

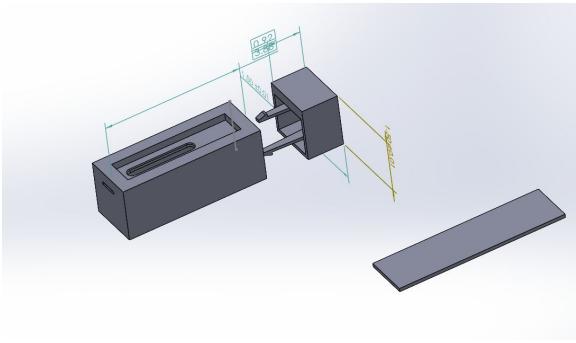
Spiked Drink Detector

Capsule Model: Makeshift

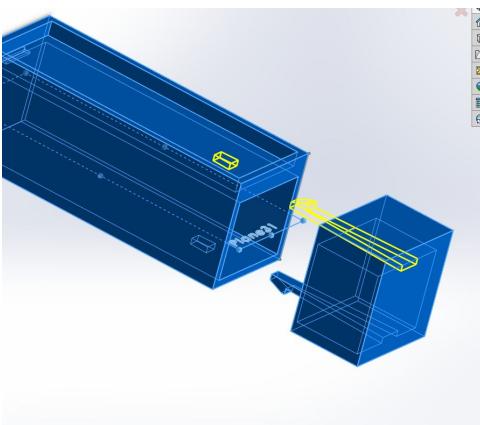
- Top compartment holding all of our test strips
- Bottom Compartment holding an individual test strip at a time in order to perform the test
 - It will be held by a “spike” by the lamination part of the testing strip (preventing any cross-contamination between the other teststrips inside the capsule)
 - Has a clear cover in order to see the colorimetric change that occurs when there is a positive result in the solution being tested



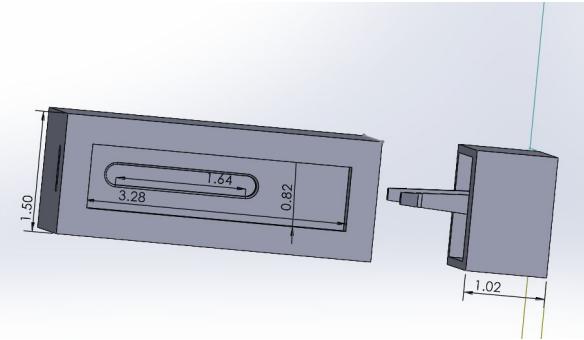
Capsule Model: Solidworks



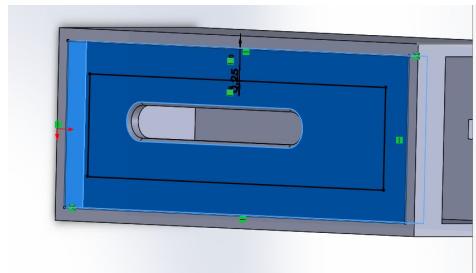
Plane on the right will be inserted inside the capsule; Test strips will go on top



Slit inside the capsule in order to keep the hook in place

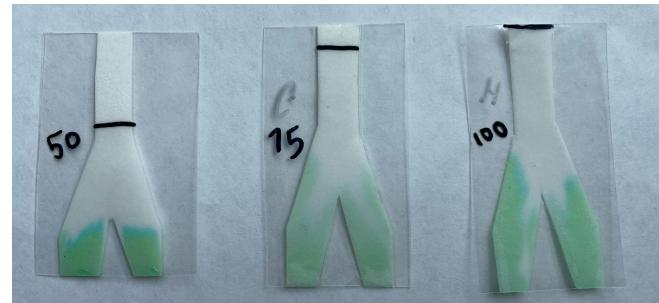
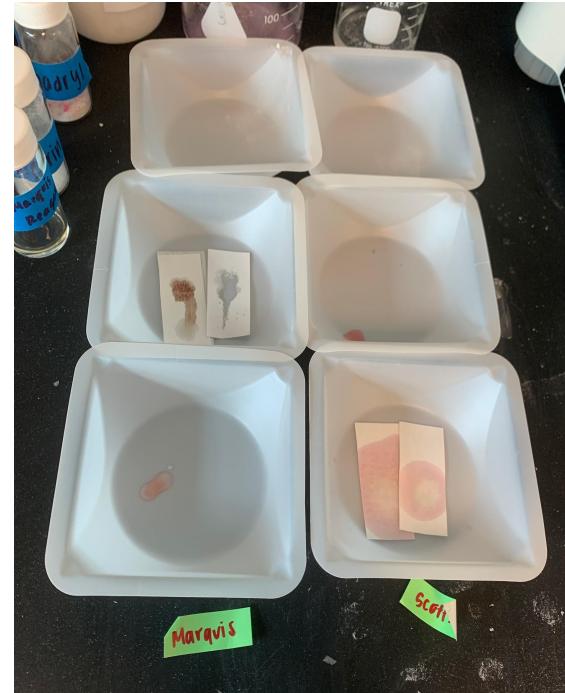


Two snap hooks that on 2 opposite sides of the cap



Test Strip Model

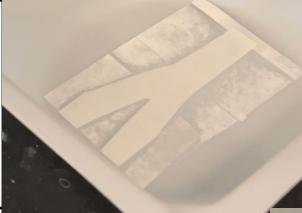
- Test liquid traveling using water and food coloring to visualize
- Volume capacity
 - 50 μ l - A bit under the desired line of reach
 - 75 μ l - Ideal reaches the desired line
 - 100 μ l - Exceeds passes the line (might cross contamination the other test strips in the capsule)
 - Another thing to note is that although the green colored water doesn't seem to reach were our desired line is (50 μ l) it did
 - the water seemed to separate from the color; we do not know why
- Final dimensions still undecided
 - The paper test strip components
 - the laminated component will be 1 in. wide, but the length undecided
 - Channels end-to-end: 3.11 cm wide



Tabular Data

Test Method	Reactions	Observation	Results
Scott's Method	10 μL of Benadryl Solution + 2 drops of Scotts Reagent	Low quantity of benadryl no color change High quantity of benadryl : pink to blue color change	Failed initially but with more quantity of benadryl showed minimal success
Scott's Method $\text{Co}(\text{SCN})_2$	0.56 grams KSCN+ 25ml water + 0.544 grams Co Benadryl+ CoCl_2	Strong reaction with dark blue color	Successful as dark ble color can be observed for this reaction
	10 μL $\text{Co}(\text{SCN})_2$ + 5 μL of Benadryl solution	There was a diffusion of color change ot blue	Success on both one sided lamination and double sided lamination
Marquis Method	1 microliter of aspirin water + 2 drops of Marquis Reagent	- non laminated - burnt through test strip - reaction seeped behind the paper	
	1 microliter of aspirin water+ 2 drops of Marquis Reagent	- single laminated - no burning of paper - slight color change	

Modified Scott's Reagent Test

Results/Observations	Pictures
<p>This is our control group as the single side laminated test strips have only the prepared reagent on it.</p> <ul style="list-style-type: none">- cobalt tetrathiocyanate $[\text{Co}(\text{SCN})_4]$-	 A photograph showing four white, rectangular test strips arranged in a row. They are placed on a dark, textured surface, possibly a tray or a piece of paper. The strips appear uniform in color and texture, indicating no reaction has occurred.
<p>This is immediate after we added Benadryl to get a reaction.</p> <ul style="list-style-type: none">- There is a slight hue of color change present as the finer particle of benadryl were quicker to react	 A photograph showing four white, rectangular test strips. One strip shows a small, distinct reddish-pink spot where Benadryl was applied, indicating an initial color change.
<p>This is 4 minutes of the Benadryl sitting on the reagent soaked test strip.</p> <ul style="list-style-type: none">- Color change from clear to blue- Indicates that a false positive of ketamine was detected	 A photograph showing four white, rectangular test strips. One strip shows a more extensive, faint blue coloration across its surface, suggesting a color change over time.
<p>After 7 minutes of observation, the color change deepend to a darker blue.</p>	 A photograph showing four white, rectangular test strips. One strip shows a significantly darker, more intense blue color compared to the previous stage, indicating further progression of the color change.

Data Analysis

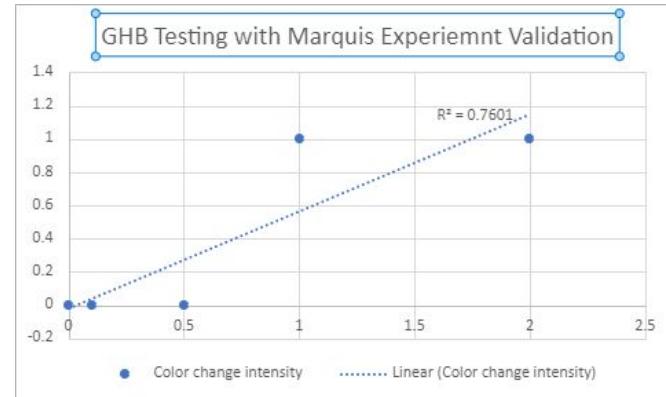
- Currently we do not have enough data to analyze
- But here is our plan:

Regression Analysis: $Y_i = f(X_i, \beta) + e_i$

Y_i = Response variable (Color change)

$f(X_i, \beta) = (\beta_1 X_1 + \beta_2 X_2 + \dots)$; % concentration, Volume

e_i = Error



Test strips burnt because GHB does not react with Marquis

Scott Reagent: Cobalt Thiocyanate



When the Cobalt Thiocyanate Reagent made direct contact with high concentration of Benadryl there was an instantaneous color change reaction from a magenta color to a blue color.



Both Pictures are the same displaying 2; one-side laminated strips containing 5 μ L of our testing solution

- Image to the left is the reaction after approx. 1 min
- The image to the right is the reaction after 20 min
- It maintains its color; doesn't fade out (all strips after 40 min remained blue)



Double Laminated Paper Strips Cobalt Thiocyanate with 5 μ L of our testing solution

- A small color change

Next Steps

Capsule

- Complete the two 3D printing trainings still needed
- Print the 3D model
 - Once printed, figure out how many tests can be held

Test Strips/Reagents

- Add the reagents onto test strips
- Get exact measurements for effective tests
 - Drug to liquid ratio, minimum amount to get a color reaction
 - Keep playing with colored drinks

Meeting Discussion

- Fast, discrete color change reaction
- Notes added in the notes section under specific slides
- Showed Lauren the ketamine testing from 23-02-28