

Experimental Results Worksheet KEY
BIOL 01104, Dr. Spielman

We have previously discussed the two experimental scenarios given below. For each scenario, several options for experimental results are provided.

For each potential result, determine if the results: **support** the alternative hypothesis, or if the results **fail to support** the alternative hypothesis. If the results fail to support, do they support other conclusions? Or, do the results not point to a clear conclusion at all?

Hypothesis: Thyroxin (a thyroid hormone) release triggers amphibian metamorphosis.

Researchers collect 100 tadpoles. They randomly place fifty tadpoles into a tank with just water, and they place the other fifty tadpoles into a tank with thyroxin. After four days, they count how many tadpoles have undergone metamorphosis in each tank.

Result #1:

Experimental Groups	Percent metamorphosing
Thyroxin	85%
Water (no thyroxin)	5%

Support hypothesis. Much higher percentage in thyroxin tank.

Result #2:

Experimental Groups	Percent metamorphosing
Thyroxin	55%
Water (no thyroxin)	25%

Support hypothesis due to higher percentage in thyroxin tank. OR fails to support because one could view these numbers as too similar. Need more trials.

Result #3:

Experimental Groups	Percent metamorphosing
Thyroxin	35%
Water (no thyroxin)	35%

Fails to support hypothesis. Same values in control and treatment. Results suggest thyroxin has no effect.

Result #4:

Experimental Groups	Percent metamorphosing
Thyroxin	4%
Water (no thyroxin)	3%

Fails to support hypothesis. Same values in control and treatment. Results suggest thyroxin has no effect.

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Hypothesis: Acetylcholine stimulates muscle contraction.

Researchers prepare fifty identical replicate cell cultures of muscle fibers. They randomly divide these cultures into five groups with 10 dishes each. Three of the groups are treated with an acetylcholine solution of a different concentration. The fourth group receives a treatment of the solvent without acetylcholine, and the fifth group receives no treatment.

Result #1:

Experimental Groups	Percent contracting
Acetylcholine, low concentration	12%
Acetylcholine, medium concentration	25%
Acetylcholine, high concentration	38%
Solvent only	2%
No treatment	1.8%

Support hypothesis. Further suggestions higher concentrations lead to increased levels of muscle contraction.

Result #2:

Experimental Groups	Percent contracting
Acetylcholine, low concentration	58%
Acetylcholine, medium concentration	56%
Acetylcholine, high concentration	57%
Solvent only	2%
No treatment	3%

Support hypothesis. Further suggestions that acetylcholine concentrations don't have an effect; just presence of acetyl will cause muscle contraction.

Result #3:

Experimental Groups	Percent contracting
Acetylcholine, low concentration	58%
Acetylcholine, medium concentration	56%
Acetylcholine, high concentration	61%
Solvent only	48%
No treatment	49%

Fails to support hypothesis. Extremely similar numbers between control and treatment, although treatment are marginally higher. There is a possibility that these results DO support the hypothesis, but it would mean that acetylcholine's effect is VERY SMALL.

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Result #4:

Experimental Groups	Percent contracting
Acetylcholine, low concentration	5%
Acetylcholine, medium concentration	8%
Acetylcholine, high concentration	6%
Solvent only	82%
No treatment	64%

Fails to support hypothesis. Suggests the opposite conclusion: Acetylcholine may be inhibiting muscle contraction.

Result #5:

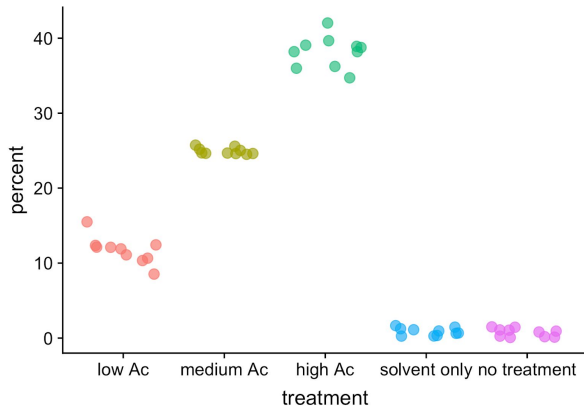
Experimental Groups	Percent contracting
Acetylcholine, low concentration	79%
Acetylcholine, medium concentration	78%
Acetylcholine, high concentration	81%
Solvent only	85%
No treatment	2%

Fails to support hypothesis. Suggests the SOLVENT is causing contraction instead.

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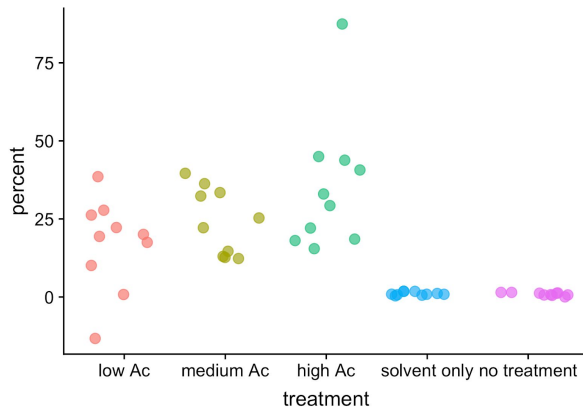
Consider these graphs as you considered the tables: Each point represents a single measurement from each treatment or control replicate. The X-axis shows your experimental groups, and the Y-axis shows the percent of contracting fibers.

Result #6:



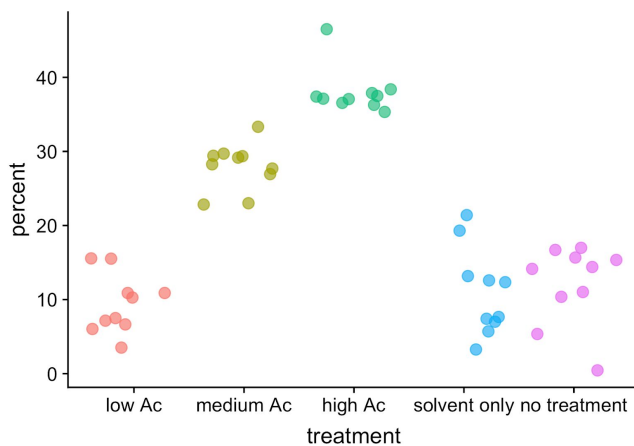
Same answer as #1

Result #7:



Same answer as #2

Result #8:



Likely supports hypothesis, but suggests low concentrations have no effect. need medium or high to see any muscle contraction.