ZOO 368: COMP VERTEBRATE EMBRYOLOGY

PRACTICAL 2: CHICK EMBRYOLOGY

INTRODUCTION

1. This practical will introduce the students to a couple of easy techniques which can be used to observe the development of a chick embryo. By the continual observation of the chick embryo, the students should be able to gain a better understanding of how organisms develop.
2. The environment in which the chick develops can be easily manipulated so that the organism can be studied in the laboratory. The technology is available for students to observe a complex animal and how quickly that animal evelops into an adult.
3. This particular practical activity will be done during the study of comparative embryology. Some background information on the embryological development of the chick should be included.

STUDENT/CLASS TIME REQUIRED

For the students, the practical takes one day to set up and an additional observation period of three weeks. The observation time amounts to only a few minutes each day. The class will be divided in two groups. Each group will have a leader who will write down the names of group member and submit it to the Technologist.

MATERIALS NEEDED

Consumables

1. 12 Petri dish bottoms - sterile
2. 70% alcohol - approximately 100 mL.
3. 12 Styrofoam coffee cups (paper cups can also be used)
4. 12 48-72 hour old incubated chick eggs (You can get this from the university or commercial hatchery)
5. Sterile cotton
6. 12 razor blades

Capital equipment

1. 12 400 mL. beakers
2. 12 forceps
3. 12 dissecting probes
4. Incubator - include a large beaker of water to increase the humidity.

SAFETY PRECAUTIONS

1. Students need to be careful with the forceps, probes, and razor blades.
2. The 70% alcohol needs to be used with care so that none is spilled on the students or in the eggs.
3. The students who do the actual sterilization and cutting of the egg should wear goggles when working.

TECHNOLOGIST GUIDE FOR THE PREPARATION OF MATERIALS

Preparation Time Required:

The primary planning is the purchasing of the fertile eggs, the setting of the incubator, and the sterilization of the equipment. It should take approximately one hour to do the preparation.

Preparation of solutions:

1. The material and equipment used in this lab need to be sterilized. An easy way to sterilize the forceps, probes, and razor blades is to put the number you need in a large beaker, cover with aluminium foil, and sterilize with a pressure cooker. The 400ml beakers can be wrapped in paper towels, taped and sterilized. The pressure cooker needs to be set at 250 degrees F and kept there for 15 minutes.
2. Fertile eggs need to be purchased locally and incubated for 2-3 days before the students open them.
3. The sterile plastic bottoms of Petri dishes are the best to set the egg and the beaker on.

Shelf-life of the prepared solutions - Does not apply.

TECHOLOGIST OUTLINE FOR THE PRESENTATION OF ACTIVITY

1. Locate and purchase the fertile eggs a couple of days before you are going to do the activity.
2. Begin incubating the eggs 2-3 days before the day that the students will be opening the eggs. Be sure to put a large beaker of water in the incubator to increase the humidity.
3. Sterilize the beakers and equipment a day or two before the activity will be done.

SOURCES OF MATERIALS

1. The fertile eggs should be purchased from a local hatchery.
2. The other materials should be on hand or could be purchased from any biological supply house. Some of the items (cotton, paper towels cups, razor blades etc.) can be purchased from local retail stores

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CHICK EMBRYOLOGY

STUDENT INSTRUCTIONS

PURPOSE:

The purpose of this laboratory activity is to study the embryology of a chicken egg by setting up an apparatus to watch the continuous development of an incubated egg.

INTRODUCTION:

The chick egg has been a favourite of the embryologist for many years because of the availability of eggs and minimal amount of materials and equipment that are needed to study them.

Once incubation begins, it takes approximately 3 weeks for a fertile egg to develop into a juvenile chick. The temperature should be kept at 37 degrees C or 99 degrees F. If a little care is taken and sterile techniques are used, one can watch the chick go through its normal development.

MATERIALS:

- Incubator
- Chick egg
- Petri dish bottom
- 400 mL. beaker
- Styrofoam coffee cup
- Forceps
- Ethanol
- Dissecting probe
- Razor blade

PROCEDURE:

1. All the glassware and equipment should be as sterile as possible. All efforts should be made to prevent contamination of the embryos. You have to work

quickly. Before you begin you need to read the entire procedure before you proceed with this lab.

2. Obtain a sterile Petri dish, 400 mL. beaker, forceps, dissecting probe, razor blade and a small amount of alcohol.
3. Take a Styrofoam cup and with a razor blade cut the bottom one inch off of the cup. Turn the cup upside down and cut a hole in the bottom of the cup. The size of the hole should be large enough to put the pointed end of the egg in. Sterilize the cup with alcohol.
4. Take a 24 or 48 hour incubated egg and gently wipe it off with alcohol. Put the pointed end in the Styrofoam cup. With the blunt end of the forceps or the dissecting probe, tap the blunt end of the egg until the shell is cracked (There is an air space just under the surface). With the forceps, peel back the shell so that you have an opening between the size of a nickel and quarter. Remove the white membrane just beneath the shell. DO NOT REMOVE THE MEMBRANE OVER THE EMBRYO.
5. Place the 400 mL. beaker over the egg and on the Petri dish.
6. Quickly make your observations and put opened egg back in the incubator.
7. If you were careful, you should be able to observe the egg as it develops into a chick.

DISCUSSION:

1. For the next three weeks, observe your egg and record the changes that take place. Use sketches to help explain your observations.
2. Write a paragraph describing the chick development. Include in your paragraph which systems developed first and which parts of the chick were the last to develop.
3. Propose a hypothesis to explain why some of the systems started to develop very early and why others systems developed at later times.