

Who killed Kyle?





LIVE

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VICTIM: Kyle Connor, 26

BREAKING NEWS

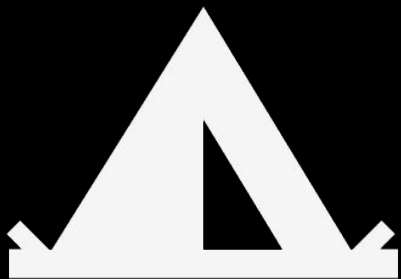
WHO KILLED KAYAKER KYLE?

17:27

BEAR SIGHTED NR. LOON LAKE | SCANDAL: GIRL GUIDES TO STOP MAKING COOKIES



The Crime Scene



The Suspects



Juno - Girlfriend



Beth - Ex Girlfriend



Jon - Colleague



Dean - Colleague



Oliver - Cousin

What are suspects' motives/alibis?

Who is your prime suspect? Why?





Who do you suspect now? Who did not
commit the crime?



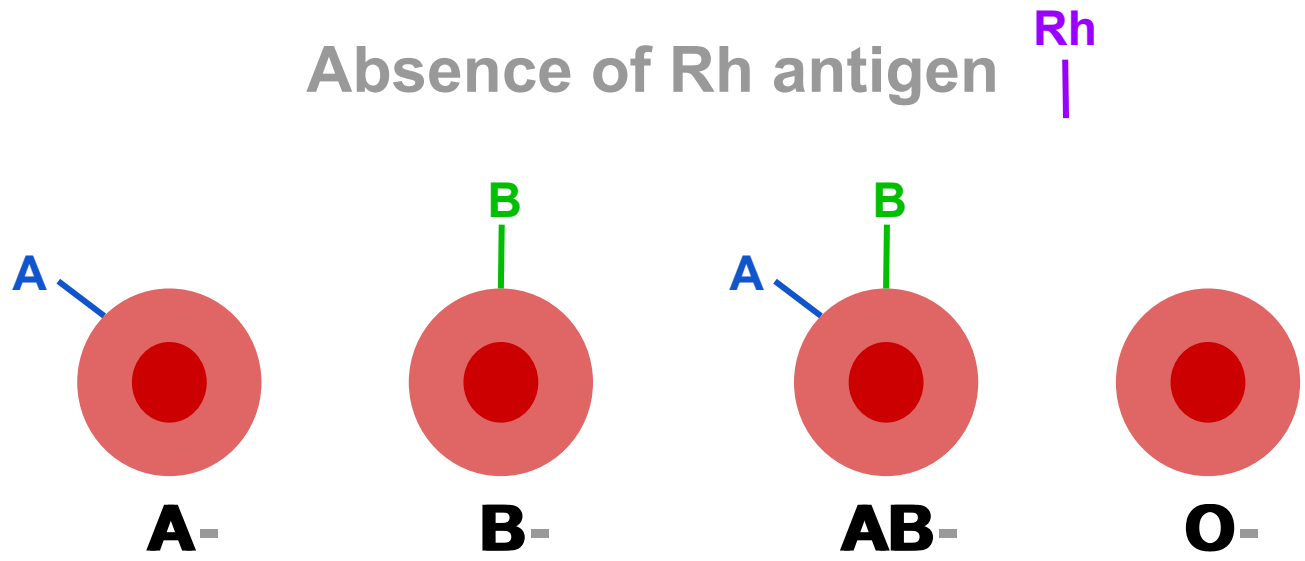


Blood Evidence

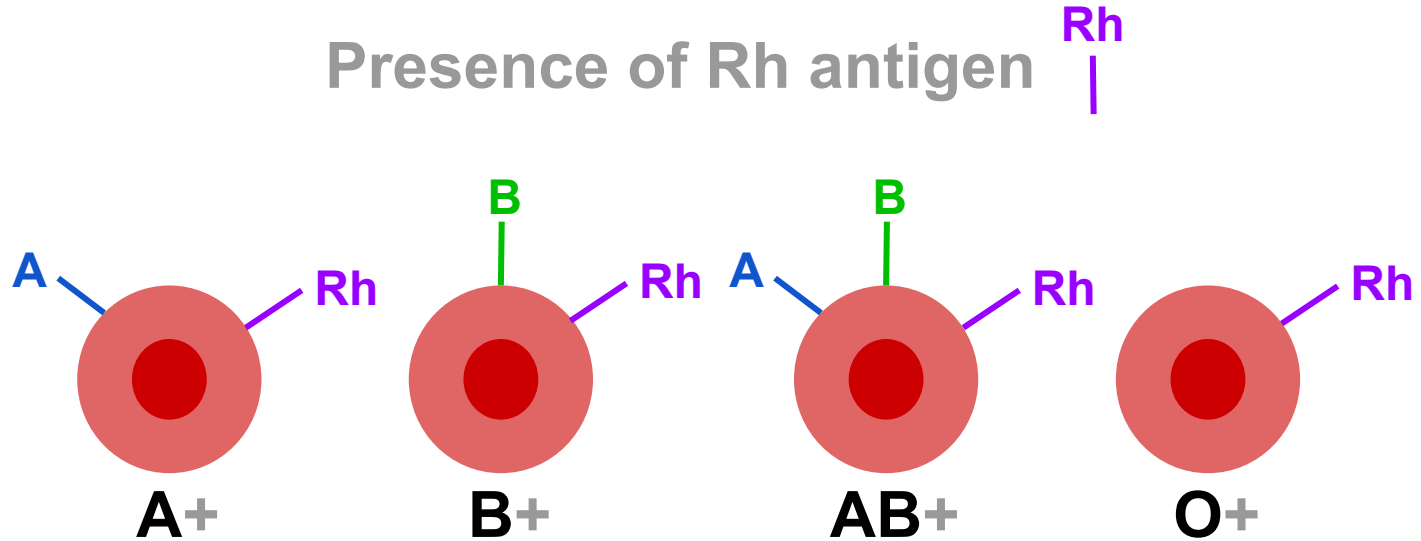


Whose blood might be on the pocket knife?

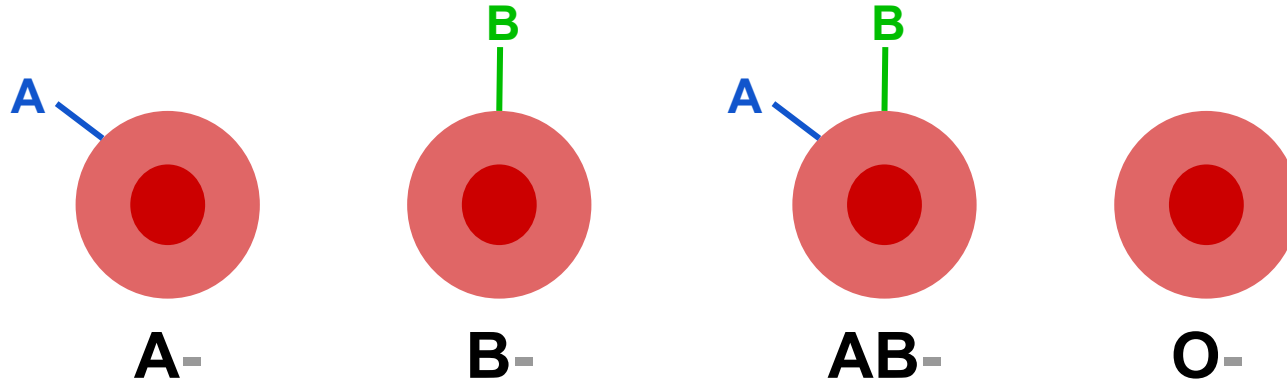
Blood Types



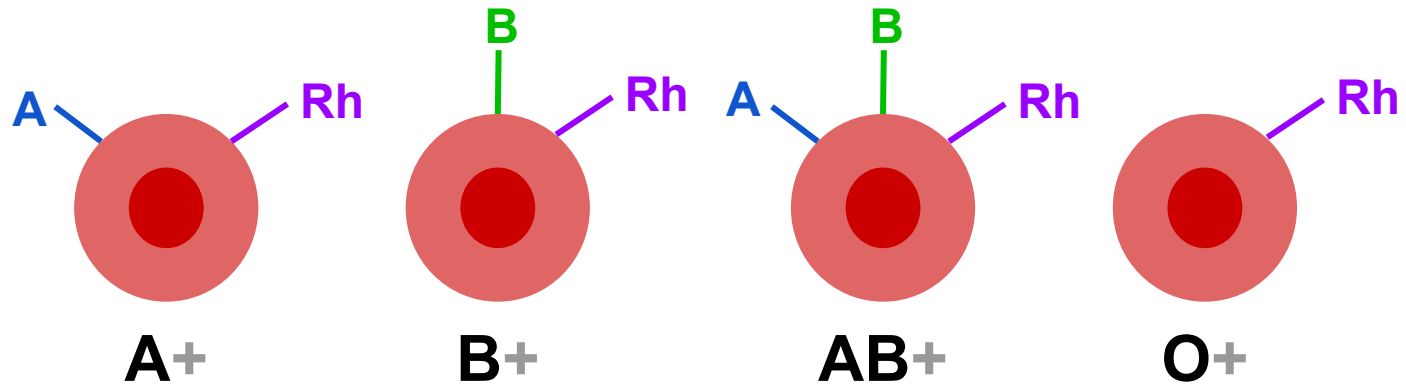
Blood Types



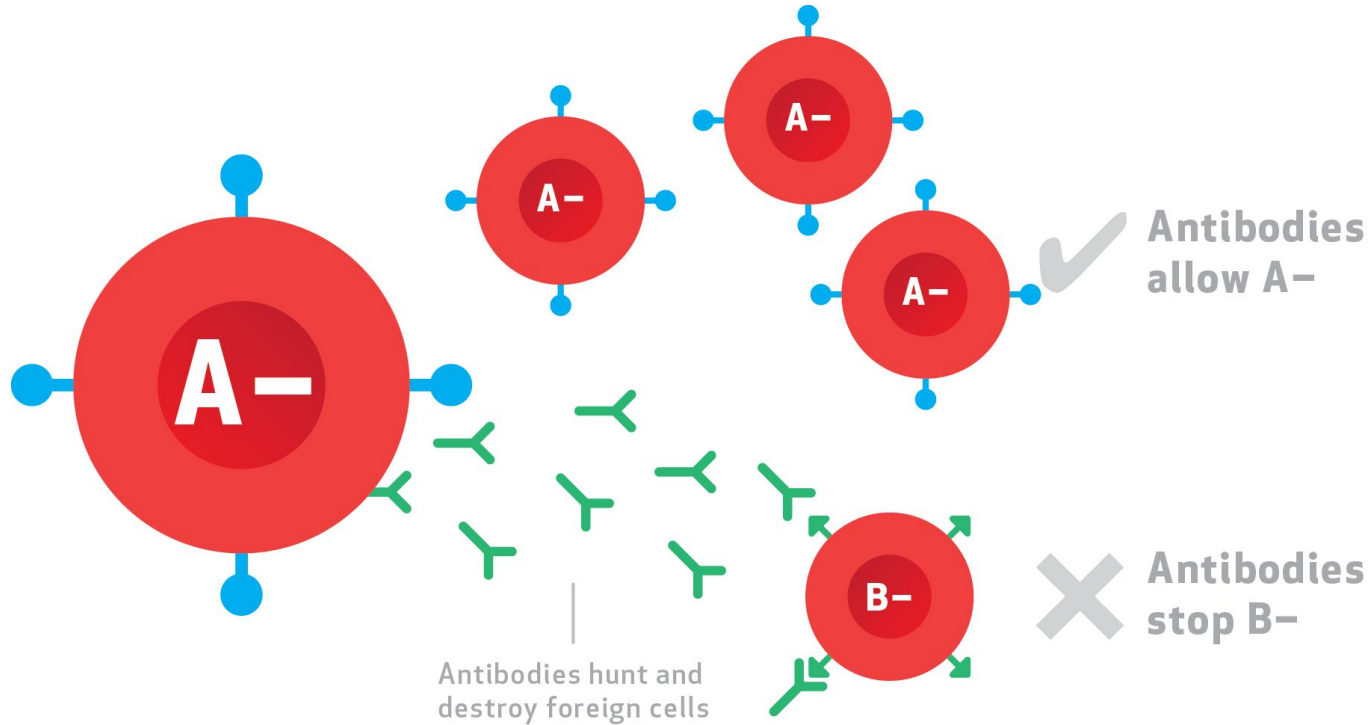
Absence of Rh antigen



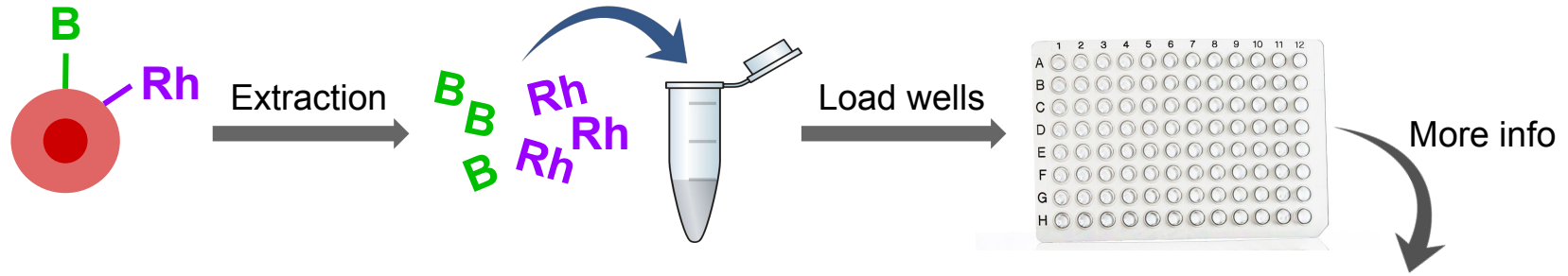
Presence of Rh antigen



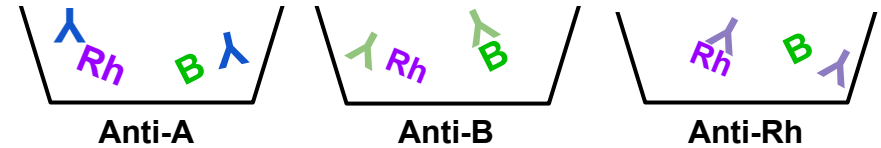
What happens if you give a person wrong blood type?



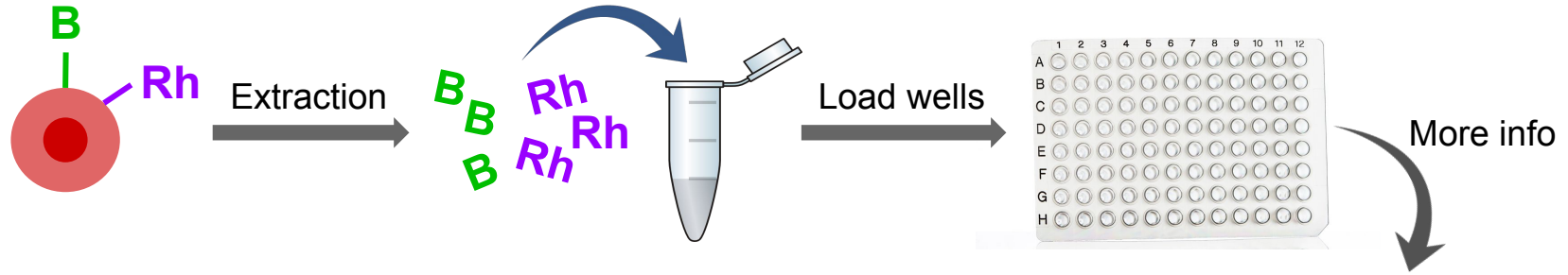
Enzyme-Linked ImmunoSorbent Assay (ELISA)



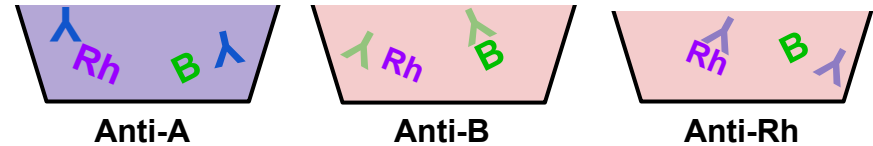
1. Load cell extracts into wells and add antibodies



Enzyme-Linked ImmunoSorbent Assay (ELISA)



1. Load cell extracts into wells and add antibodies
2. Add substrate to trigger colour change if antigen is present



ELISA Blood Typing Activity

Make sure to rinse the pipette with water between each sample

Step 1

Add 2 drops into each well

Step 2

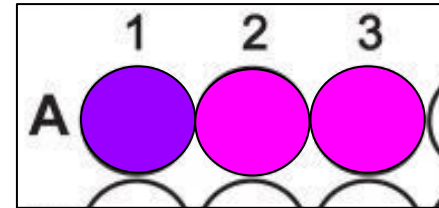
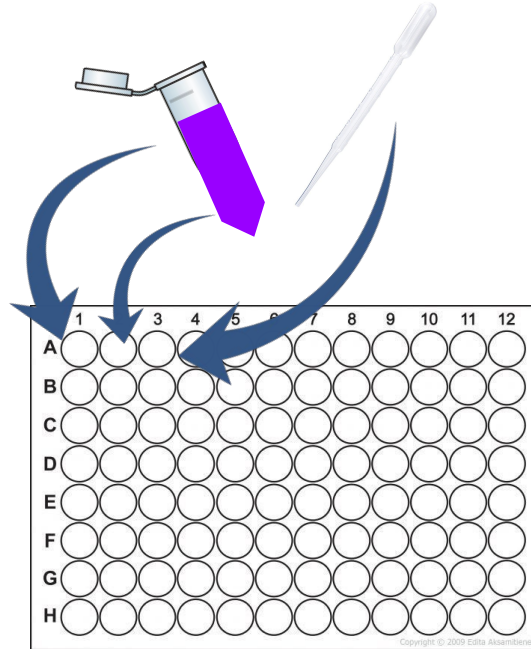
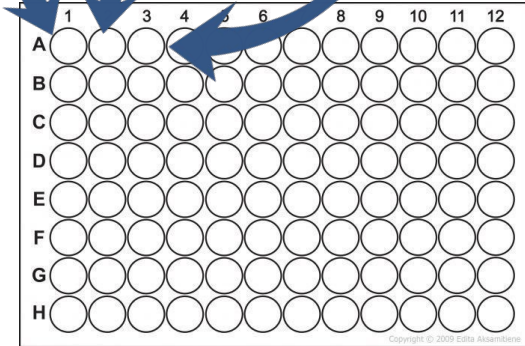
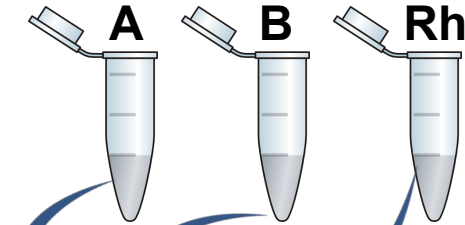
Add 2 drops of indicator

Step 3

Observe colour change

Step 4

Blood type?

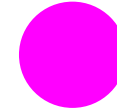


xA antigen
✓ B antigen
✓ Rh antigen

Type B+



Absence of antigen



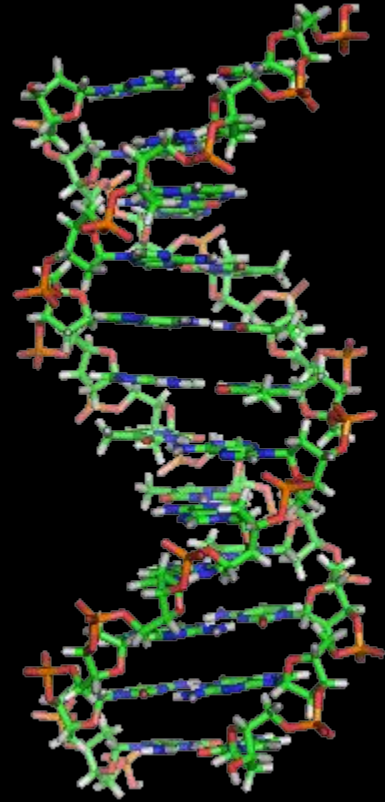
Presence of antigen

Blood Type Analysis: Results

Sample ID	Antigen A	Antigen B	Antigen Rh	Blood Type
Crime Scene Knife				
Victim - Kyle	-	+	+	B+
Juno				
Jon				
Oliver				
Beth				
Dean				

Who do you suspect after blood type analysis?
How confident are you?





DNA Fingerprinting

1. DNA is extracted.
2. Copies of short tandem repeats (STR) are made.
3. STRs are separated by size using gel electrophoresis.

Short Tandem Repeats

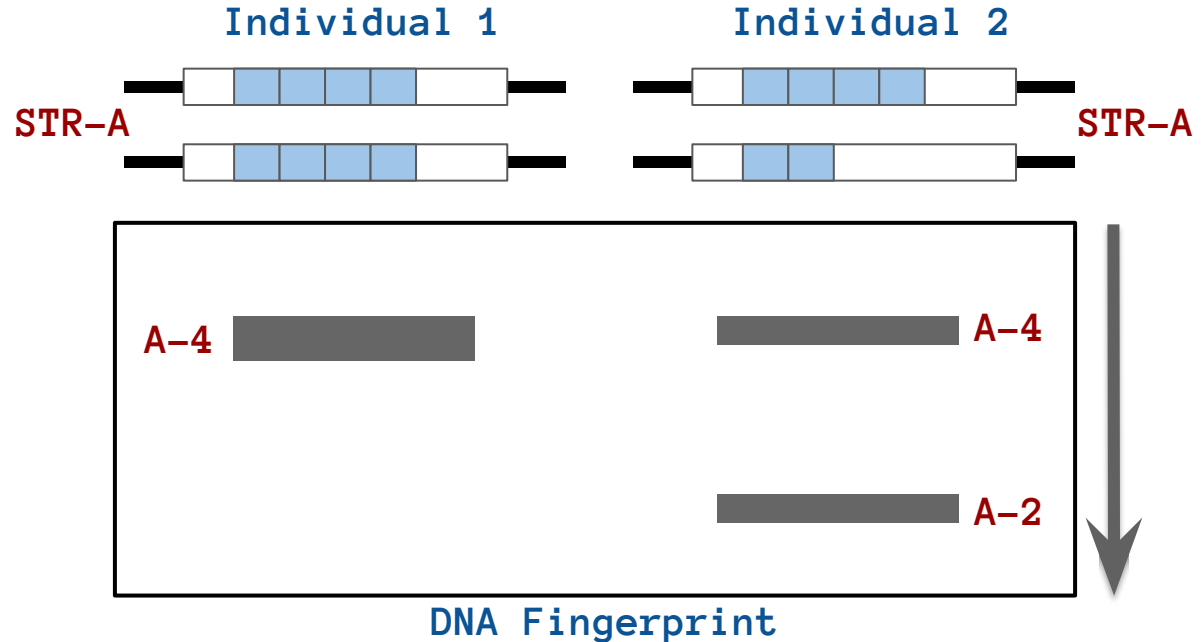
of repeating units
are highly variable

 CAT

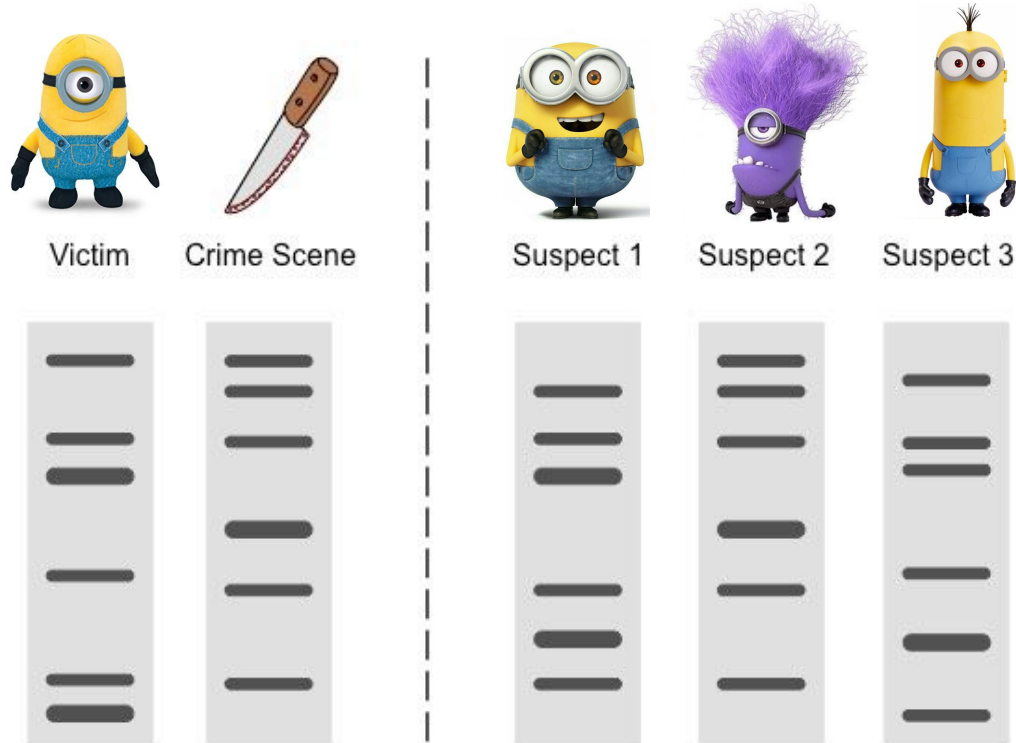
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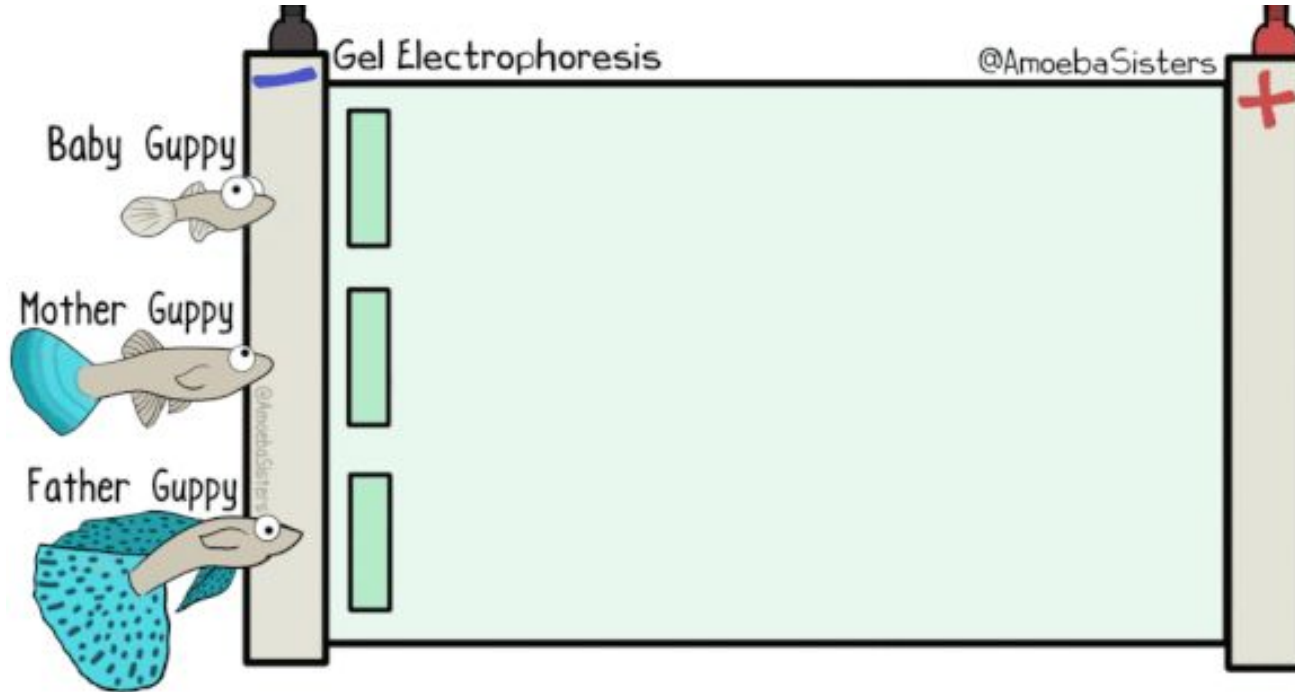
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DNA Fingerprinting



DNA Fingerprinting



Who do you suspect after DNA analysis?
Why?



Who will you try in court?
Are there any doubts that the jury
might consider?



BETH

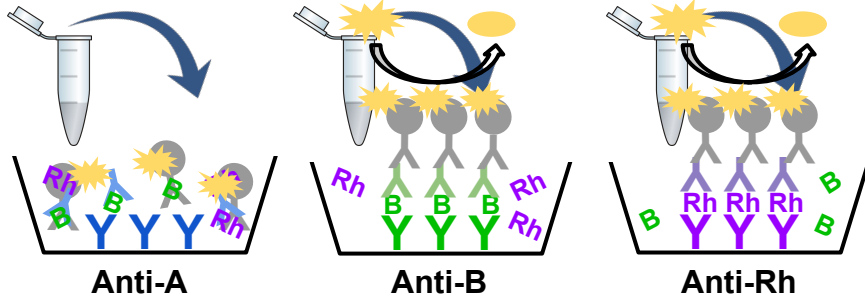
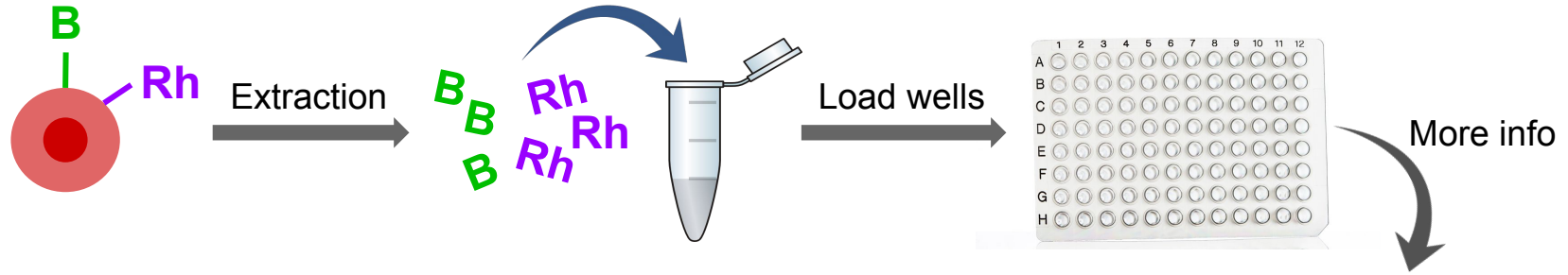


What Really Happened


Beth

"I didn't mean to kill him! I couldn't sleep I was so furious at being pushed into the water earlier. So, when I saw Kyle head down to the canoe in the night, I went down to confront him. I just wanted an apology but he started laughing at me again! So I picked up the paddle to threaten him and he whisked out a knife!! He started playing around, pretending to swipe at me. So I swung the paddle...not meaning to hit...but got him square on the jaw. At the same time, his knife caught my arm. He fell and hit his head on the canoe. He didn't wake up after that."

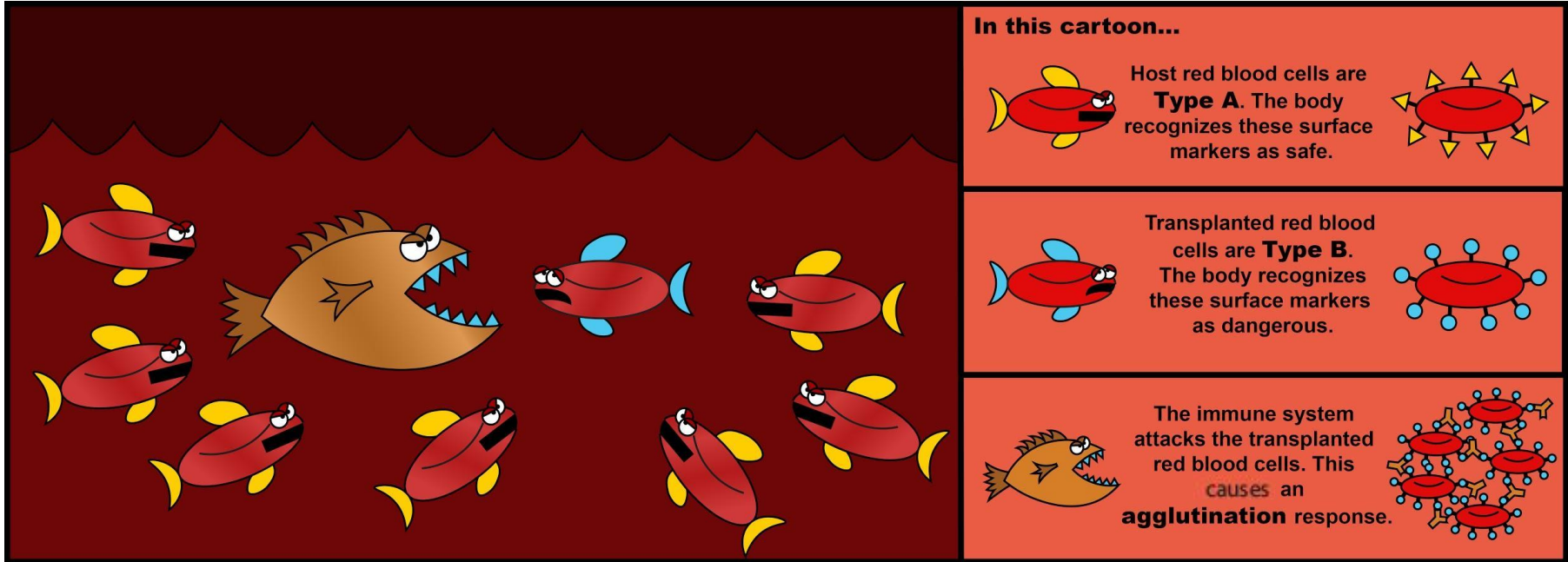
Enzyme-Linked ImmunoSorbent Assay (ELISA)



1. Load cell extracts into wells with capture antibodies
2. Add 1° antibodies
3. Add 2° antibodies with attached enzyme
4. Add substrate that reacts with enzyme

 → Colour Change → Presence of Antigen

What happens if you give a person wrong blood type?



Fingerprint Analysis

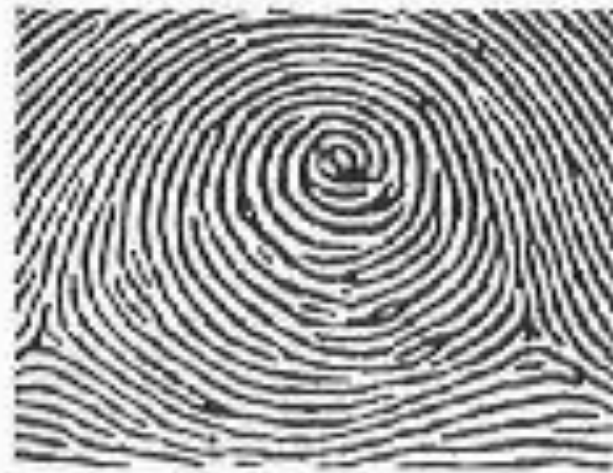
- All fingerprints are unique
- Combination of 3 major patterns



Arch



Loop



Whorl

Whose fingerprints were found at
crime scene?

Do these findings alter your theory?



Blood Type Analysis: Results

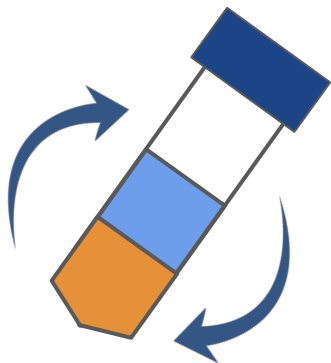
Sample ID	Blood Type	Antigen A	Antigen B	Antigen Rh
Crime Scene Knife	A+	+	-	+
Victim- Kyle	B+	-	+	+
Juno	AB+	+	+	+
Jon	O+	-	-	+
Oliver	B-	-	+	-
Beth	A+	+	-	+
Dean	A+	+	-	+

DNA Extraction Activity

1

Add 20 mL of warm water into tube of raw wheat germ.

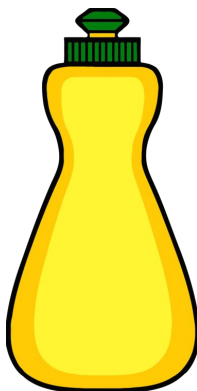
Mix gently for 3 mins.



2

Add ~1 mL of detergent and mix gently for 5 mins.

Try not to create foam!

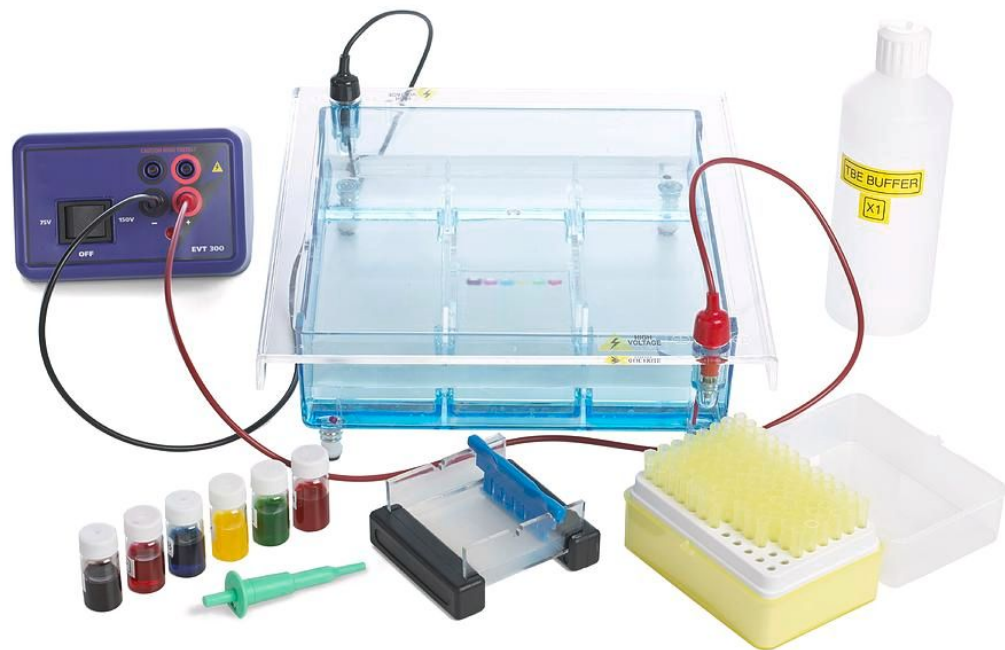


3

Tip the tube at an angle. Slowly and gently pour 14 mL of rubbing alcohol down the side.

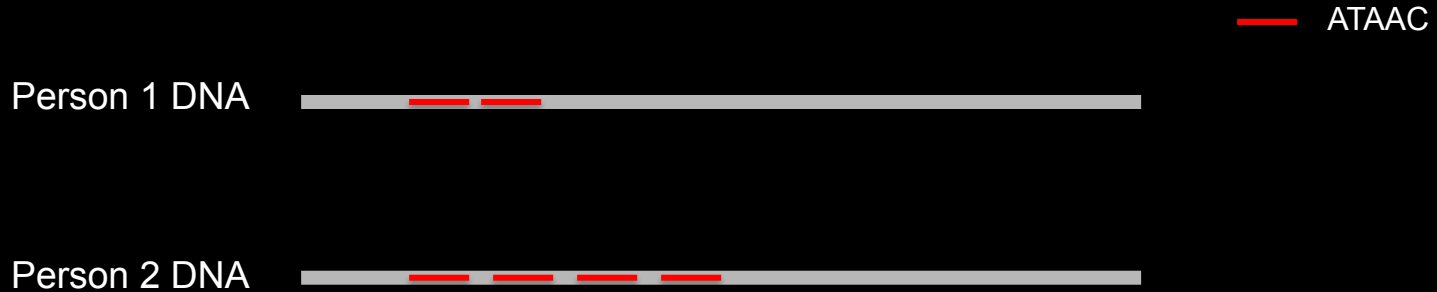
Do not mix the layers!





DNA Analysis

- 1) DNA is extracted
- 2) PCR used to make many copies of Short Tandem Repeats (STR)



PCR takes advantage of the enzymes that cells use for DNA replication to make enough DNA that we can see it on a gel

DNA Analysis

3) Gel electrophoresis separates Short Tandem Repeats by size

