

Analysis of soil and unknown substance in the cup

Investigation details on Genially: <https://view.genially.com/62b98e3019c10300188bf136>

Now, you know the blood type of:

- the victim
- the suspects
- the blood found on the floor and on the wine bottle

Other evidence must be analyzed: the soil and the liquids found in the cup of coffee and in the beer bottle

In your group of 3:

- ⇒ 1 student will work on mission 1.
- ⇒ 2 students will work on mission 2.
- ⇒ Then you will share.

Mission 1: Analyze the contents of the cup of coffee and the beer bottle

The autopsy showed that Max had a particular substance in his body:

Look up on the internet the effects of this substance on the human body:

We would like to know whether the **liquids in the cup of coffee or in the beer bottle** contain this substance.

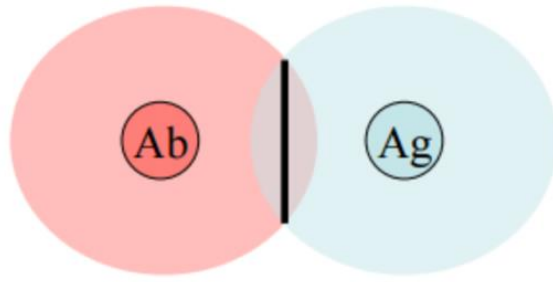
An Ouchterlony assay will be done, with the following solutions:

- Eppendorf 1: Content of the cup of coffee
- Eppendorf 2: Content of the beer bottle
- Eppendorf 3: Control: the substance found in Max's body
- Eppendorf 4: Antibodies against the substance

- ⇒ **Read the text below, watch the video (available on Genially, start at 0.53 min) and write down the procedure - by filling in the sketch.**

The Ouchterlony test is used to test whether an antibody-antigen interaction occurs.

For this assay, an agarose gel is used in which wells are punched. The antibody (Ab) and antigen (Ag) samples are put inside the wells. During incubation, the antibodies and antigens diffuse through the gel. When an interaction occurs, they will stick together (agglutinate) and precipitate in the gel. This is visible as a white line.

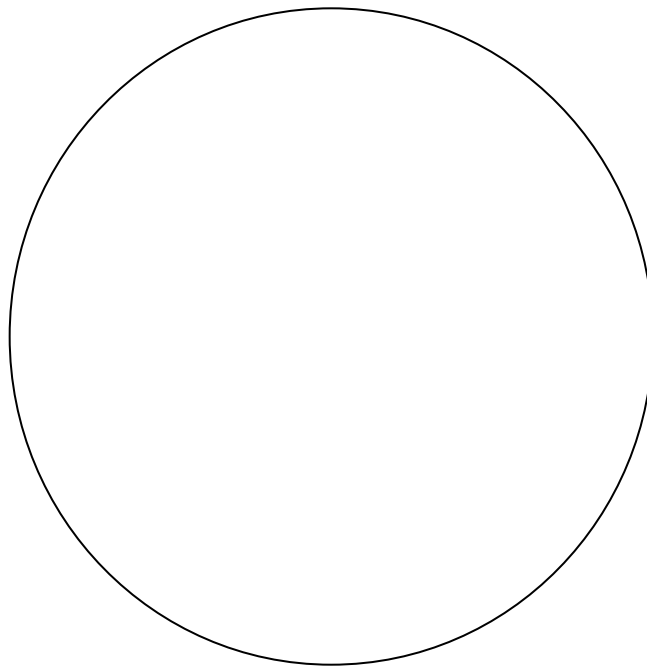


the Ouchterlony principle



how it looks in agarose

Procedure: Draw where you will put the samples and call me for verification



Results:

AUTOPSY RESULTS

Positive Findings:

<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Matrix Source</u>
Caffeine	Presump Pos	mcg/mL	001 - Cardiac Blood
Fentanyl	11	ng/mL	001 - Cardiac Blood
Norfentanyl	1.3	ng/mL	001 - Cardiac Blood
4-ANPP	0.83	ng/mL	001 - Cardiac Blood

See Detailed Findings section for additional information

Agency Case Number: 23-0537

Testing Requested:

<u>Test</u>	<u>Test Name</u>
8084B	Postmortem, Expanded w/Vitreous Alcohol and 6-MAM Confirmation, Blood (Forensic)

Tests Not Performed:

Part or all of the requested testing was unable to be performed. Refer to the Analysis Summary and Reporting Limits section for details.

Specimens Received:

<u>ID</u>	<u>Tube/Container</u>	<u>Volume/ Mass</u>	<u>Collection Date/Time</u>	<u>Matrix Source</u>	<u>Labeled As</u>
001	Gray Stopper Glass Tube	9.25 mL	04/17/2023 07:55	Cardiac Blood	230417-489
002	Red Stopper Glass Tube	3 mL	04/17/2023 07:55	Vitreous Fluid	230417-489

All sample volumes/weights are approximations.

Specimens received on 04/19/2023.

OUCHTERLONY PROCEDURE (for students that needs it)

1. Wells are punched into the gel using a gel borer
2. By using a micropipette, Fill wells with 50 μ L solutions. Antibodies are placed in the central well and tested solutions are added to the wells around the center well.
3. Incubate the glass plate 20 minutes

Mission 2: soil analysis

The soil contains pollen, a fine powdery substance, typically yellow, consisting of microscopic grains discharged from the male part of a flower or from a male cone. Each grain contains a male gamete that can fertilize the female ovule, to which pollen is transported by the wind, insects, or other animals.

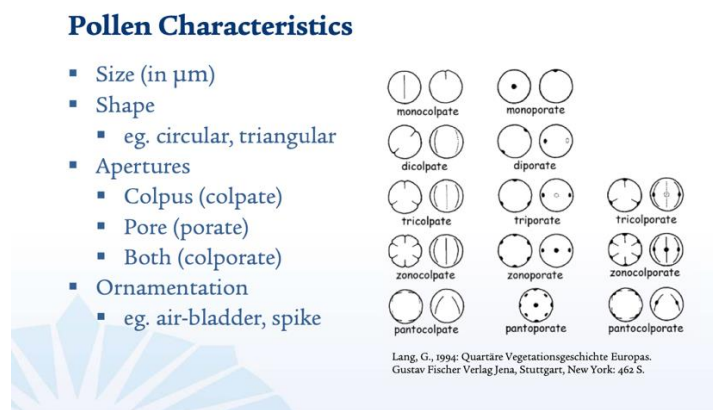
The different plant species produce different types of pollens, as shown on the gallery on your virtual class (all pollen pictures have been taken with an optic microscope)

⇒ **Student 1: Watch the video and explain how pollen discovery on a crime scene can help**

⇒ **Student 2: Using a microscope, observe the pollen extracted from the crime scene soil.**

Determine from which plant species they come (**Pollen gallery available on Genialy**). You will deduce where the murderer walked!

Compare with the pictures taken in the garden of each suspect (**Photos available on Genialy**). What conclusion can you make?



Example of pollen with air-bladder (left) and another with spike (right)

Images: Science and Plants for School (CC-BY-NC) – <https://www.saps.org.uk>

