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Fish air bladder and its importance in medical science

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ABSTRACT

The swim bladder is an internal fish organ, which is filled with several gases (oxygen, nitrogen, carbon-dioxide and argon). In fishes, these organs maintain their buoyancy and swimming in the water body. Apart from this, it also acts as a very effective organ for aerial gas exchange. The many nutrients found in swim bladder include protein, vitamins and microelements. Traditionally it was used as a medicine to treat several conditions such as amnesia, sleeplessness, dizziness, enepithymia,and postpartum weakness, heal wounds. But in the present time, by working on it, many researchers have furthered its usefulness in the field of medical science. He told that it has the power to fight against infection and cancer. Therefore, looking at all these, this article is based on fish air bladder and its importance in medical science.

I. INTRODUCTION

The swim bladder, often referred to as the 'air bladder' or 'gas bladder', is an internal gas-filled organ in fish. Through these organs, fishes control their buoyancy and the depth of swimming. It is located dorsal to the coelom, between the alimentary canal and the vertebral column. The weberian apparatus (a bony device) evolved from the vertebrate, connects the swim bladder to the labyrinth of the inner ear in some fish, especially freshwater species (e.g., common carp, wels catfish), providing an accurate sense of water pressure and improving hearing. It is a membranous sac that holds the gases in the atmosphere. The mixture of gases in the swim bladder varies generally. In deep sea fishes have larger percentage of oxygen, whereas in shallow water fish oxygen remains nearly resemble to environment. For instance, 75.1% oxygen, 20.5% nitrogen, 3.1% carbon dioxide, and 0.4% argonhas been found in the swim bladder of eel Synaphobranchus. Additionally Liu et al., 2012 found 75.2 ±1.4% moisture contents (wet weight basis) in swim bladder of Bighead carp (Hypophthalmichthysnobilis).

The dried swim bladder of fish is known as fish maw. Fish maw production is fairly widespread in Southeast Asia, particularly in Hong Kong and southern China (Clark, 2004). Fish maw has been used traditionally in China and Southeast Asia as a cure and tonic. In ancient times, it was used as a medicine for many diseases such as amnesia, sleeplessness, dizziness, enepithymia, and postpartum weakness (Jian and Wu, 2003). Additionally, studies have shown that fish maw may reduce free radicals, prevent inflammation, and fight cancer (Li and Yao, 2013). Recent research suggests that fish maw crude polysaccharides may speed up wound healing, fight infection, and potentially reduce thrombotic events (Chen et al., 2014).

Fish swim bladder derived products

The swim bladders of some larger fish are used as a delicacy in many Asian countries. Dried swim bladder (fish maw) has been used in soups and stews for many years in China. Additionally, the swim bladder serves as a source of collagen in the culinary region. They are also used to make isinglass, or water-resistant glue, isinglass used in breweries to clean beer (Teresa, 2009). Recently Sinthusamaranet al., (2013) isolated collagen from sea bass swim bladder. Additionally, Bamaet al., (2010) and Liu et al., (2012) also isolated collagen from catfish and bighead carp swim bladders.

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Fig. 1 Fish maw

Fig. 2 Isinglass

https://powing.com/product/fish-maw/https://en.wikipedia.org/wiki/Isinglass

Functions of fish swim bladder

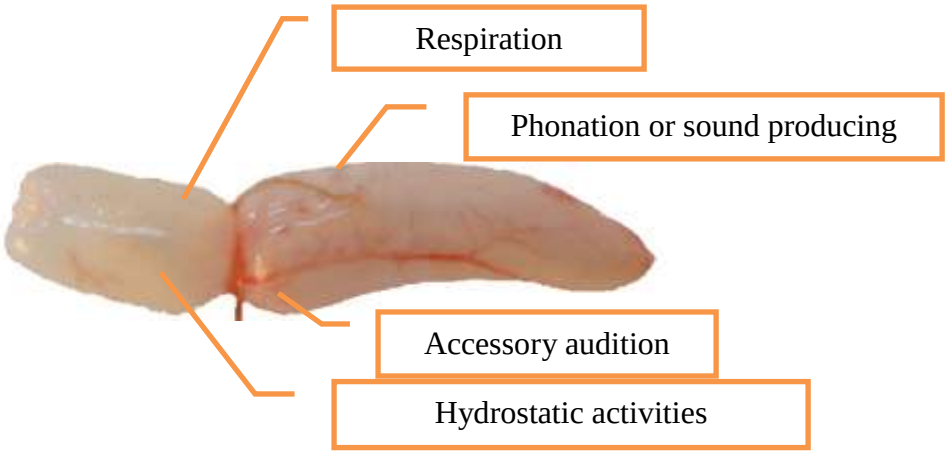

Fig. 3 Functions of fish swim bladder

According to researchers, only a few species of fish use their swim bladder for respiration. In addition, a number of fish species also use them to produce sounds or phonation. The swim bladder sometimes becomes subordinate to the auditory organ, with which it may be directly associated or through the interpolation of components of the uniquely modified anterior vertebrae. Furthermore the primary function of the swim bladder is hydrostatic activities, meaning that fishes maintain their buoyancy and balance with the surrounding medium (water) under a range of pressures.

Medicinal uses of fish swim bladder

- In ancient times, dried swim bladders were used to treat hemorrhagic diseases, tetanus, and wet wounds.
- It was also used to treat infertility, strengthen the fetus, nourish tendons and nerves, and to tonifying the kidneys and essence.
- Ben CaoHui Yan first mentioned in his book that swim bladder helps in pregnancy and childbirth
- It has been used in treating kidney yang deficiency disease
- Swim bladder and its hydrolysate have beneficial effects on postpartum care, infertility therapy; wound healing, and skin aging.

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- Nowadays gelatin which is being obtained from the skin and swim bladder of fish is being used to make the outer part of the capsule

Hemorrhagic

Tetanus

Wound healing

infertility

Pregnancy and childbirth

Nourish tendons and nerves

Tonifying the kidneys and essence

Skin aging

Fig. 4 Images showing some of the diseases that swim bladders were used to treat in ancient times

II. CONCLUSION:

In high water pressure, the swim bladder maintains the fish alive and well. Swim bladder is a potential therapeutic or preventative measure for numerous human diseases aside from delicious meals.In China and Southeast Asia, fish maws (dried swim bladders of fish) have been utilized for ages as traditional medicines, tonics, and opulent gourmet foods. Nowadays fish maw utilized to treat suture wounds in the field of medical science due to its low cost and skin-dissolving characteristics. More research needs to be done on fish swim bladder because not much has been done on it in the field of medical science so that we can make maximum use of it.

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