RESPIRATION IN AMPHIBIA

HOME ASSIGNMENT

SUBMITTED BY :

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INTRODUCTION

The word amphibian is a Greek word. It is the combination of the word " amphi," which means dual, or both kinds and the word "bio," which means life. The translation would be 'of both kinds of life'. This definition refers to the fact that most amphibians live their lives in two different stages in two different environments…water and land, first as tadpoles and then as terrestrial adult frogs.

A brief note on *RESPIRATION IN AMPHIBIA* has been prepared as part of the HOME ASSIGNMENT, this project is guided by Dr. Purnima Das Bora . The study is mainly based on the frog.

CONTENTS

HOW DO AMPHIBIANS BREATHE ?

Most amphibians breathe through lungs and their skin. Their skin has to stay wet in order for them to absorb oxygen so they secrete mucous to keep their skin moist (if they get too dry, they cannot breathe and will die). Oxygen absorbed through their skin will enter blood vessels right at the skin surface that will circulate the oxygen to the rest of the body. Sometimes more than a quarter of the oxygen they use is absorbed directly through their skin. Tadpoles and some aquatic amphibians have gills like fish that they use to breathe. There are a few amphibians that do not have lungs and only breathe through their skin.

RESPIRATION IN FROG

Due to amphibious mode of life, frog shows different modes of respiration. The exchange of gases takes place in following four ways:

1. Gill respiration
2. Cutaneous respiration
3. Bucco-pharyngeal respiration
4. Pulmonary respiration

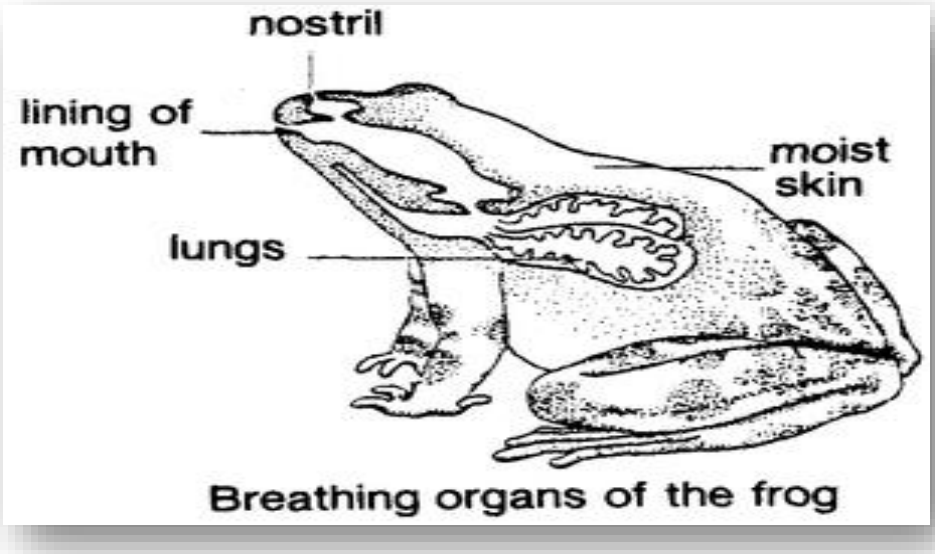

Fig : Breathing organs of the frog

1. Gill respiration:

In tadpole condition, such type of respiration takes place through 4-5 pairs of gills. The gills are distributed with blood vessels and absorb oxygen through diffusion. The oxygen combines with haemoglobin of blood and forms oxyhaemoglobin which goes to tissue.

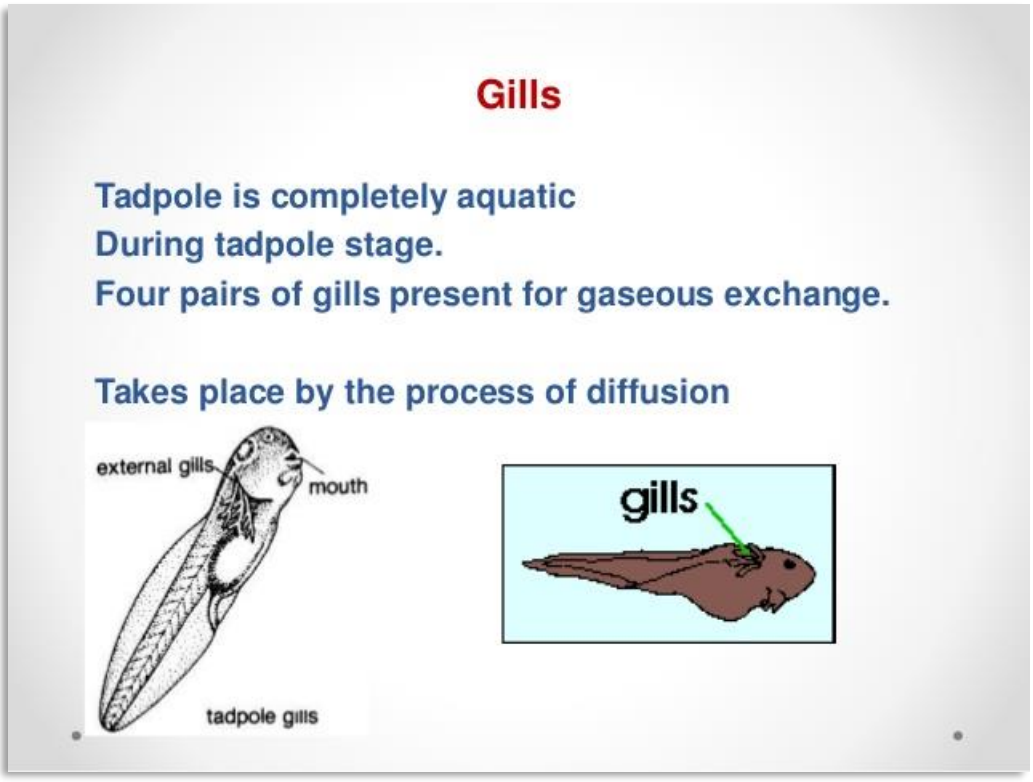

Fig: Respiration during tadpole stage

2. Cutaneous respiration:

The respiration which takes place through skin is called cutaneous respiration.

It takes place in water and during aestivation and hibernation when metabolism is low and demand for oxygen is small. Skin absorbs oxygen dissolved in water through blood capillaries where oxygen combines with haemoglobin. It is carried into different parts of the body by blood and release energy.

The CO_2 produced as a waste product is mixed with haemoglobin and forms carboxy-haemoglobin which goes to veins of skin. Later it is passed outside.

When the skin is completely dry, the cutaneous respiration is not possible. Consequently, the frog dies.

Skin of frog is respiratory in nature because it is profusely supplied with blood capillaries. Skin is thin and devoid of any structure that prevent diffusion of dissolved oxygen from water in the blood. Secretion of mucous by mucous gland always keeps its surface moist.

3. Bucco-pharyngeal respiration:

Simply known as mouth respiration. The respiration which takes place through buccopharyngeal cavity, it is called buccopharyngeal respiration.

The buccal cavity consists of moist mucous membrane and richly supplied with blood capillaries. It absorbs oxygen through diffusion or simply by contraction or expansion of sternohyals and petrohyals muscles. Oxygen dissolves in moist mucous of the cavity and diffuses into the blood capillaries. Similarly, CO_2 diffuses out into the cavity and passes out through nares during expiration.

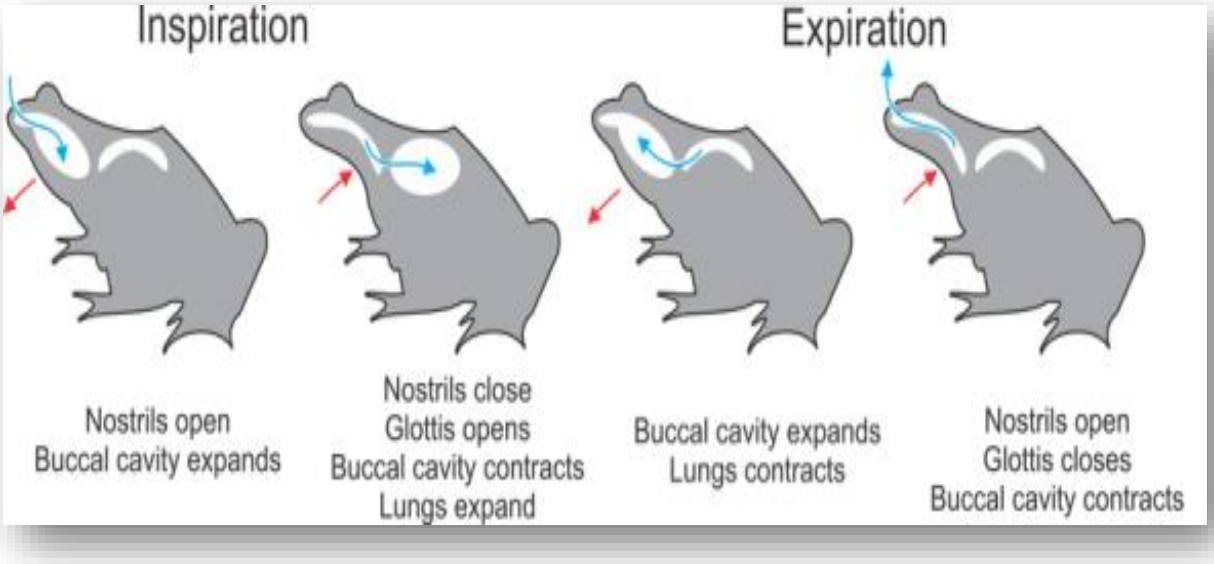

Fig: Buccal pumping in frogs

4. Pulmonary respiration:

It is also known as lung respiration. Frogs respire through lungs when it lives on land.

When frog is more active during locomotion, during leaping and jumping, the demand of oxygen is increased. For pulmonary respiration, the routes of air passage are as follows – external nares, olfactory chamber, internal nares, buccopharyngeal cavity, glottis, laryngo-tracheal chamber, bronchi and lungs. Pulmonay respiration or breathing occurs in two steps which are inspiration and expiration.

CONCLUSION

This project has been done as part of the Home Assignment that has been given to us by our guide Dr. Purnima Das Bora. Also the project was guided by our Ma'am, Dr. Purnima Das Bora. I have completed the project work of our B. Sc 4th semester (Zoology General) of DHING COLLEGE under Gauhati University. With the help of some books and guidance received from our Ma'am I have been able to complete this assignment in time.

Recommended Books :

VERTEBRATE ZOOLOGY

By S. CHAND