**Handout 2: Egg Lab Summary**

**Dehydration of Cells**

**Purpose:**

To model dehydration in cells and investigate the effectiveness of common drinks in rehydrating cells using shell-less raw eggs.

**Safety:**

Students should wear goggles, aprons, and gloves at all times while handling eggs. Every effort should be made to prevent puncturing the membrane of the raw eggs. Should an egg rupture, students should wash carefully and the work surface should be cleaned with a mild bleach solution.

**Removing shells:**

Students will submerge raw eggs with vinegar in a plastic cup. After 24 hours (sometimes longer) the shells should be softened enough to rinse under water and remove the remaining shell pieces. Mass is recorded for each individual egg. Begin a discussion with students about what types of drinks teenagers typically consume to generate a list of test solutions. Have students bring something they have easily available. Be sure that someone selects water as an option. [Alternative: If eggs are not available, dialysis tubing can be substituted for the eggs without soaking in vinegar]

**Dehydrating cells:**

Students then placed the de-shelled eggs into a solution of 90% corn syrup in a plastic cup. Eggs were left overnight to create a cell in a dehydrated state (alternatively pancake syrup can be used). Mass is recorded for each individual egg.

**Prediction Modeling:**

Students should predict what they expect to happen to their dehydrated cell when placed in their selected drink. The model included a drawing with explanation and appropriate terminology to describe the movement of substances into or out of the cell. Classmates can review models and ask for clarification or provide constructive feedback.

**Rehydrating cells:**

Dehydrated eggs (whose mass have already been recorded) are placed into a clean plastic cup and covered with enough liquid from the selected drinks to submerge fully. Mass should be taken after 30 minutes and can be taken again after 24 hours. The 30 minute time check allows for discussion of which beverages help combat dehydration quickly.

**Data Collection:**

Students should keep an ongoing data chart of mass. Percent change should be calculated to compare dehydrated egg mass with rehydrated egg mass:

$$\% Change = \left[(rehydrated mass - dehydrated mass)÷dehydrated mass\right]×100$$

Students should create a compilation chart of percent change.

**Sample Data Charts:**

|  |  |  |  |
| --- | --- | --- | --- |
| Mass without shell | Dehydrated Mass | Rehydrated Mass (30 min) | Percent changeDehydrated - rehydrated |
|  |  |  |  |

**Class Data**

|  |  |
| --- | --- |
| **Drink** | **Percent Change** |
| water |  |
| soda |  |
| Energy drink |  |
| Sports drink |  |
|  |  |
|  |  |

**Conclusion:**

Students should make a claim about what sort of drink is most effective in rehydrating a cell quickly. Conclusion should follow claim, evidence, and reasoning format and describe the movement of molecules into or out of the dehydrated cell. An extension to make recommendations for providing appropriate and effective drinks for athletes can be included.