***C. elegans* and the effects of alcohol** **Student name:**_____

Activity 1 Goal

To investigate how alcohol affects the movement of a microscopic roundworm (*Caenorhabditis elegans* or *C. elegans*)

Materials

- light microscope
- petri dish containing N2 *c. elegans* (wild type)
- slide with 2 depressions (concavity culture slide)
  - or -
  2 small petri dishes with agar
- worm picker(s)
- 95% alcohol (diluted and prepared)
- permanent pen (Sharpie)
- timer with seconds feature
- distilled water in a small cup
- 10-100 µl pipetter with tips
- disposable plastic pipettes

What do you remember about *C. elegans*? What do they look like? How do they move?

_____

_____

What do you think might happen when the worms are placed onto or into alcohol?

_____

_____

One way to quantify locomotor activity (i.e. thrashing)

Decide how you are going to define "thrashing" behavior; describe it here. _____

_____

1. Decide which person will keep time and who will count the thrashes.
2. Set the timer for 30 seconds.
3. Ask the thrash-counting partner to look at the worms from one petri dish or depression in the slide under the microscope. Focus on one worm and start counting the number of thrashes or movements it makes after the timer is on. Record the number of thrashes in the data table.
4. Stop and wait for 2-3 minutes; then once again set the timer for 30 seconds and follow step 4. Do steps 3-4 one more time.
5. After counting the thrashes, do steps 3-5 for the worms on the second petri dish or slide well in the slide.

What other ways could you measure the worms' movement?

Qualitatively? _____

_____

Quantitatively? _____

_____

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Setting up the experiment

1. Prepare alcohol infused plates.

   If using Petri dishes that have alcohol on them, _____ alcohol needs to be placed on the surface of the ___ mm dishes in order to be absorbed into the agar. Alcohol should be placed on the dishes at least one hour prior to use.

OR

2. Pick the worms individually from the petri dish.
   a. If a slide is being used, put one drop of water in one well and one drop of ____ alcohol in the other well.
   b. Place the petri dish with the worms under the microscope. Using the worm picker, carefully slide the picker on the surface of the agar. Try to get a small amount of bacteria on the pick.
   c. Once bacteria are on the pick, place the pick on top of a worm or slide the pick near a worm. Imagine the bacteria are like glue to stick the worms to the picker.
   d. Gently place the worm on the surface of the petri dish or into the water or alcohol on the slide.
3. Collect and compare results.

   Petri Dish or slide 1: _____ solution used

Trial #	Time	# of thrashes
Trial 1	30 seconds	
Wait!		N/A
Trial 2	30 seconds	
Wait!		N/A
Trial 3	30 seconds	
Total		

   Petri Dish or slide 2: _____ solution used

Trial #	Time	# of thrashes
Trial 1	30 seconds	
Wait!		N/A
Trial 2	30 seconds	
Wait!		N/A
Trial 3	30 seconds	
Total		

What do you notice about how the worms move in each solution?

Activity 2 Goal

To compare and contrast the movement of different strains of C. elegans when placed in water or alcohol environment

Materials

- 4 petri dishes:
  - petri dish 1 - containing water
  - petri dish 2 - containing water
  - petri dish 3 - containing alcohol
  - petri dish 4 - containing alcohol

  - or -
- 2 slides with 2 depression wells (concave indents)
  - slide 1 - containing water in both wells
  - slide 2 - containing alcohol in both wells
- N2 worms
- slo-1 strain worms
- npr - Hawaiian strain worms
- worm picker
- 10-100 µl pipetter with tips
- disposable plastic pipettes
- stable magnifiers and/or microscopes

1. Pick the worms from the petri dish.

a. Place the petri dish with the N2 worms under the microscope or magnifying glass. Using the pipette pick, carefully slide the pick on the surface of the agar. The goal is to get a small amount of bacteria on the pick.

b. Once bacteria are on the pick, place the pick on top of a worm or slide the pick near a worm.

c. Take the N2 worm and place it on petri dish 1 (water).

d. Do step C until there are at least 3 N2 worms on petri dish 1(water).

e. Follow steps C-D but place the _____ strain worms on petri dish 2 (water).

How many N2 worms did you put on Petri dish 1? _____

How many ____ strain worms did you put on Petri dish 2? _____

2. Observations

Compare the movement and behavior of the worms on each petri dish.

How does each strain of worm move in/on water?

N2s: _____

____ strain: _____

Now try looking at how the worm strains behave in alcohol.

3. Pick the slo or npr worms from the petri dish.

a. Place the petri dish with the N2 worms under the microscope or magnifying glass. Using the pipette pick, carefully slide the pick on the surface of the agar. The goal is to get a small amount of bacteria on the pick.

b. Once bacteria are on the pick, place the pick on top of a worm or slide the pick near a worm.

c. Take the N2 worm and place it on petri dish 3 (alcohol).

d. Do step C until there are at least 3 worms on petri dish 3 (alcohol).

e. Follow steps C-D but place the ___ strain worms on petri dish 4 (alcohol).

How many worms did you put on Petri dish 3? _____

How many worms did you put on Petri dish 4? _____

4. Observations

Compare the movement and behavior of the worms on each petri dish.

What do you notice about how the worms move? _____

_____

_____

What do you think is happening to the worms? _____

_____

_____

Looking at how the N2 and the other strains of worms, what do you notice is similar about the two types of worms? _____

_____

_____

Looking at how the N2 and the other strains of worms, what do you notice is different about the two types of worms? _____

_____

_____