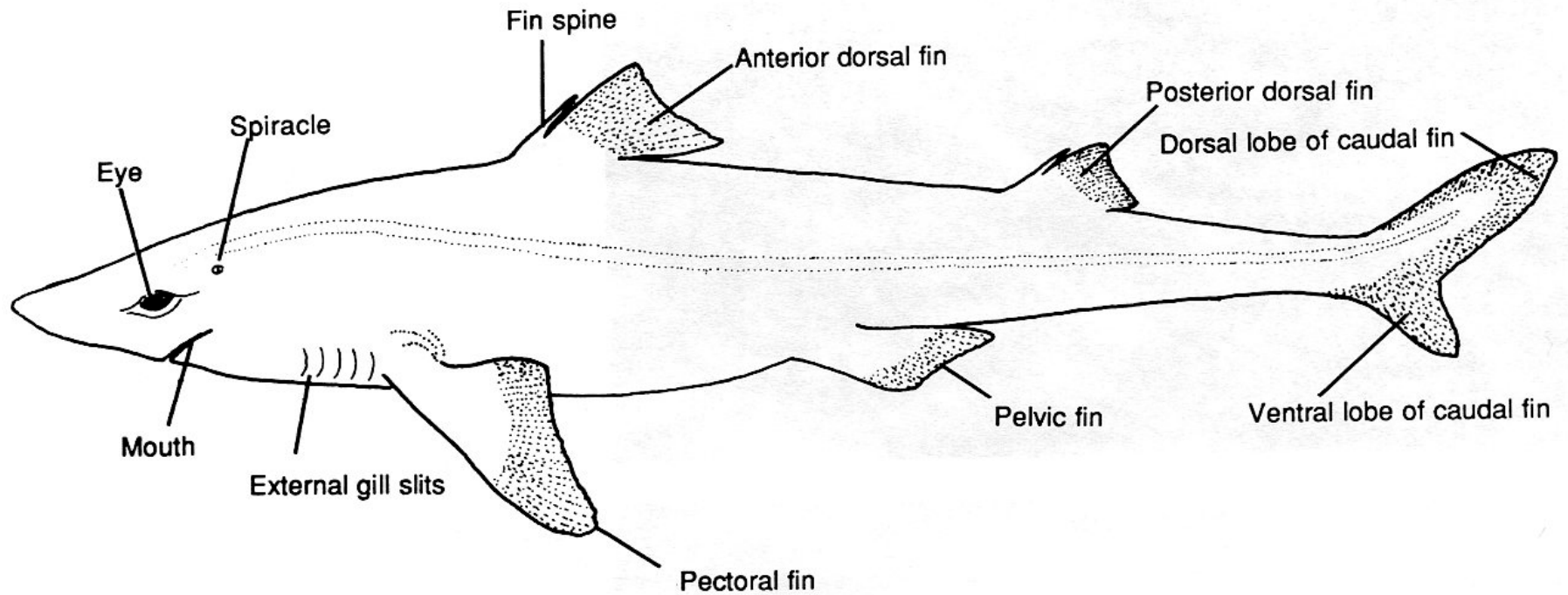
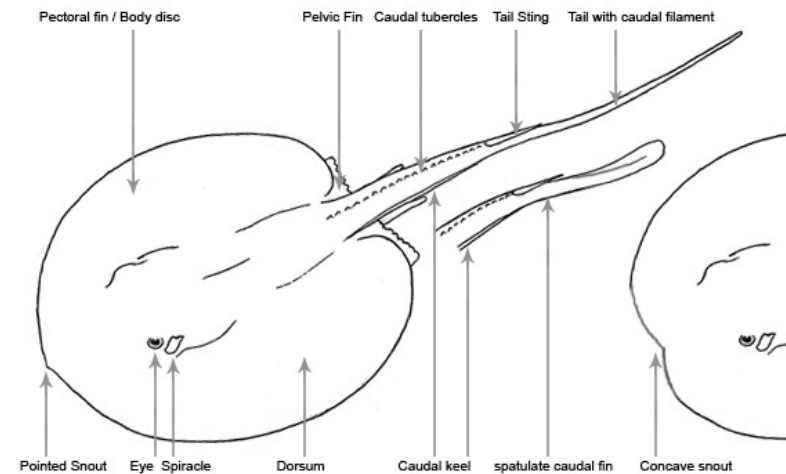
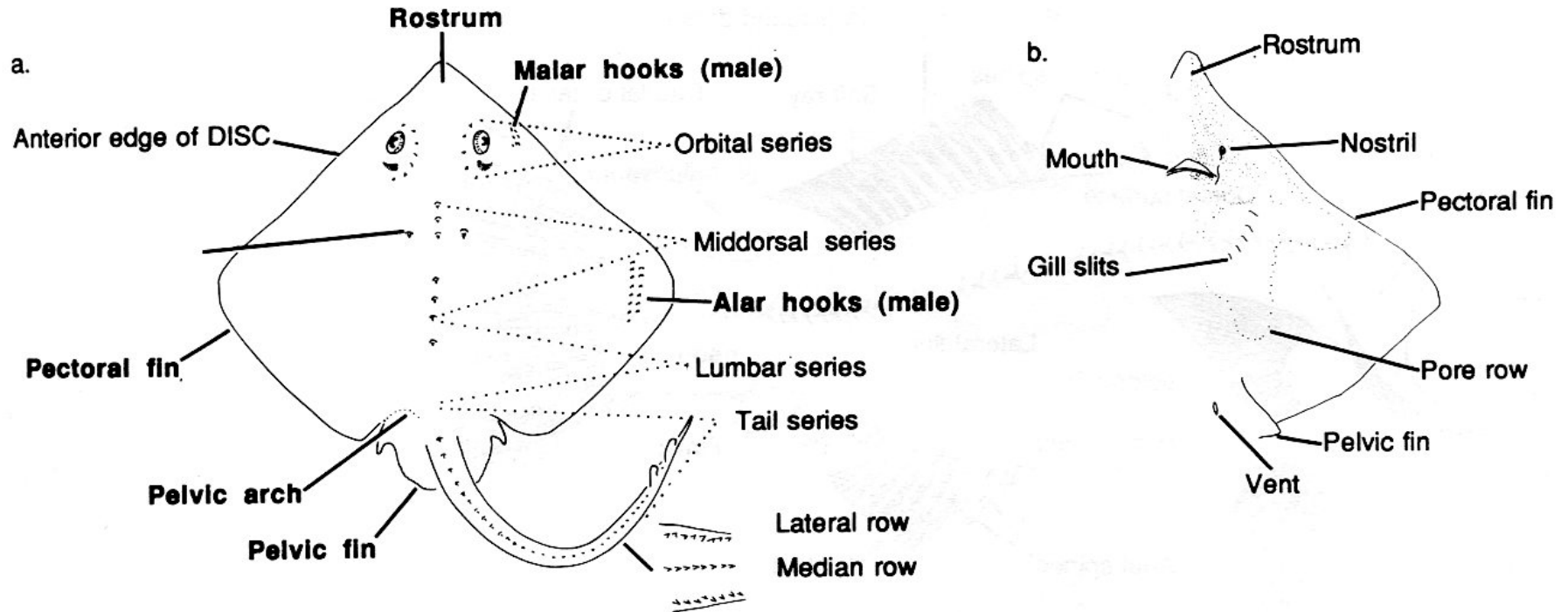


General body morphology: Shark

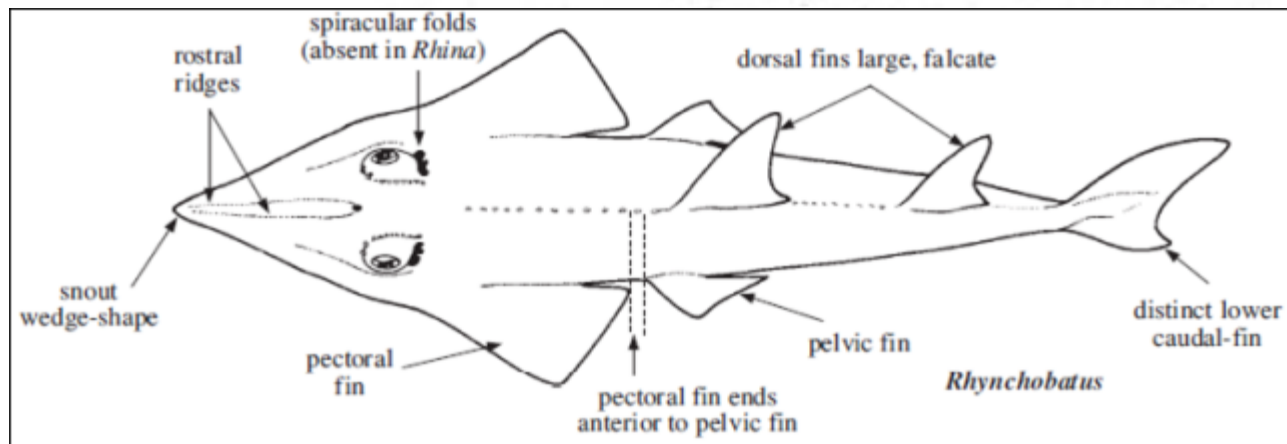
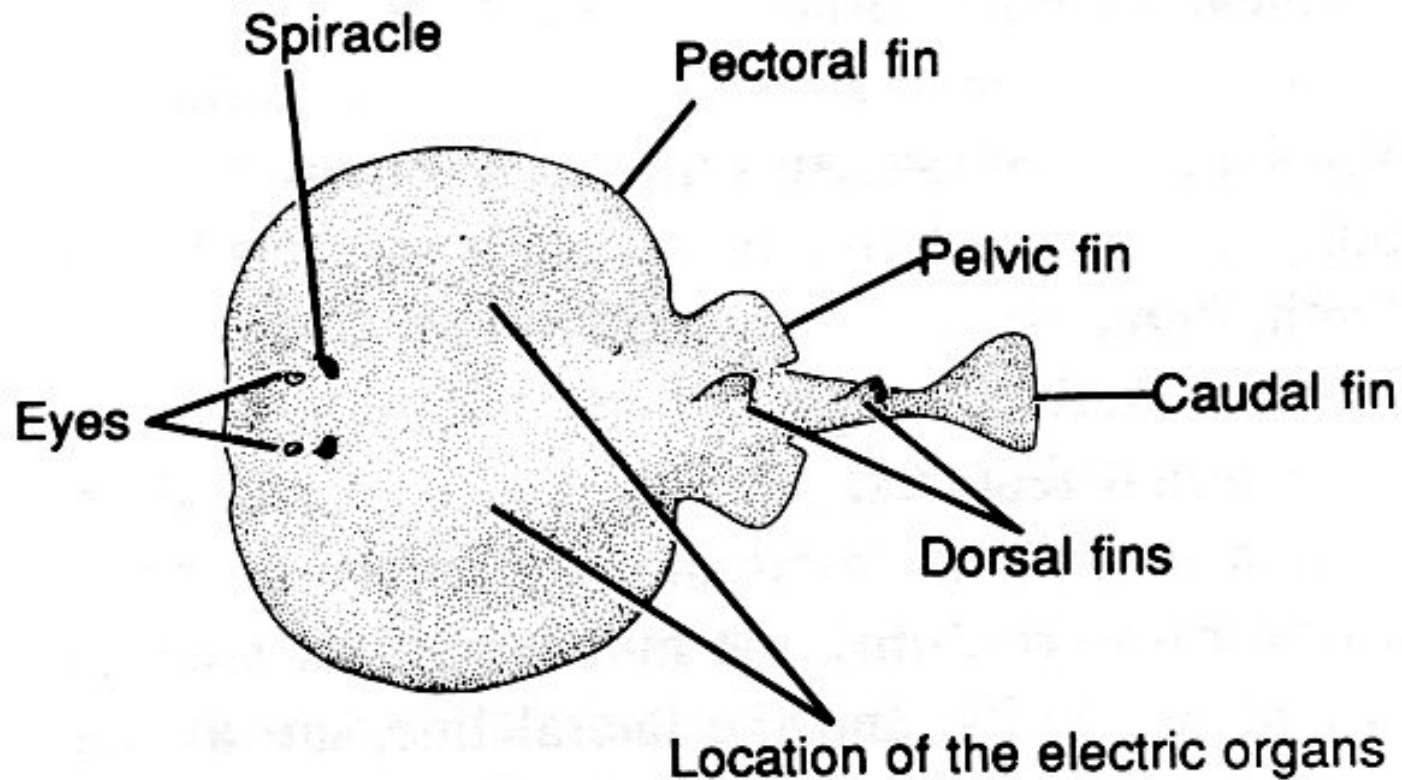


General body morphology: Skate/Ray

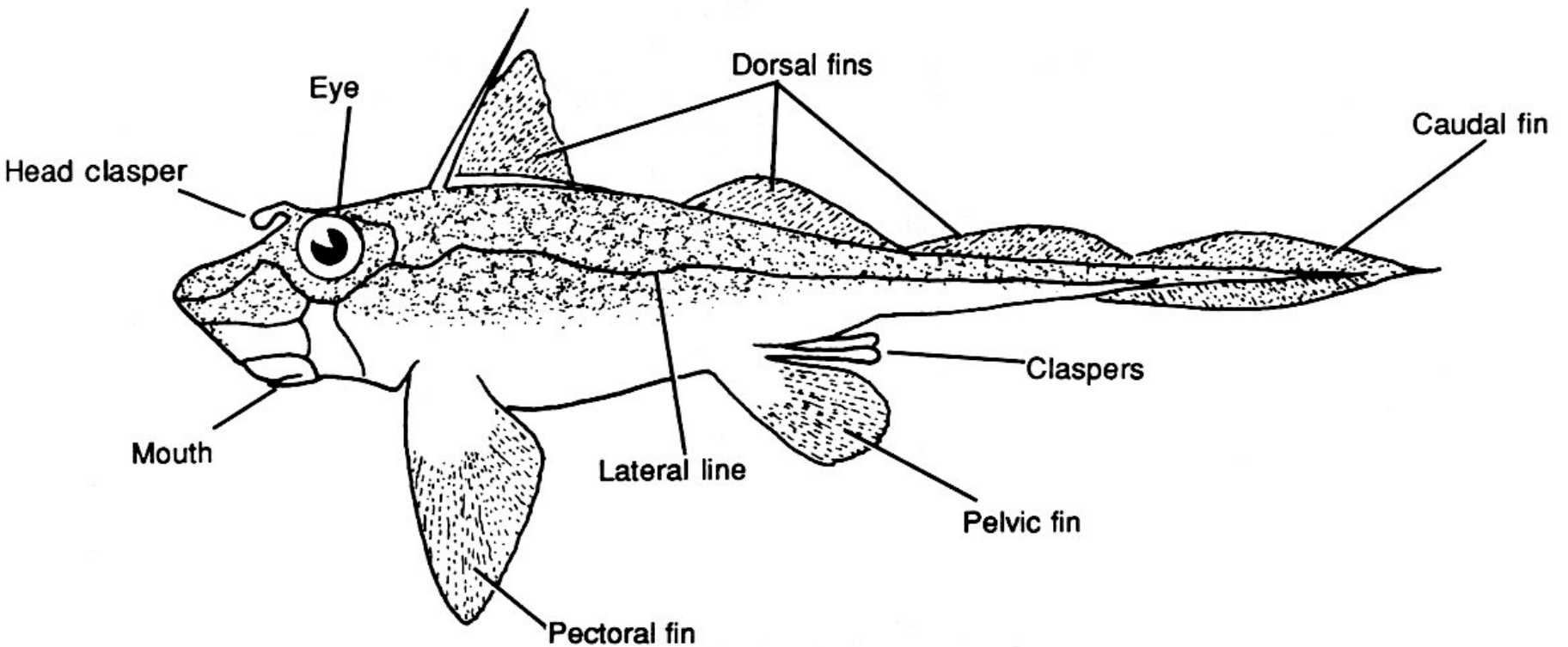


Body plan of a River Stingray (Family Potamotrygonidae)

General body morphology: Torpedo ray



General body morphology: Chimaera



Body forms and cross-sectional morphology

fusiform



tuna, Scombridae



compressiform



sunfish, Centrarchidae



depressiform



skate, Rajidae



anguilliform



eel, Anguillidae



filiform



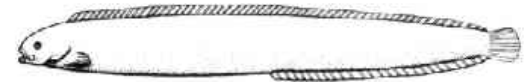
snipe eel, Nemichthyidae



taeniform



gunnel, Pholidae



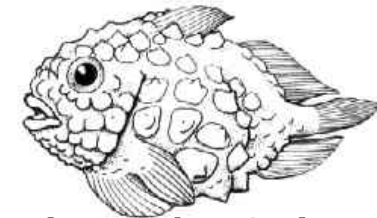
sagittiform



pike, Esocidae

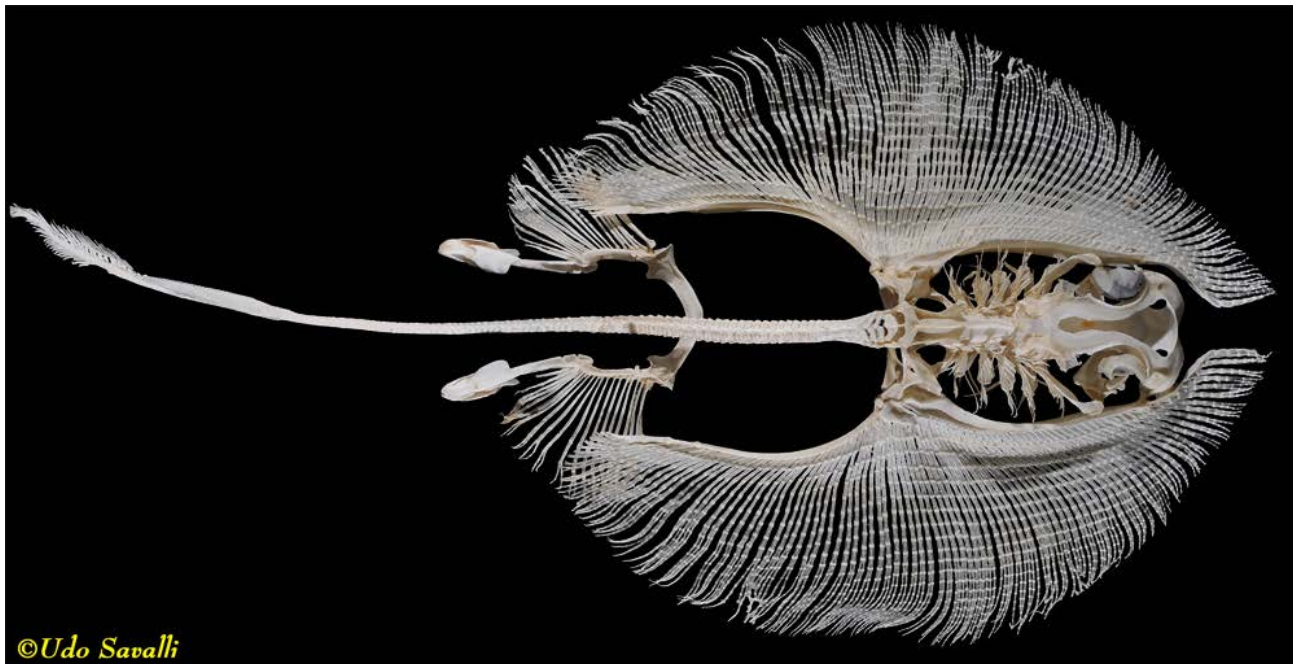


globiform

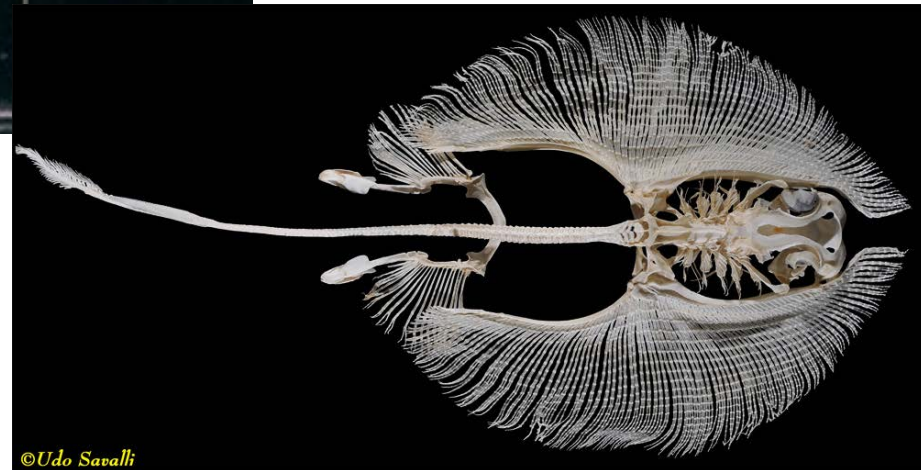
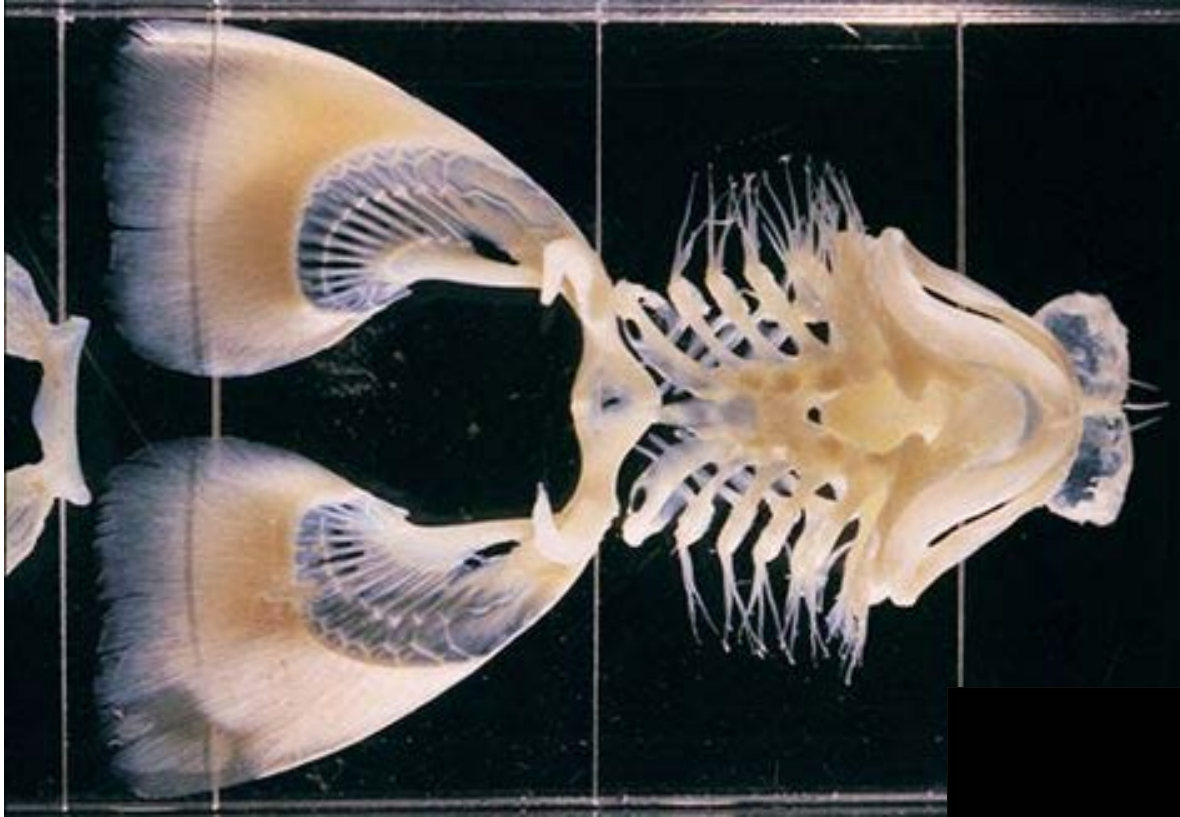


lumpsucker, Cyclopteridae

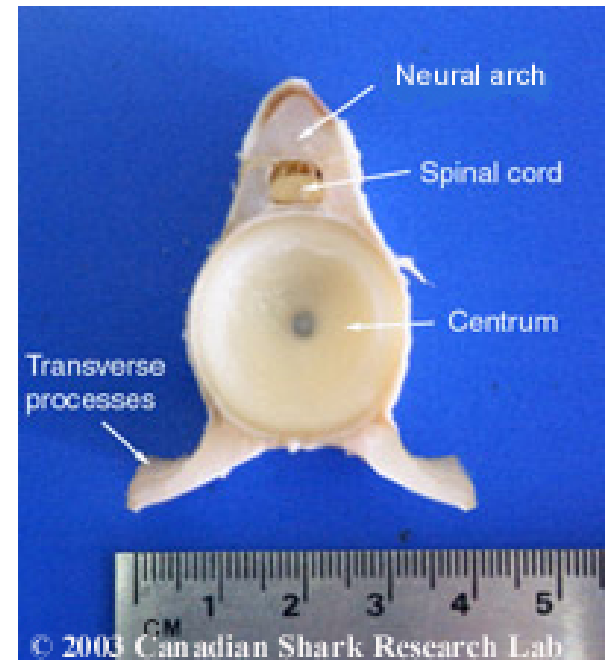
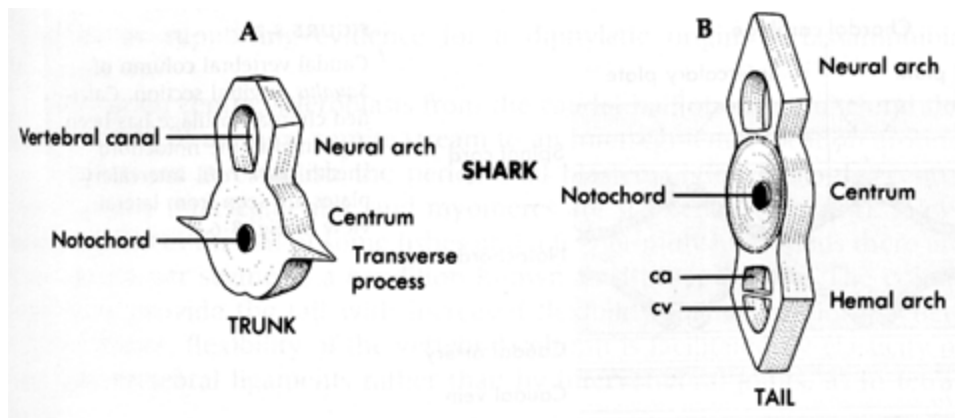
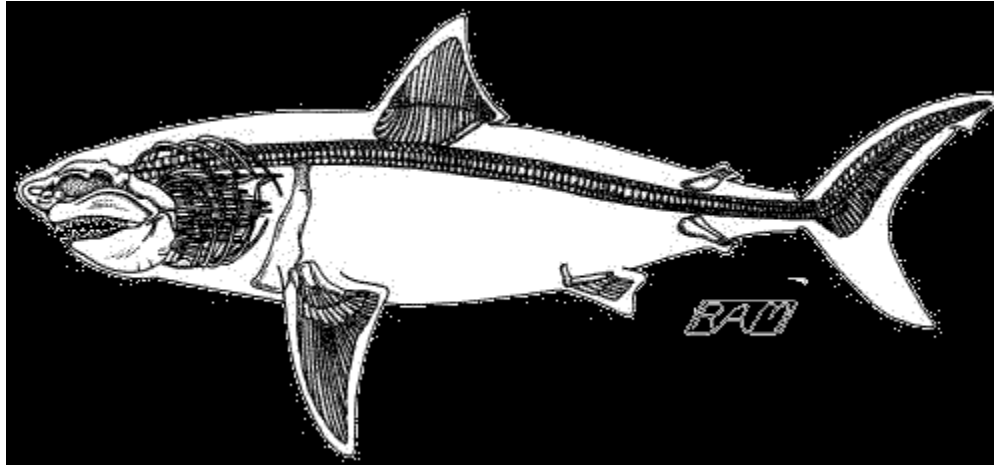
Endoskeleton



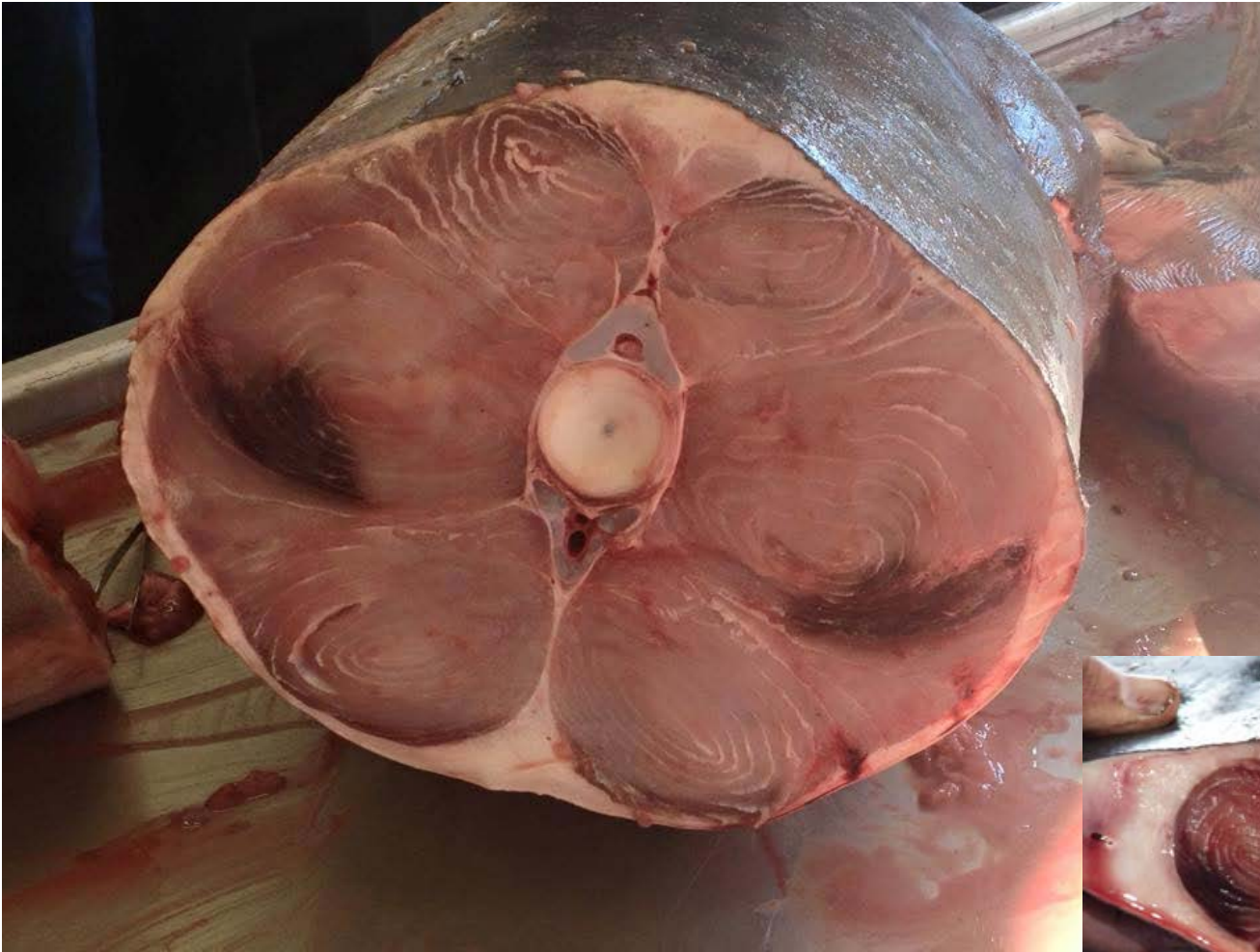
Pectoral and pelvic girdles



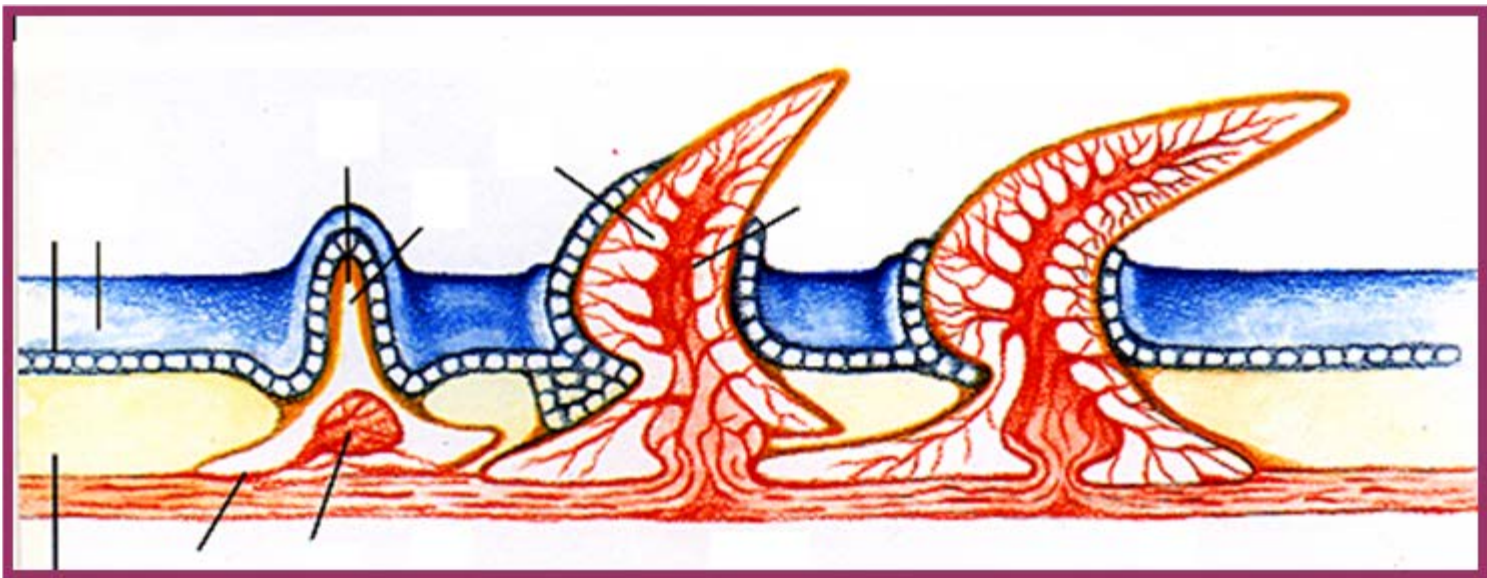
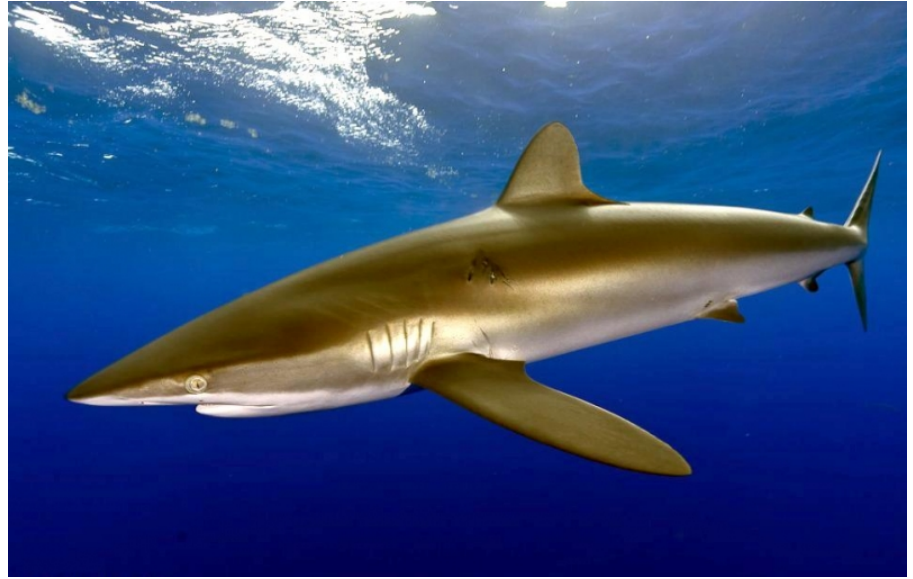
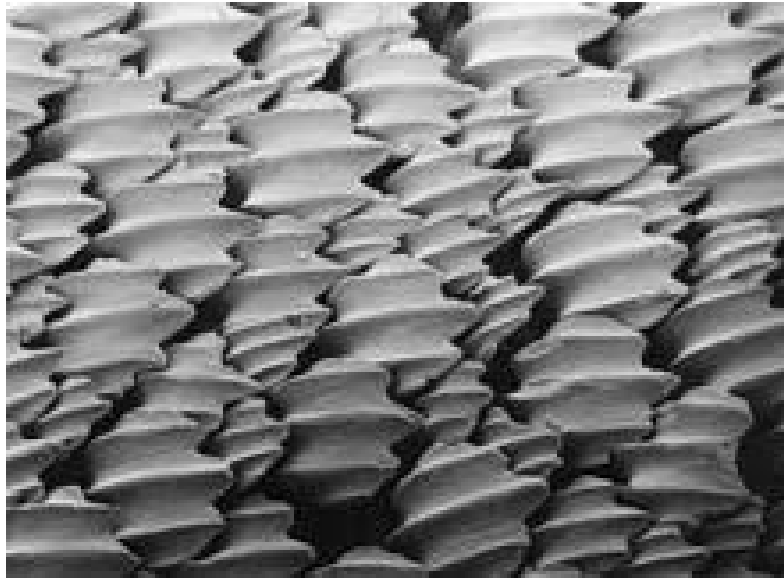
Vertebral column



'Exoskeleton'?



Placoid scales



Protection

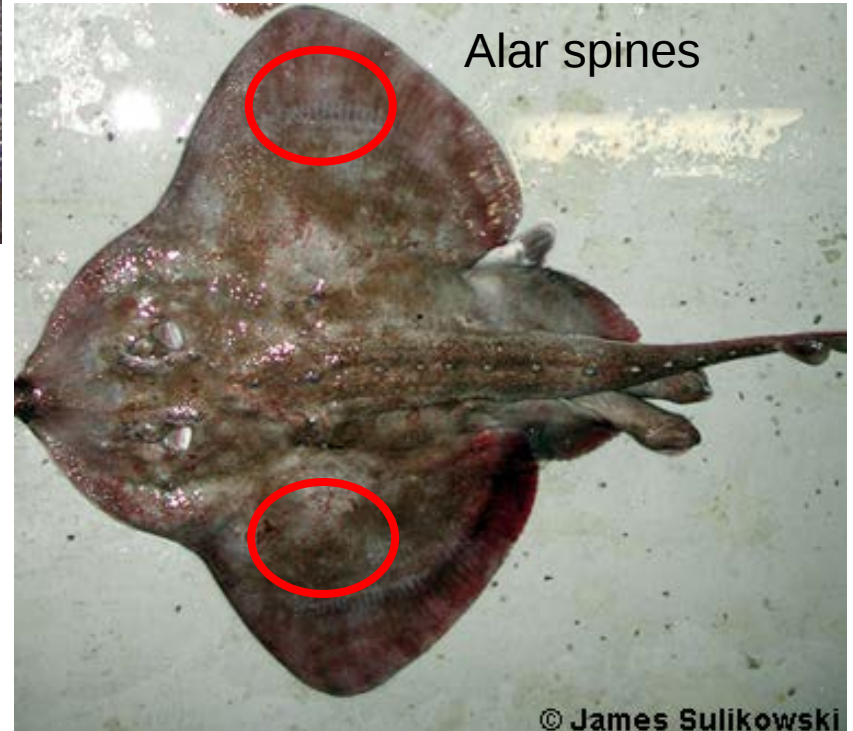


Mating?

Malar spines



Alar spines



Coloration



The Business End

Mouth position:



Inferior

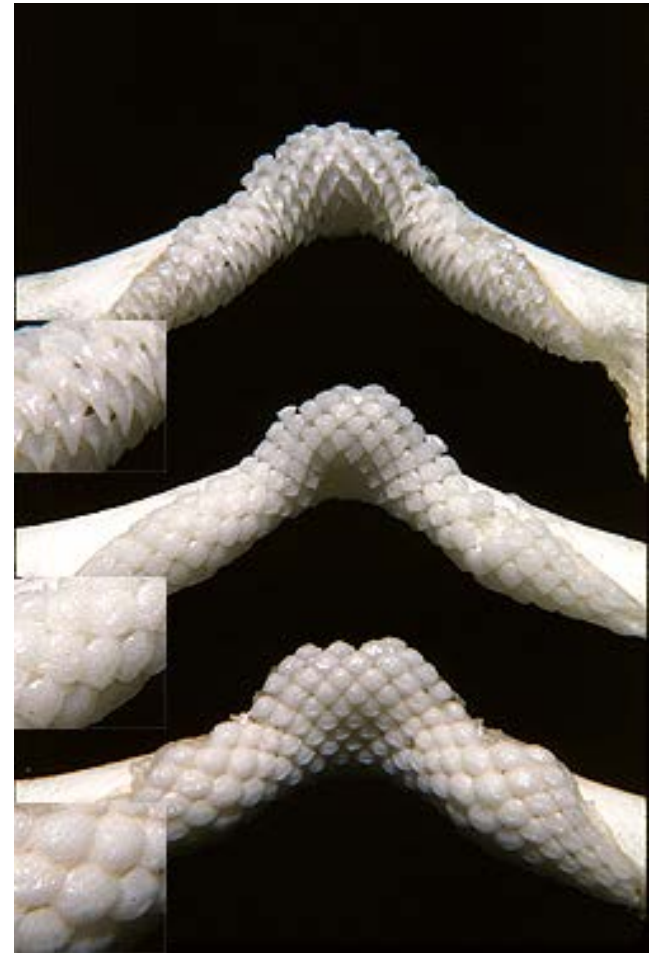
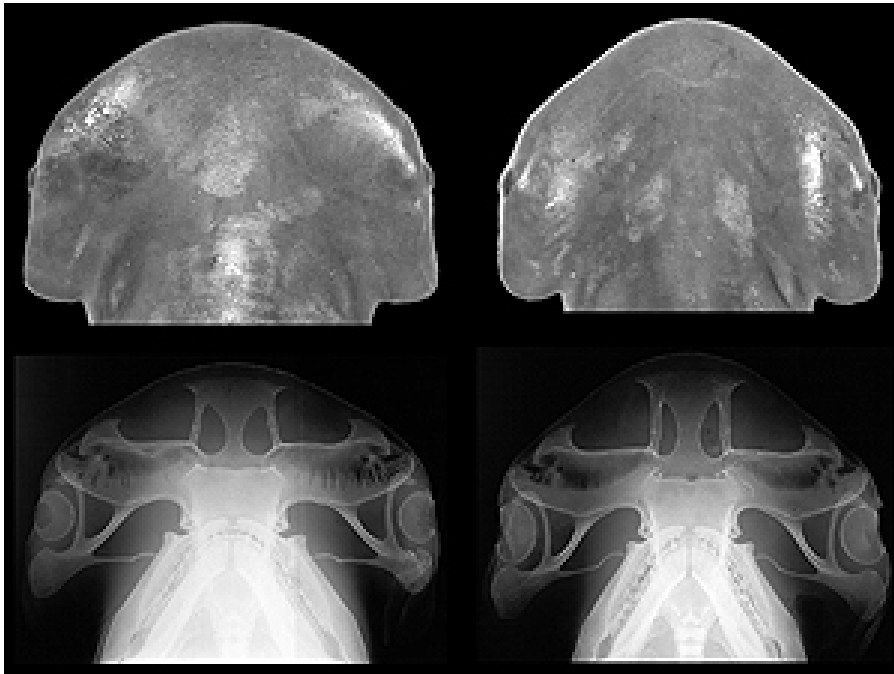


subterminal



terminal

Sexual Dimorphism



Gills

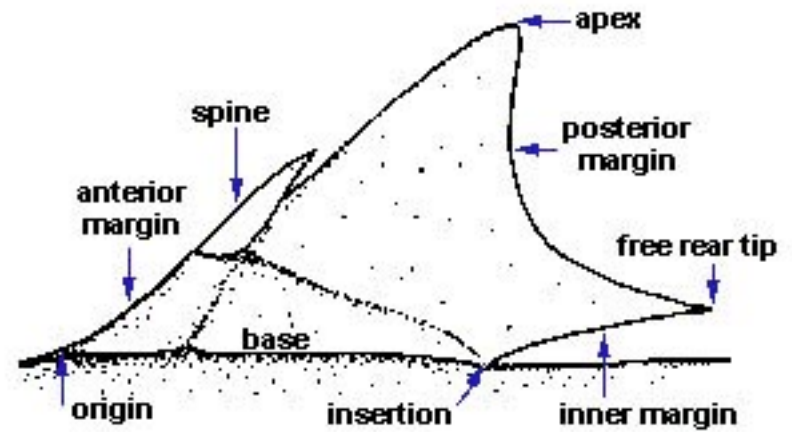


Eye protection



Dorsal fins (unpaired fins)

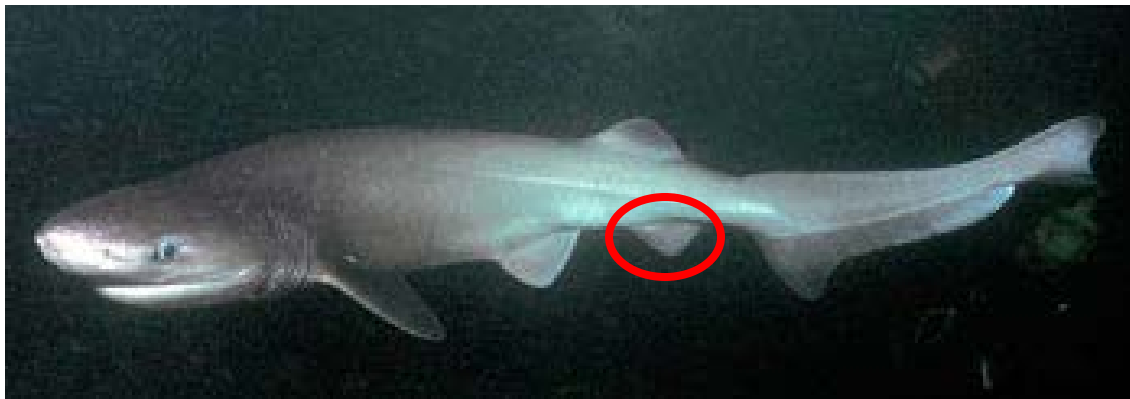
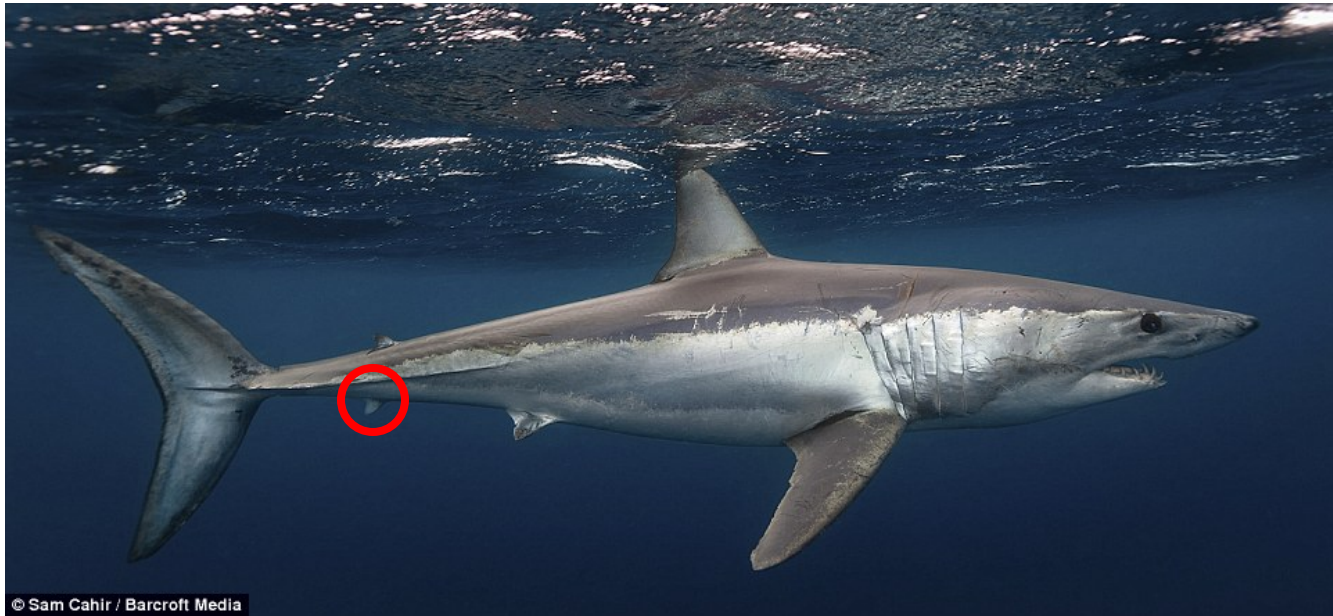
- Stabilization
- Locomotion
- Protection
- Communication?
- Mating?
- Terrorizing humans?



Dorsal fins (unpaired fins)

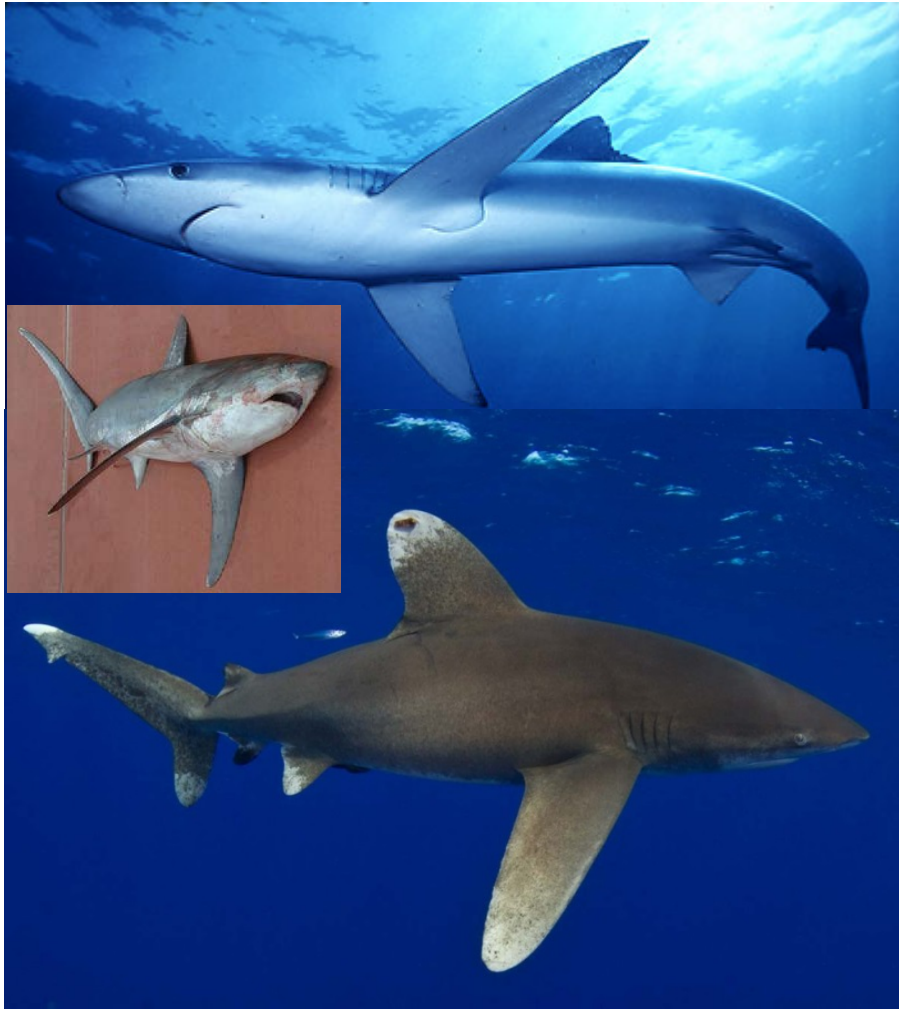


Anal fin (unpaired fins)



Pectoral fins (paired fins)

- Stabilization
- Locomotion
- Orientation
- Communication?
- Mating



Pelvic fins (paired fins)

- Stabilization
- Locomotion (skates)
- Mating

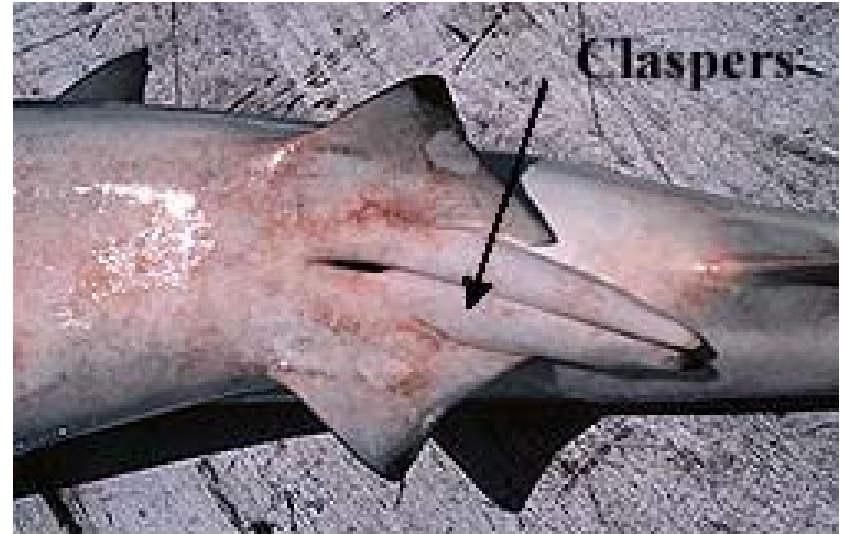
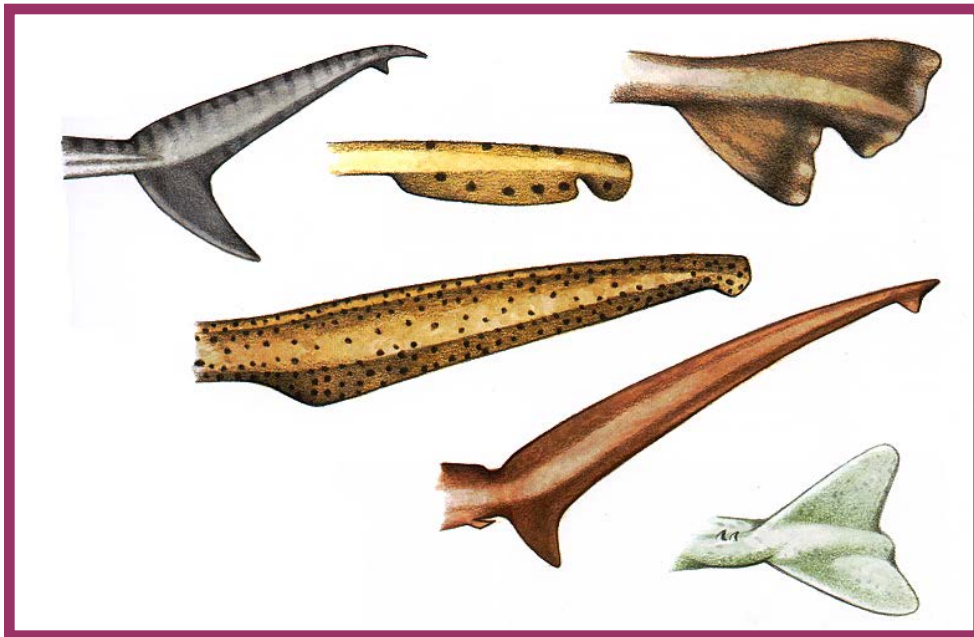
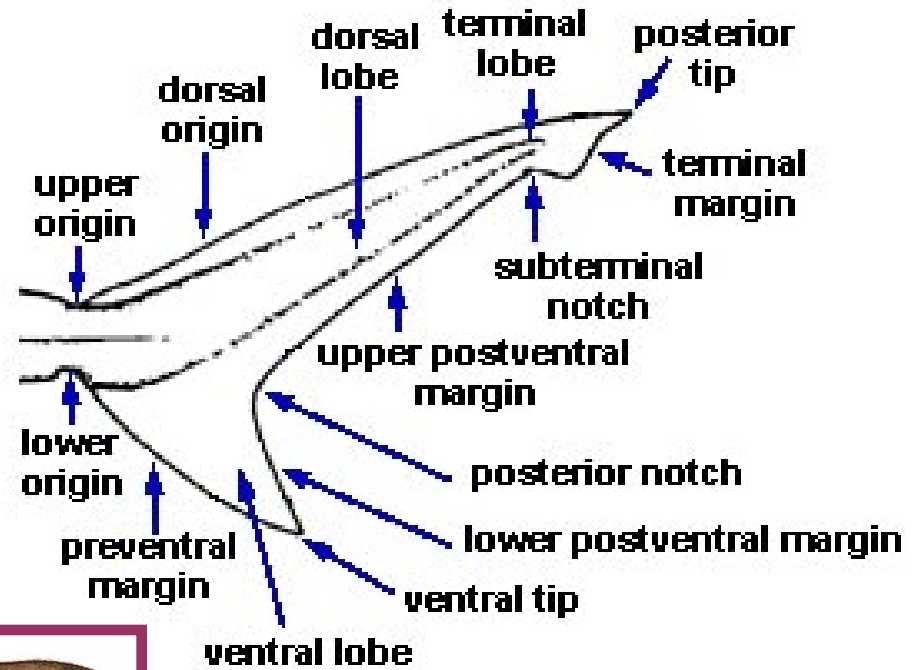
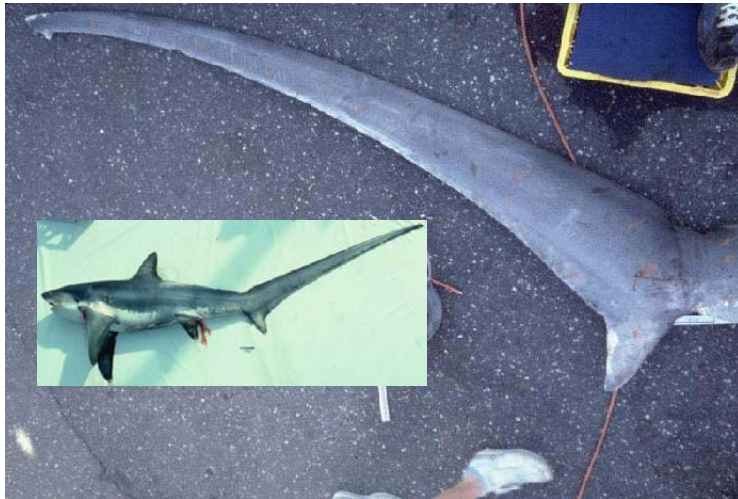


Photo by George Burgess ©

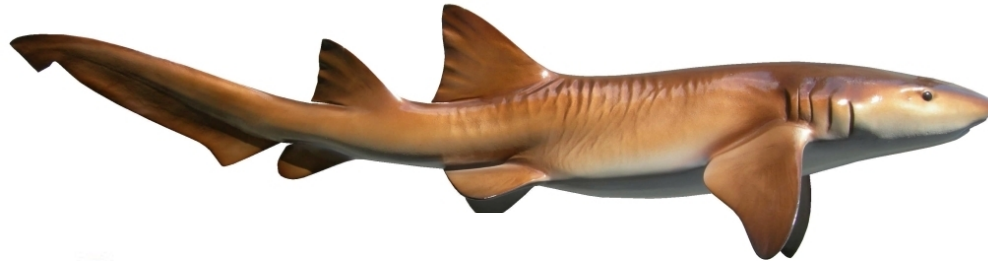
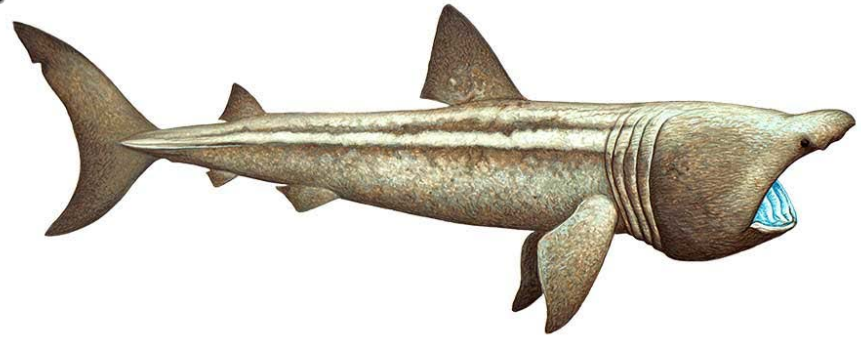
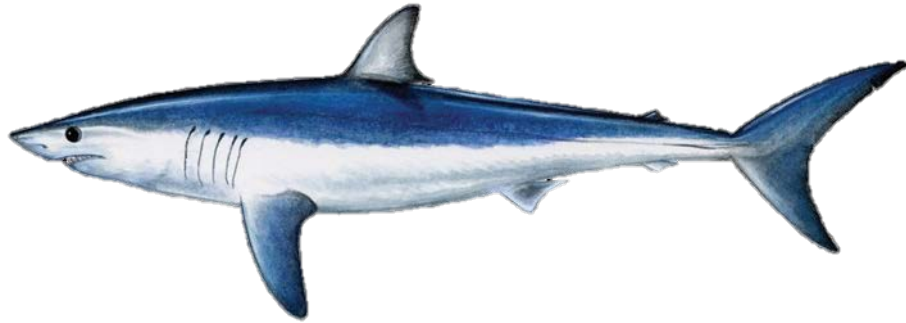


© Seapics.com

Caudal fin



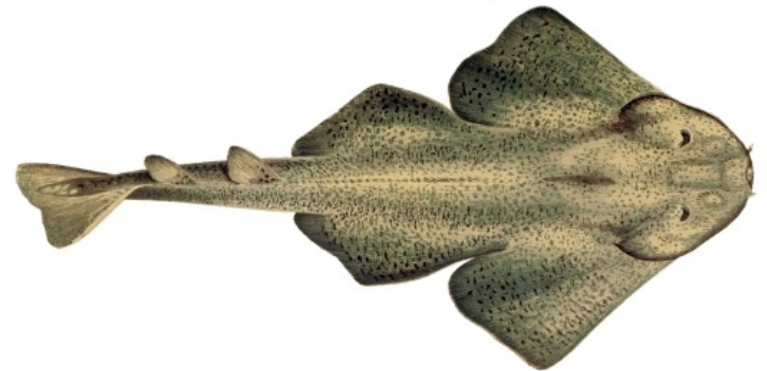
General body form and lifestyle



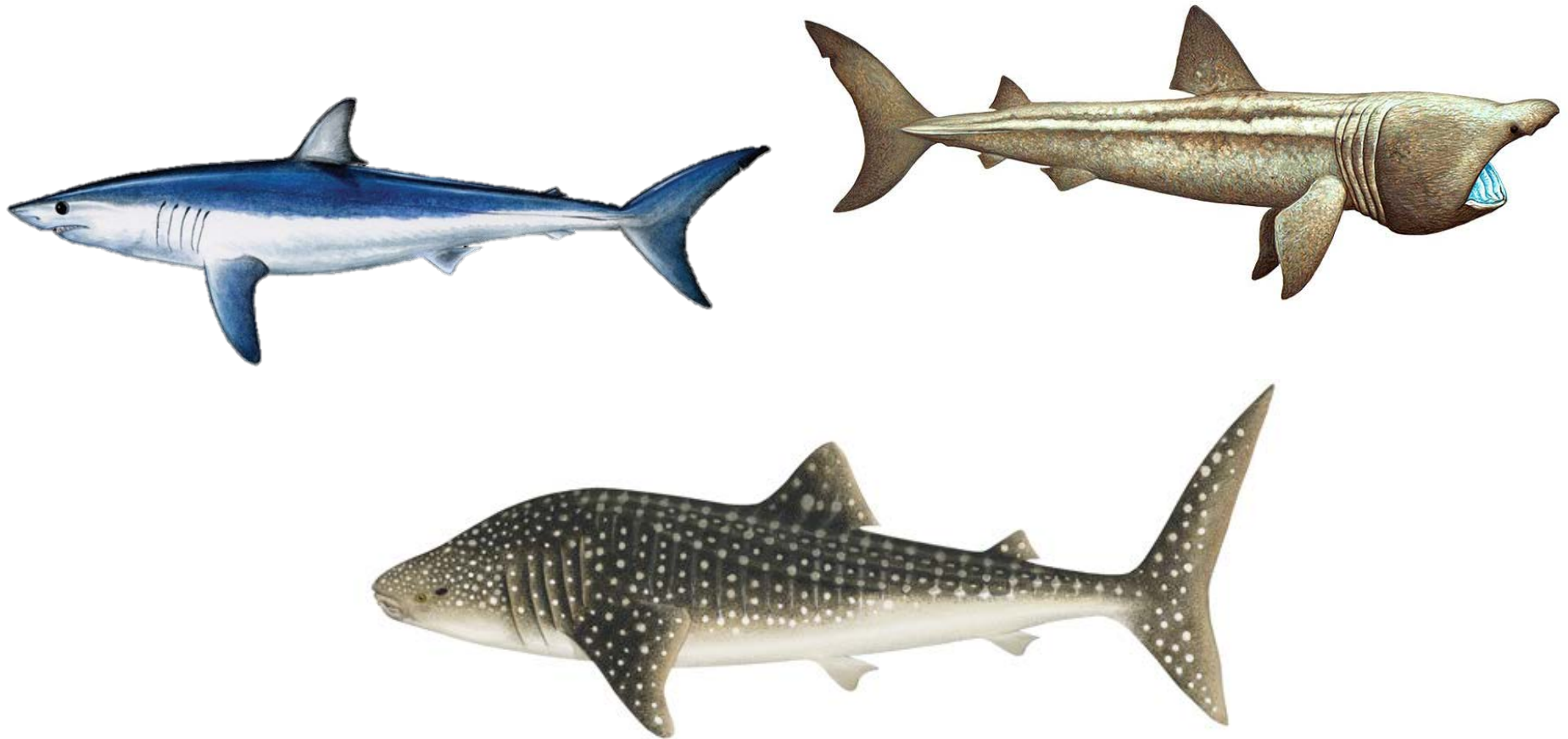
little sleeper shark
(*Somniosus rostratus*)



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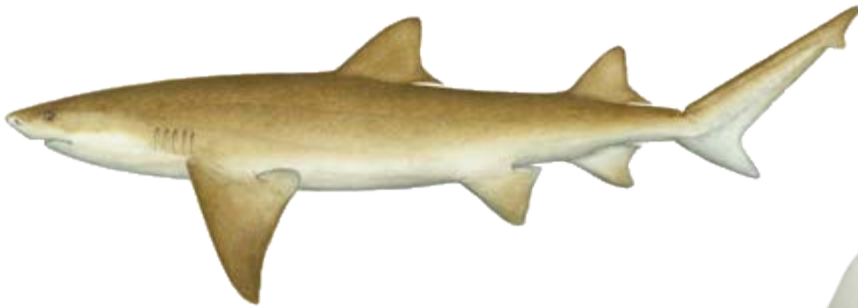
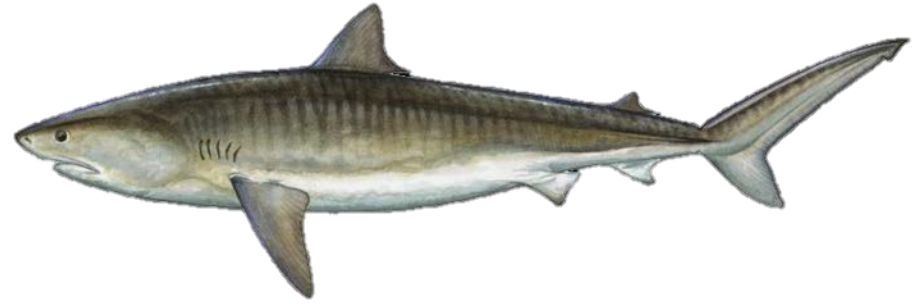


Type 1



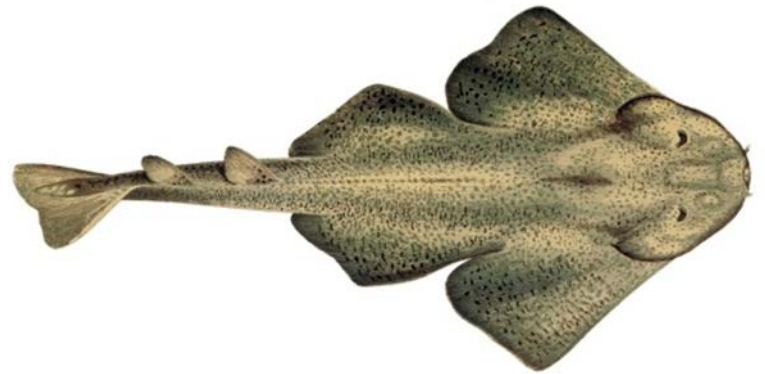
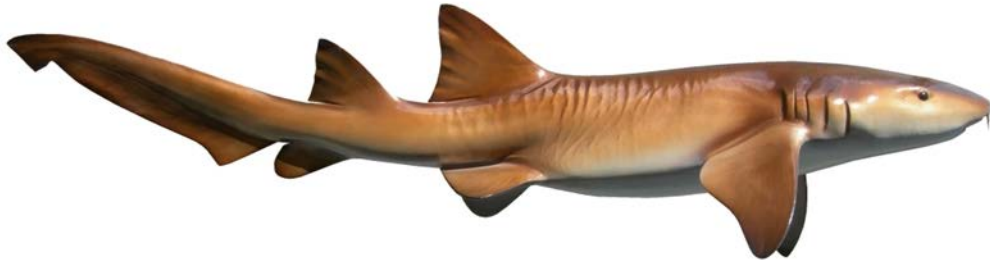
- Conical head, large deep body, large pectoral fins, narrow caudal peduncle with lateral keels, high aspect ratio (homocercal-like) tail, reduced anal, second dorsal, and pelvic fins

Type 2



- More flattened ventral head and body surface, less deep body, large pectoral fins, heterocercal tail, lack lateral caudal keels, more moderately sized pelvic, second dorsal, and anal fins

Type 3



- Large heads, blunt snouts, more anterior pelvic fins, more posterior first dorsal, low angle heterocercal tail (reduced or absent lower lobe), larger anal, second dorsal (if present), and pelvic fins

Type 4

little sleeper shark
(*Somniosus rostratus*)



kitefin shark
(*Dalatias licha*)



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- Lack anal fin, large “epicaudal” lobe, higher pectoral fin insertion (some species), reduced dorsal and pectoral fin size

Type 5



© Jim Simo



© 1992, Diane Rome Peebles



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- Dorso-ventrally flattened, enlarged pectoral fins, reduction in the caudal end of the body

Type 6



- Laterally compressed, pectoral undulations for movement, leptocercal tail (long and tapering) or heterocercal