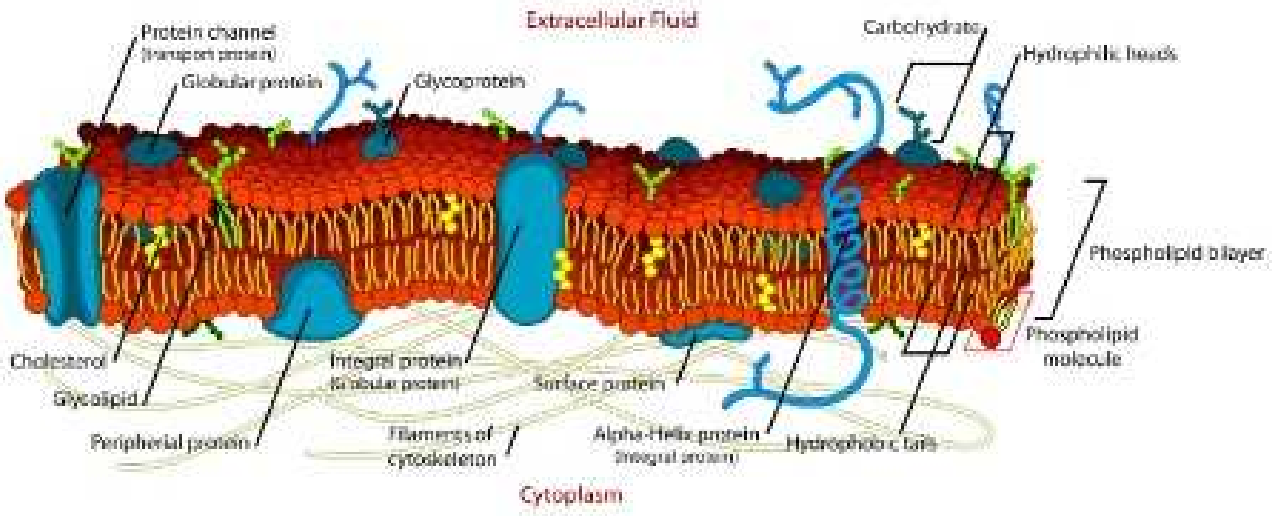
BIOLOGY LAB 1

Name: Arrpita Sethi
Candidate Number:
Year: 2010-2012
Date:
Title: The effect of varying temperature on the permeability of plasma membrane on beetroot.

Research Question:
How does varying temperature affect the permeability of the plasma membrane of beetroot cores?

Hypothesis:
Beetroot is a eukaryotic cell, and like other eukaryotic cells, beetroot cells have many types of cell organelles. Some of the organelles are bounded by a single membrane, e.g. lysosomes, Golgi apparatus, vacuoles; some are bounded by two membranes (an envelope), e.g. nucleus, mitochondrion.[1]
Beetroot has a betalain pigment, which makes it appear dark red or purple in colour.
By putting beetroot cores into water with varying temperature, it affects the cell membrane. The cell membrane is made up of two layers of molecules, so it's called "bilayer" ("bi" means two). The molecules in this bilayer are called phospholipids. Each of these phospholipids has a head and a double tail. The head is hydrophilic. The tail is hydrophobic. "Hydro" means water "philic" means, "loving." "Phobic" means, "fearing." Thus hydrophobic means it doesn't attract water, while hydrophilic means it attracts water. The tails pack together, exposing only the polar heads to the water.

[1] http://answers.yahoo.com/question/index?qid=20061129041445AAaMGDT



2

Apparatus:

- Microscope
- Beetroot cores
- Water (varying temperatures)
- Test tubes
- Syringe

Procedure:

- Take a 2cm core of beetroot.
- Fill 3/4th of the beaker with 10°C of water.
- In the test tube, put core of beetroot and using a syringe pour 15ml of water into the test tube.
- Immerse the test tube in the beaker of water, and maitain the temperature at 10°C.
- Repeat all the steps with water of varying temperatures (eg: 20, 30, 40, 50, 60,70)

2

http://vcebiology.edublogs.org/files/2011/02/450xCell_membrane_detailed_diagram_en_svg-os8fh4.jpg

Data Collection:

Table 1

Temperature	T1	
°C	Absorbance	Transmittance
10	0.207	61%
20	0.196	63.70%
30	0.158	70.40%
40	0.203	62.60%
50	0.306	49.40%
60	0.364	43.40%
70	0.84	14.40%

Table 2

Temperature	T2	
°C	Absorbance	Transmittance
10	0.208	61.90%
20	0.212	61.30%
30	0.176	66.70%
40	0.203	62.60%
50	0.271	53.40%
60	0.508	31.20%
70	0.866	13.60%

Table 3

Temperature	T2	
°C	Absorbance	Transmittance
10	0.239	57.60%
20	0.205	62.40%
30	0.203	62.60%
40	0.195	63.80%
50	0.210	61.70%
60	0.671	21.30%
70	0.846	14.30%

Table 4: average absorbance

TEMP °C	Ab
10	0.218
20	0.204
30	0.179
40	0.2
50	0.262
60	0.514
70	0.851

Data Processing and evaluations: graph of absorbance

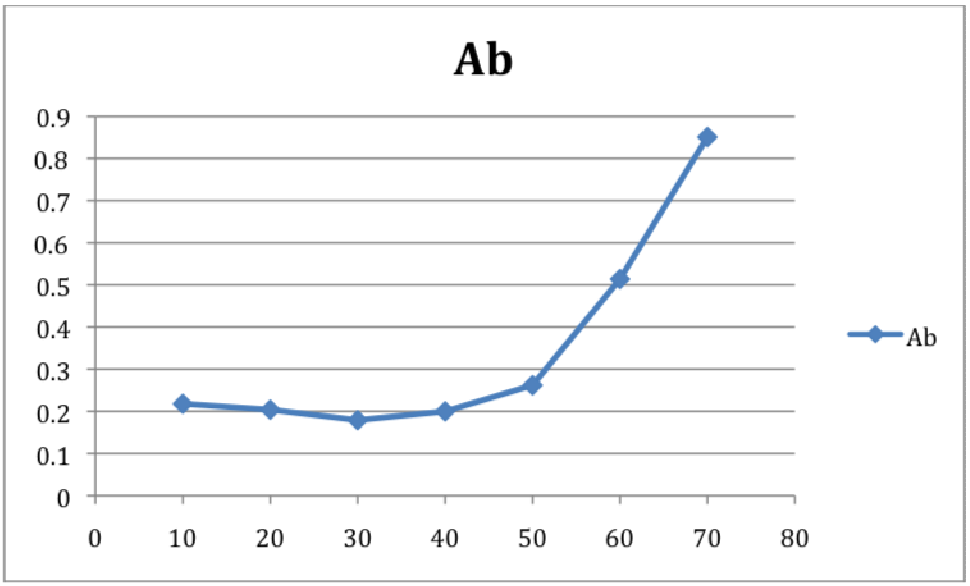
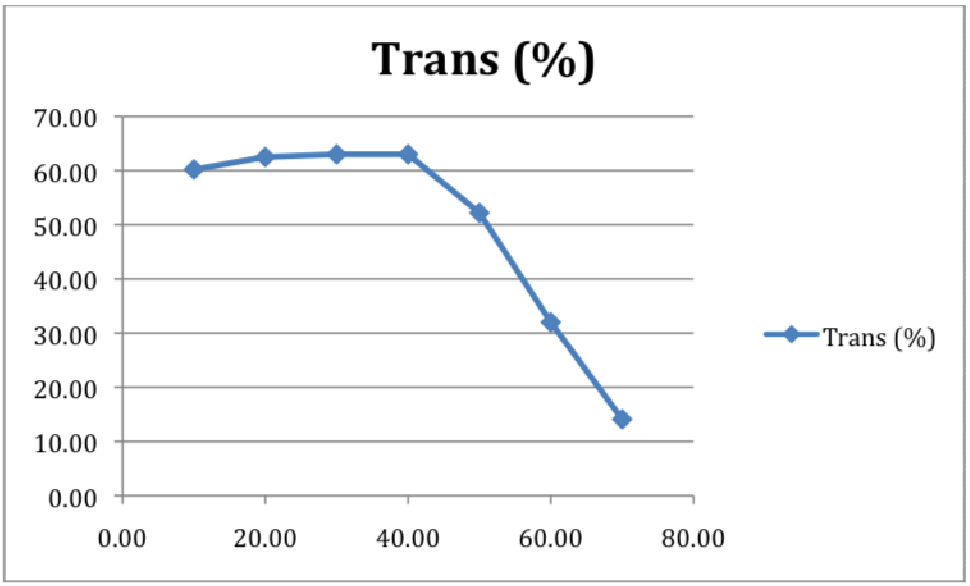


Table 5: average transmittance

TEMP °C	Trans (%)
10.00	60.20
20.00	62.50
30.00	63.00
40.00	63.00
50.00	52.20
60.00	32.00
70.00	14.10

Data Processing and evaluations: graph of transmittance



Conclusion and evaluation:
As the temperature increases, the membrane gets denatured which means the membrane becomes more permeable. As the temperature increases absorbance increases while transmittance decreases.