کیسه شنا و شناوری ماهیان Gas bladder & Buoyancy

شناوری ماهیان Buoyancy

وزن مخصوص بافت های مختلف ماهیان

- فلس و استخوان 2
- سایر بافت ها 1/05 – 1/1
- چربی 0/9 – 0/93

چگالی متوسط بدون اندام شناوری 1/06 – 1/09

وزن مخصوص آب

- آب شیرین 1
- آب دریا 1/026

وضعیت ماهی در داخل آب؟

شناوری ماهیان Buoyancy

اهمیت شناوری (حالت بی وزنی)

شیوه های ایجاد حالت بی وزنی در ماهیان

(1) Low density tissue (liver in sharks)—increase fat
(2) "Lift" from fin movement or hydrodynamics
(3) Reduced heavy tissue (bones and muscle)
(4) Gas (swim) bladder

- Sea water Fishes 5%
- Fresh water Fishes 7%

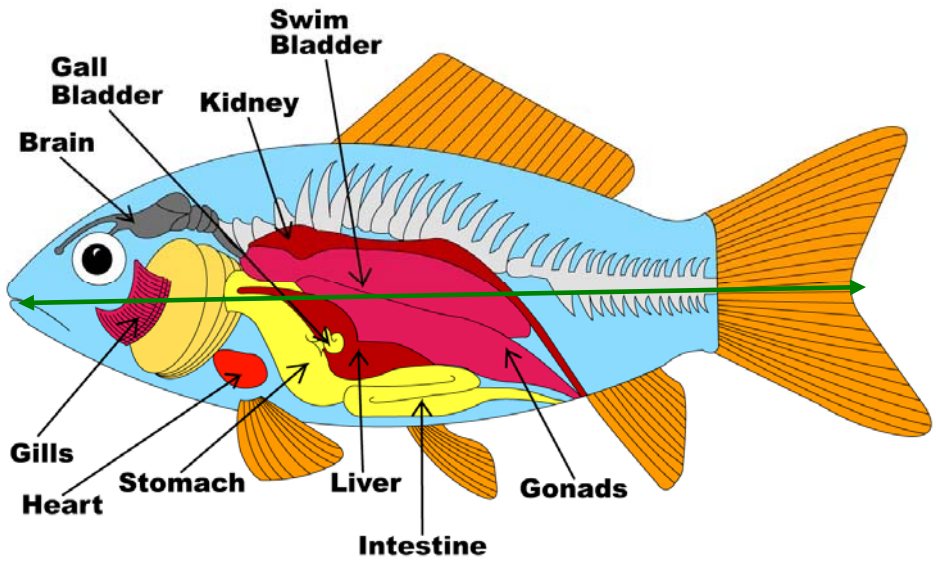
شناوری ماهیان Buoyancy

وظیفه کیسه شنا

تطلبق وزن

حفظ جهت قرار گرفتن ماهی در آب

انتقال و تقویت تشخیص اصوات



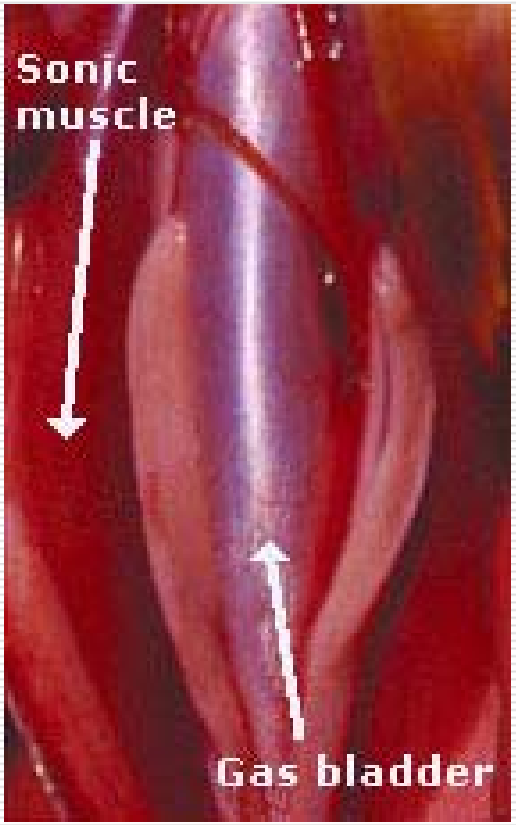
ماهیان فاقد کیسه شنا

محل کیسه شنا

Gas bladder کیسه شنا

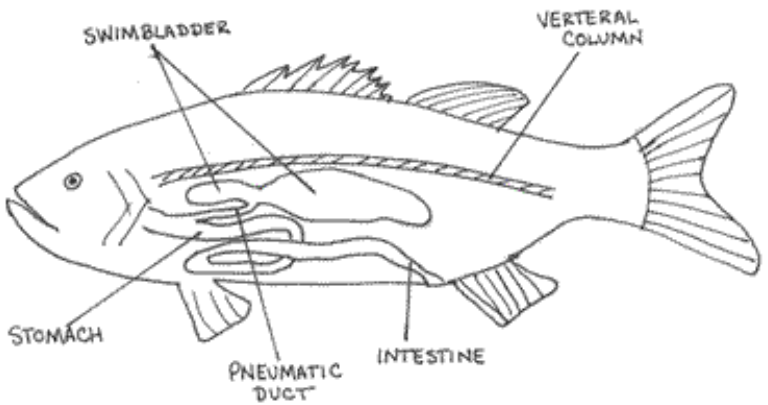
Physostome *vs* physoclists

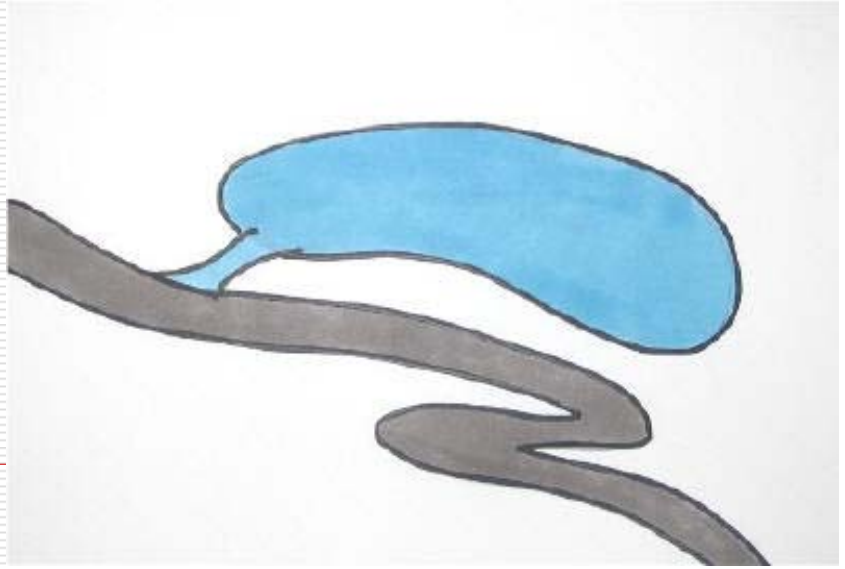
Fish with swimbladders are divided into two categories defined by which type of swimbladder is present. A fish with an open swimbladder is called a **physostome** while others with closed swimbladders are called **physoclists**.



Gas bladder کیسه شنا

The open swimbladder of physostome fish is the ancestral version of the swimbladder and it still retains a somewhat similar function to that of the lungs Gases for the filling of this bladder are retrieved from just above the surface of the water. In order for the bladder to hold and release these gases, there is a channel that connects the bladder to the esophagus called the **pneumatic duct**. This connecting duct is present in most larval fishes while their swimbladder completes its development, and only some-- the physostomes-- retain this duct through maturity.
Appear in Clupidae, Cyprinidae, Salmonidae, Esocidae, Siluridae, Anguillidae



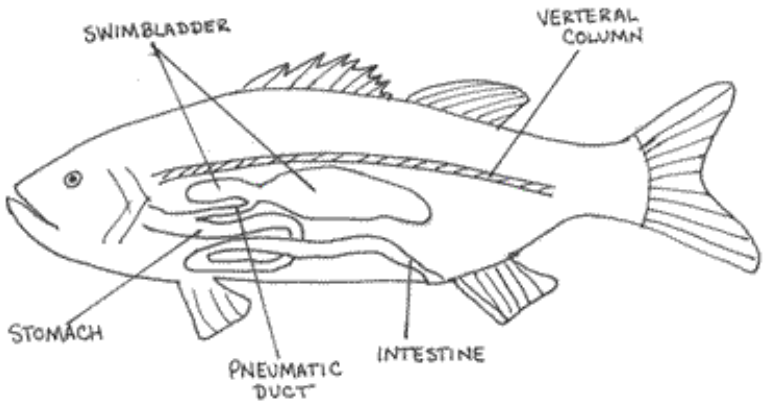


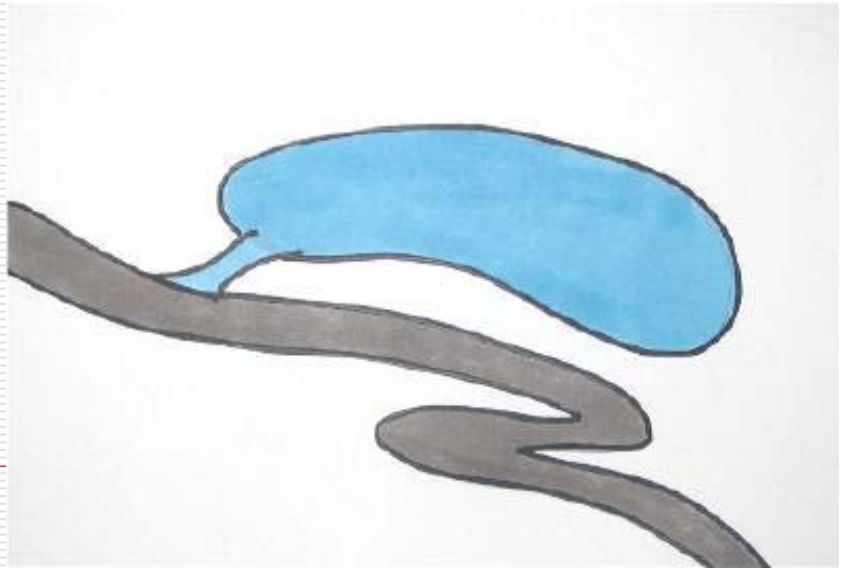
Gas bladder کیسه شنا

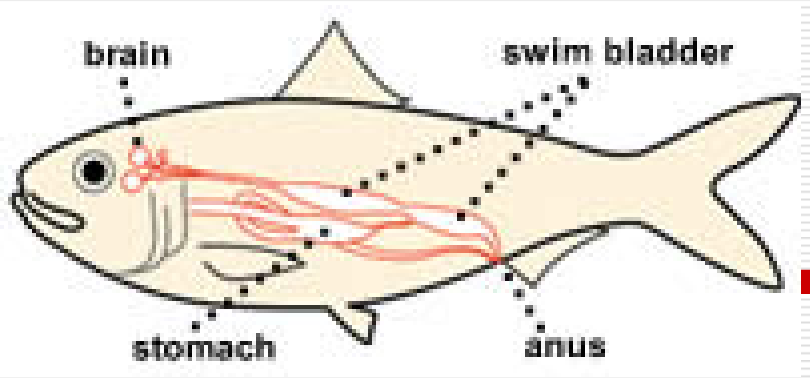
The open swimbladder of physostome

Through the pneumatic duct, fish can gulp and burp atmospheric gases from just above the surface of the water into their bladder in order to maintain their buoyancy. For this reason, open swimbladders are usually found in fish that live near the surface of the water. This is so that they may easily uptake atmospheric gases for the filling of the bladder. It would be illogical for deeper dwelling fish to have open swimbladders because of the nearly impossible task of intaking the tremendous volumes of gas that would have to be gulped at the surface in order to achieve neutral buoyancy at such great depths.

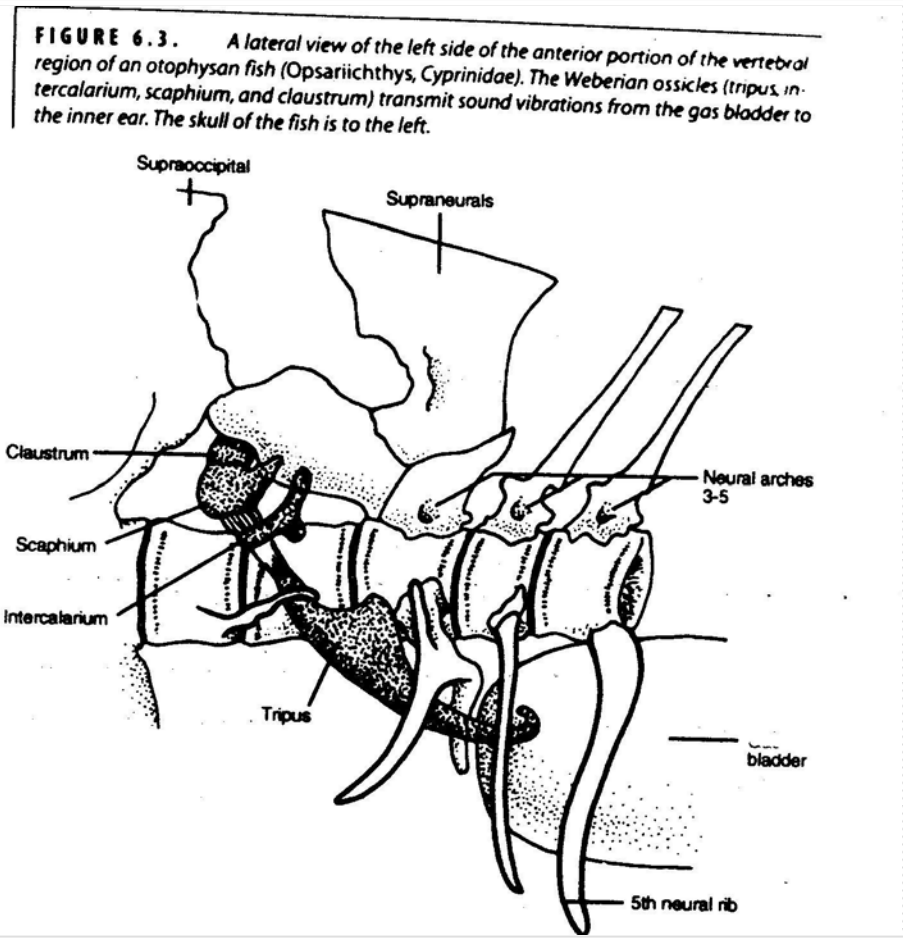
Gas-Puck reflex







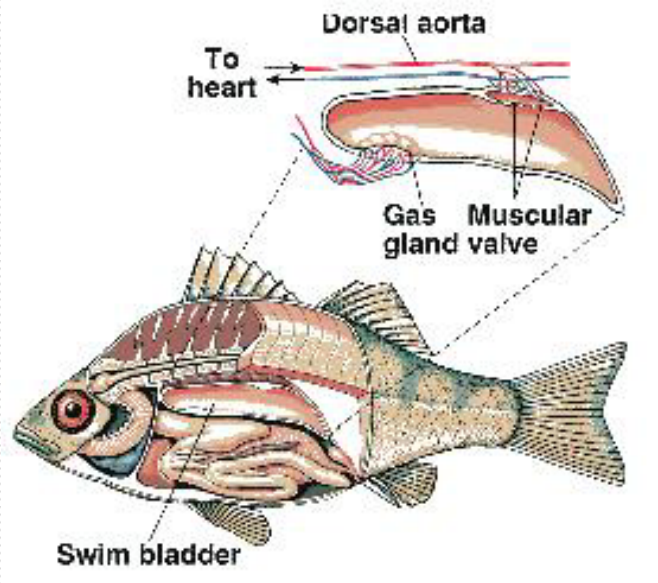
The swim bladder in the herring (similar to *Diplomystus* and *Knightia*) is connected to the gut by a thin tube. A thin tube also connects the swim bladder to the brain, which aids its hearing.



Ostariophysi

کیسه شنا Gas bladder

Physoclist



ارتباط از طریق مجرا تنها در مراحل اولیه وجود درارد

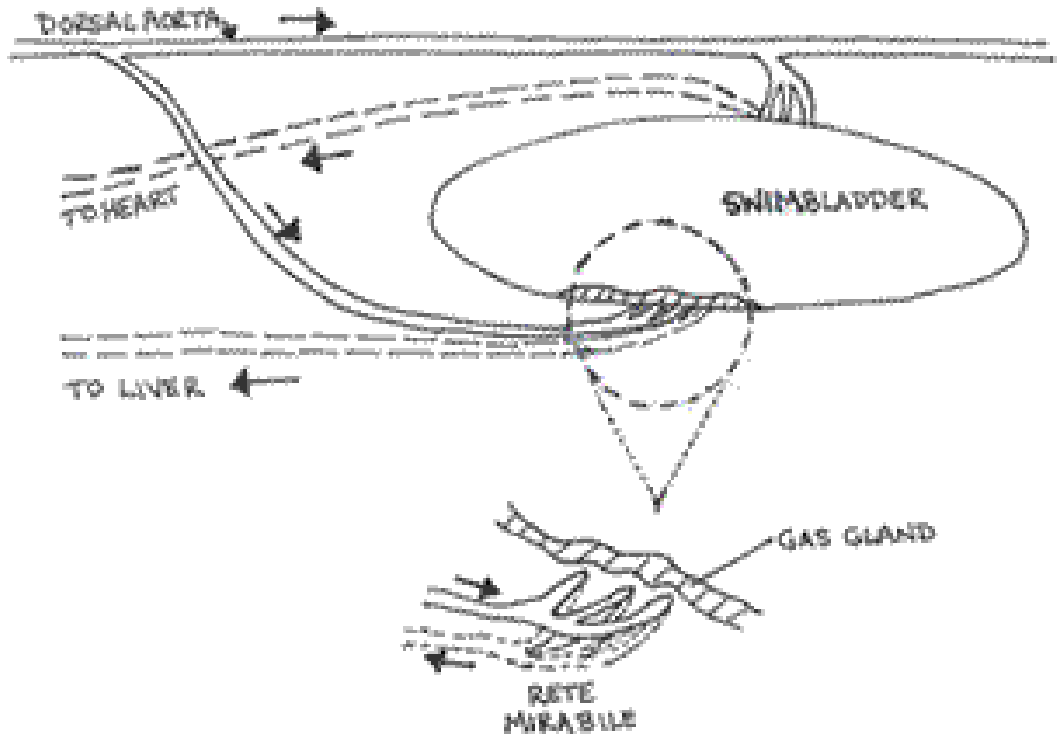
بیش از دو سوم ماهیان استخوانی فیزیوکلیست هستند (سوف، سرخوف هامور.....)

دارای ساختارهای ویژه مرتبط با دستگاه گردش خون هستند

ورود و خروج گاز به ترتیب توسط غدد قرمز یا غدد گازی به همراه شبکه اعجاب انگیز Rete mirabile آن و دریچه بیضی Oval انجام می گیرد

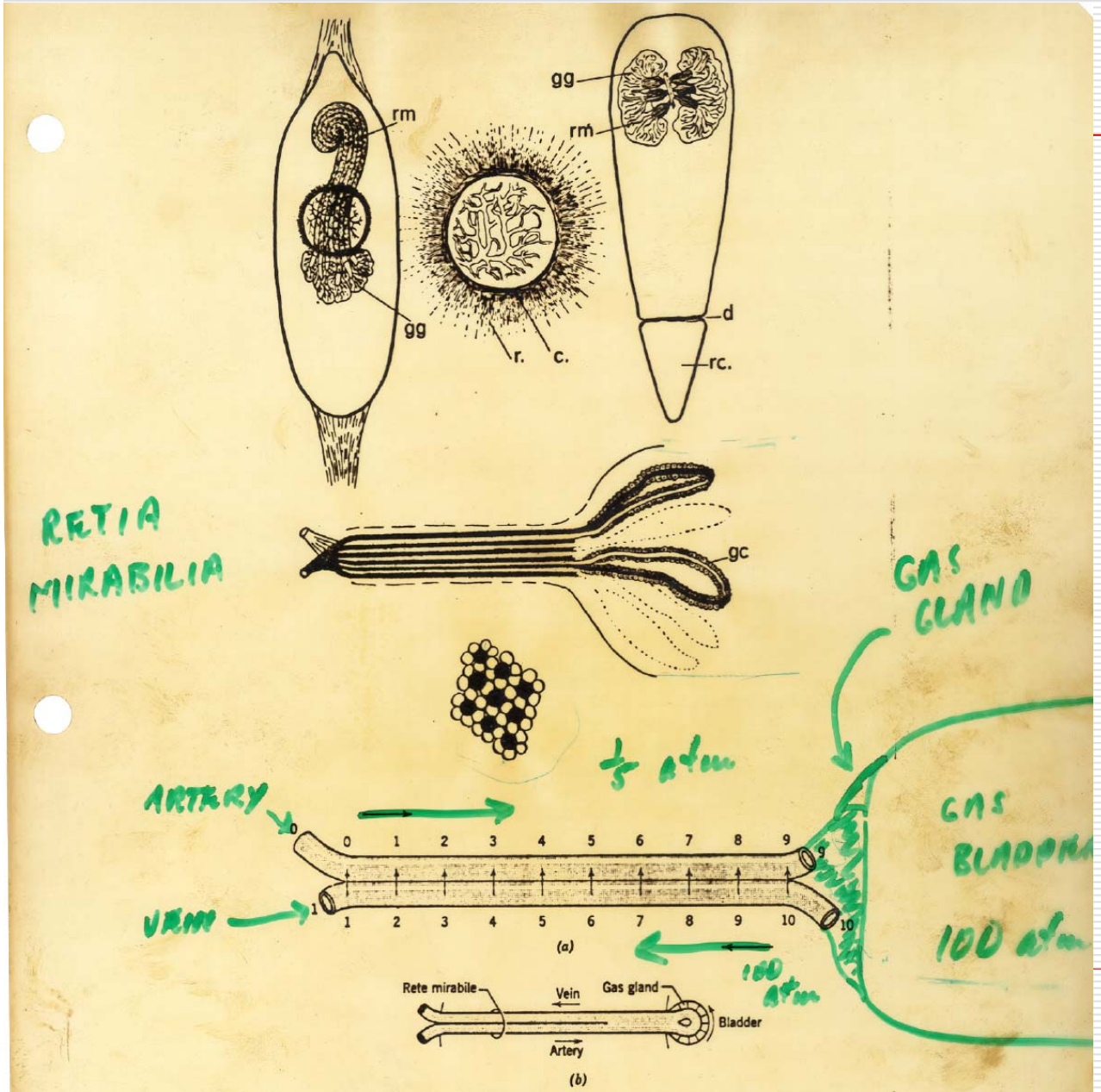
کیسه شنا Gas bladder

عملکرد شبکه میرابیل

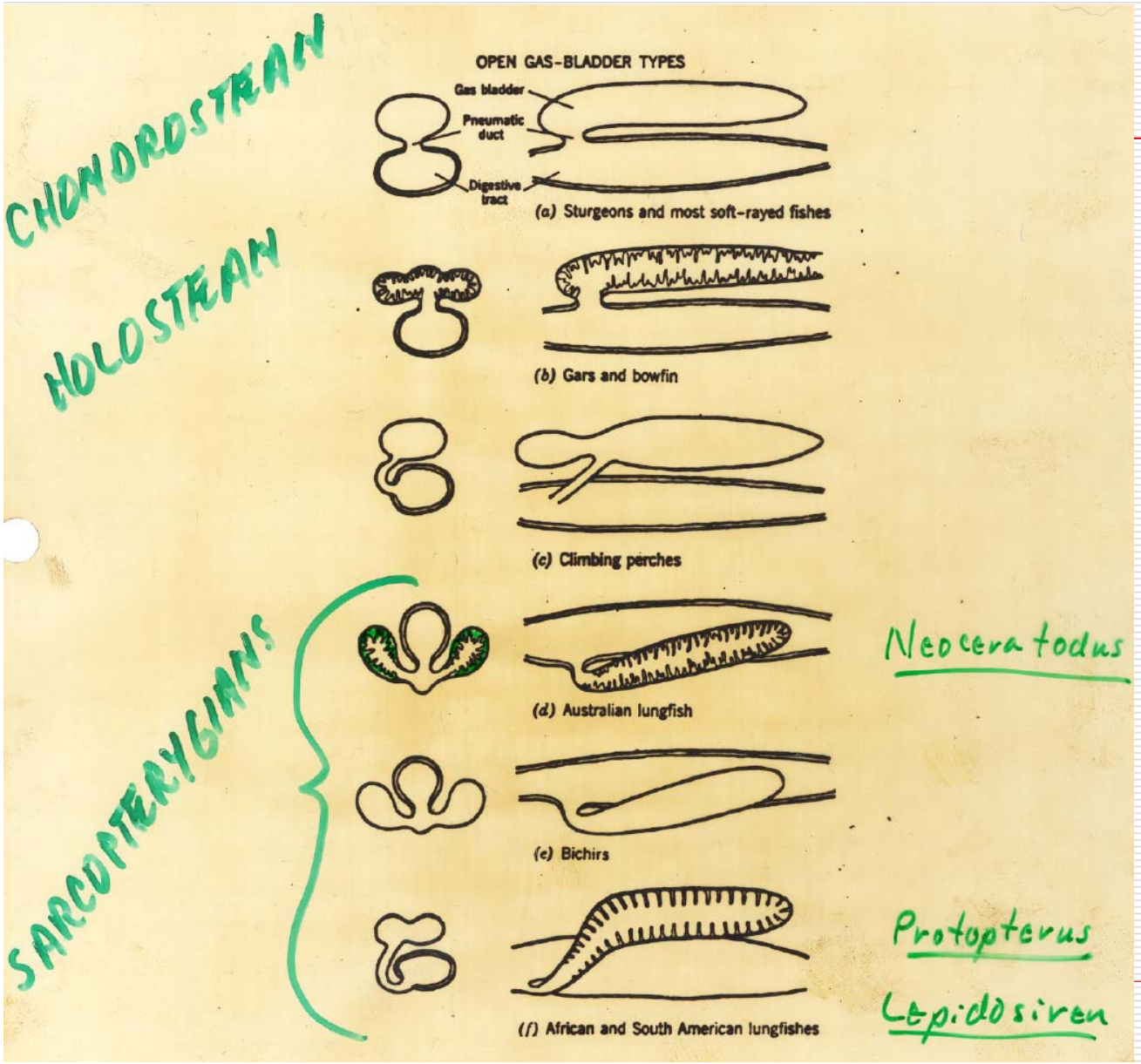


کیسه شنا Gas bladder

عملکرد شبکه میرابیل



کیسه شنا Gas bladder



تشریح

رشته های الاستیک

رشته های الاستیک فشرده

عضله صاف

لایه پوششی داخلی

شکل