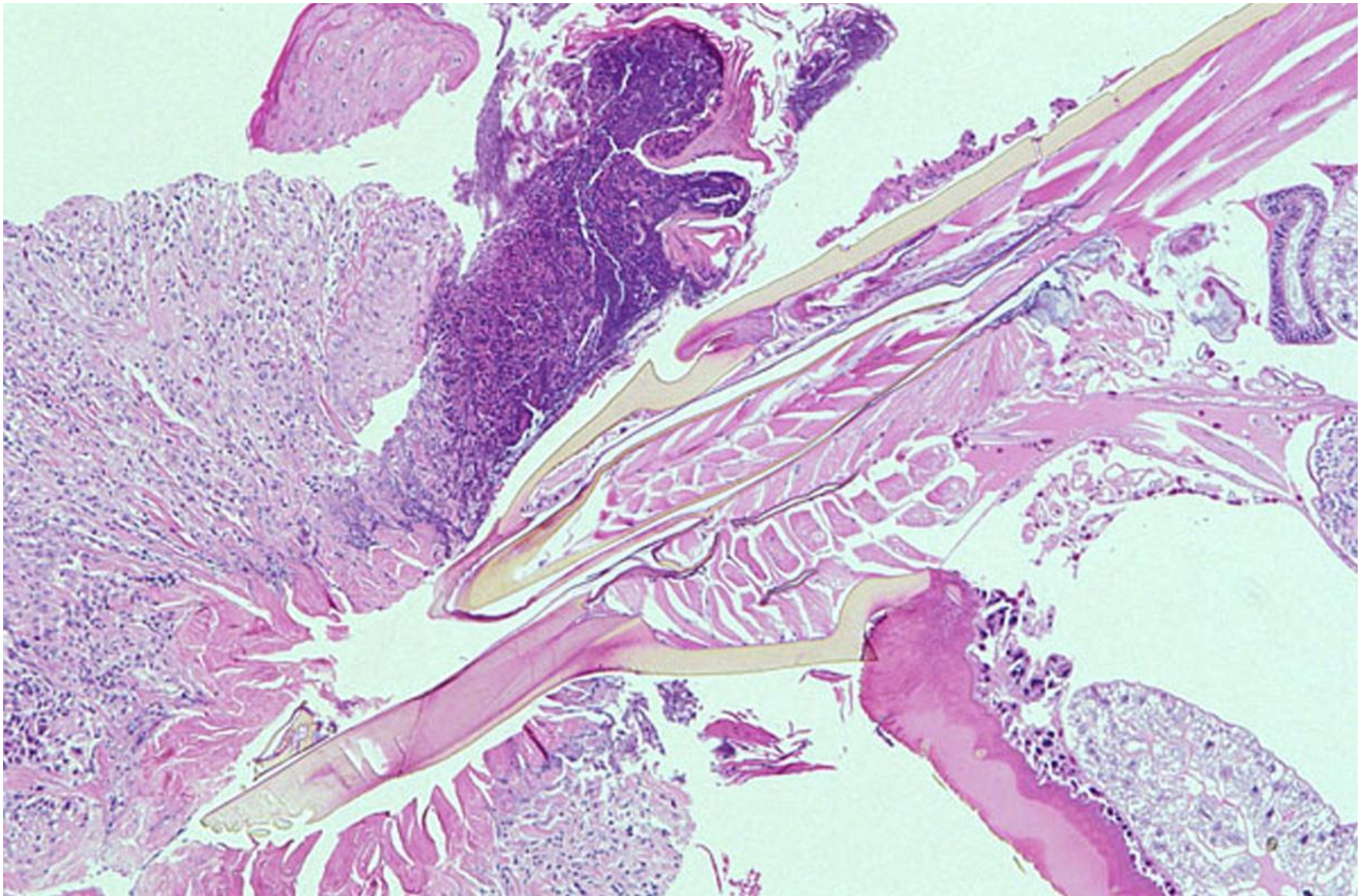
Skin biopsy of tick bite (H&E). The adult tick has four pairs of legs. At the base of the leg, striated muscles are clustered. The gut lumen is filled with red blood cells.



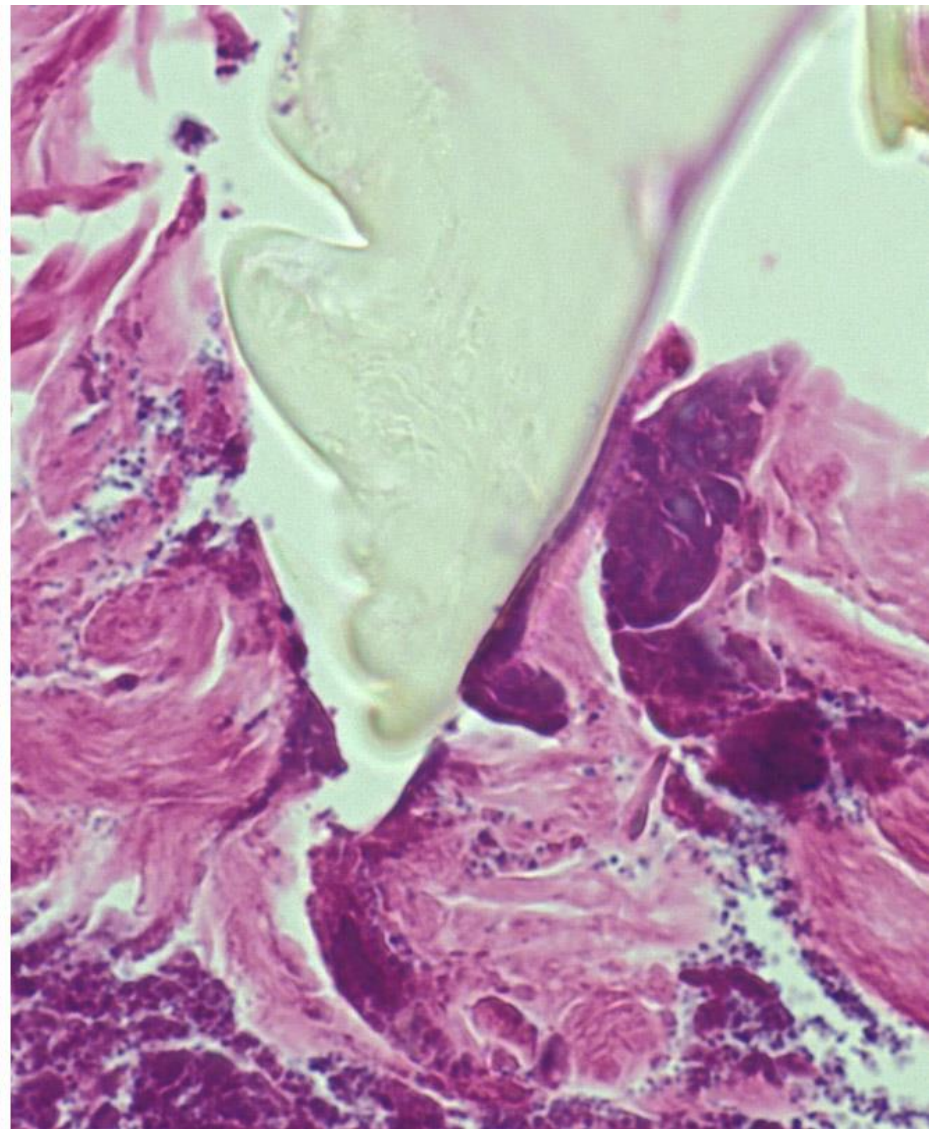
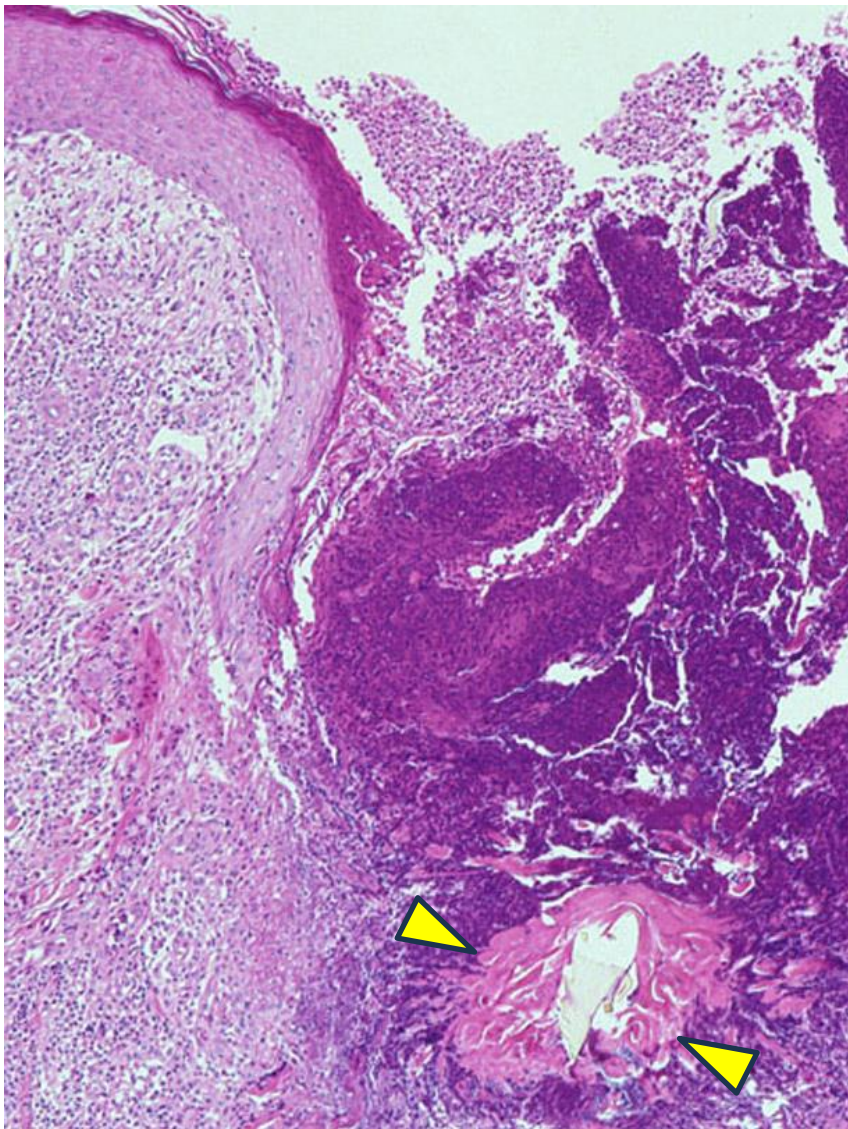
Step sections of the tick stuck to the skin (H&E). The needle-like hypostome is pierced into the dermis. The gut lumen is filled with red blood cells. In the left-sided panel, a brain tissue is observed.



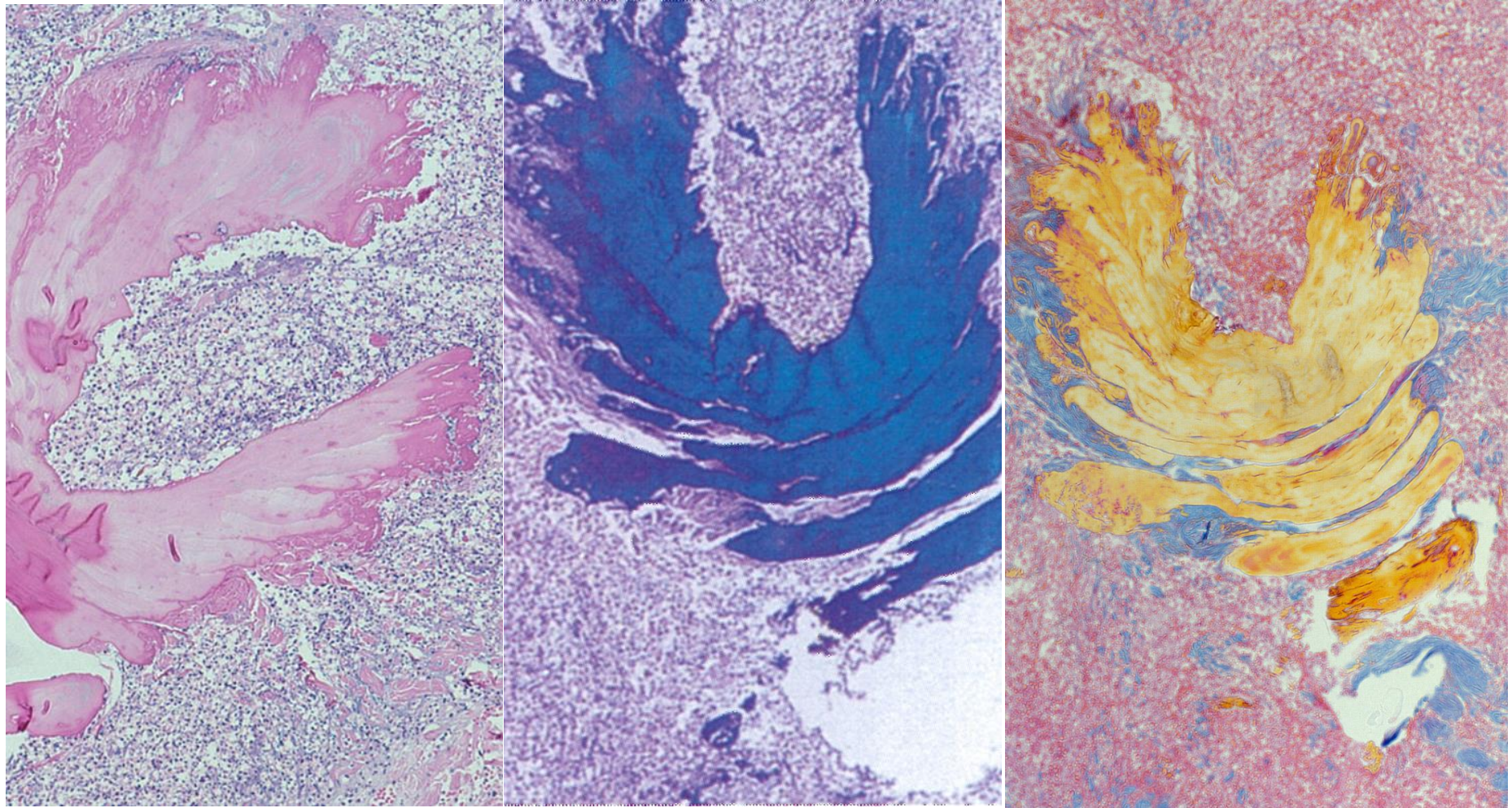
Skin biopsy of tick bite (H&E). In the gnathostoma part of the tick, the hypostome is supported by striated muscles. Small neurons are clustered around the neuropil. It is shown that the brain and peripheral nerves are closely related to the gnathostome components.



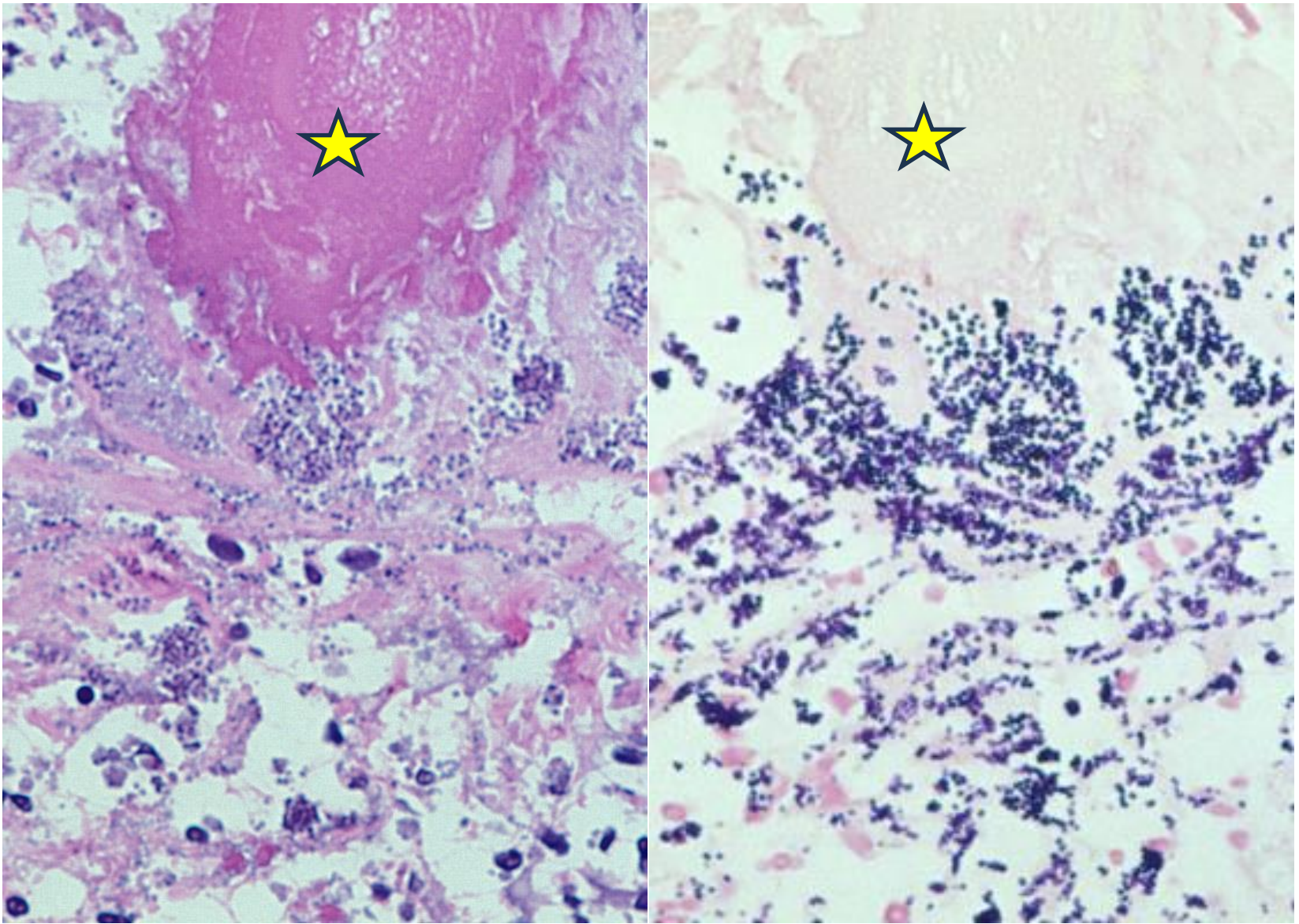
Skin biopsy of tick bite (H&E). The hypostome supported by striated muscle cells pierces into the dermis, and secreted cement-like eosinophilic substances fix the hypostome stuck in the dermis.



Skin biopsy of tick bite (H&E). The tick was mechanically removed by the patient, and at the site of tick bite ulcer, and the remnant of hypostome surrounded by cement-like substances (arrowheads) has provoked marked inflammatory reactions (left). High-powered view demonstrates hypostome and coccal infection (right).



Skin biopsy of tick bite. The cement-like substances, secretions of the salivary gland of the tick, are surrounded by inflammatory cells in the dermis. They stain eosinophilic in H&E (left), blue with LFB-HE staining (center: indicating rich phospholipid components) and orange with Azan stain (right).



Skin biopsy of tick bite (left: H&E, right: Gram). The tick was mechanically removed by the patient. At the site of tick bite ulcer, infection of Gram-positive cocci (Staphylococci) is observed around the cement-like substances (asterisks).