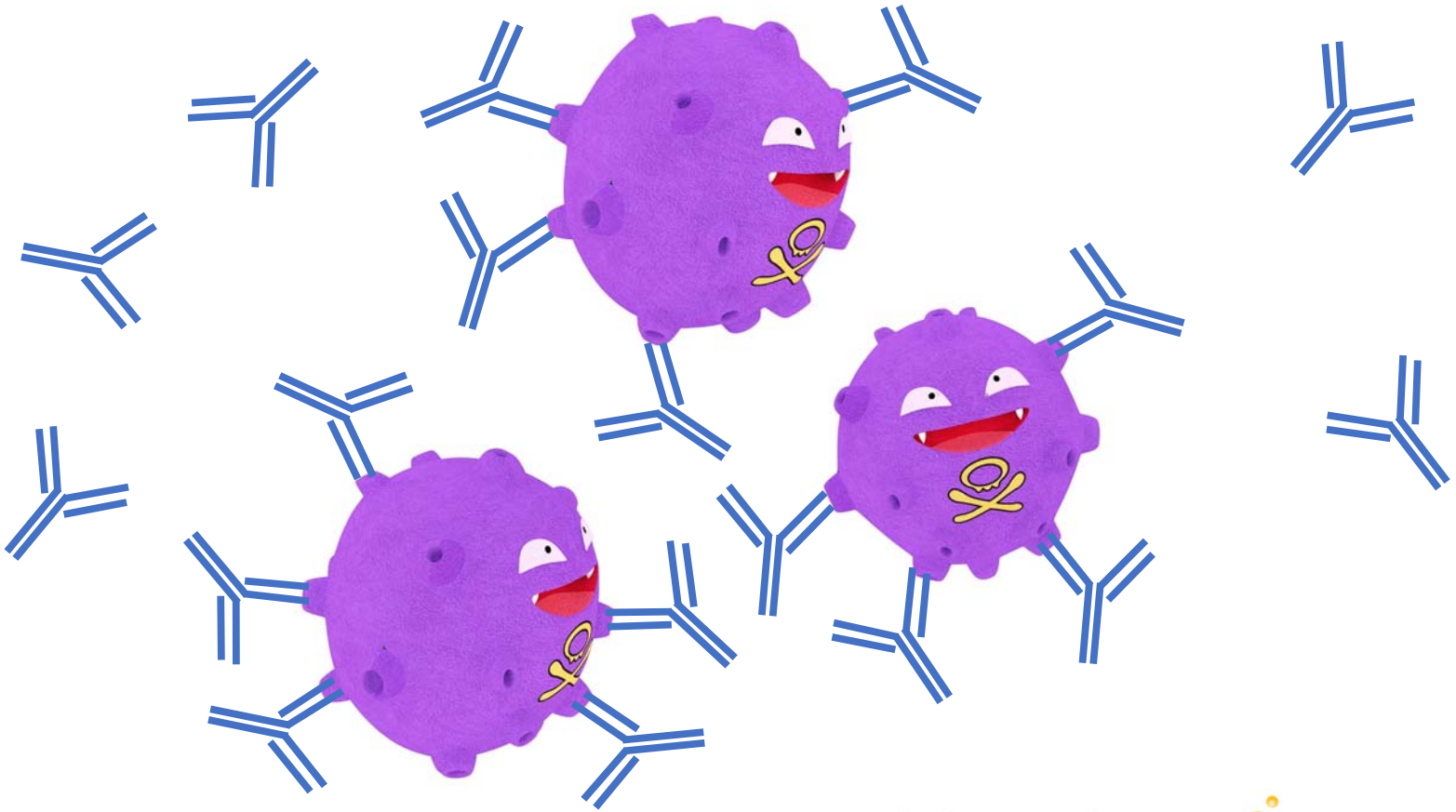
Fighting Infections with Your Immune System

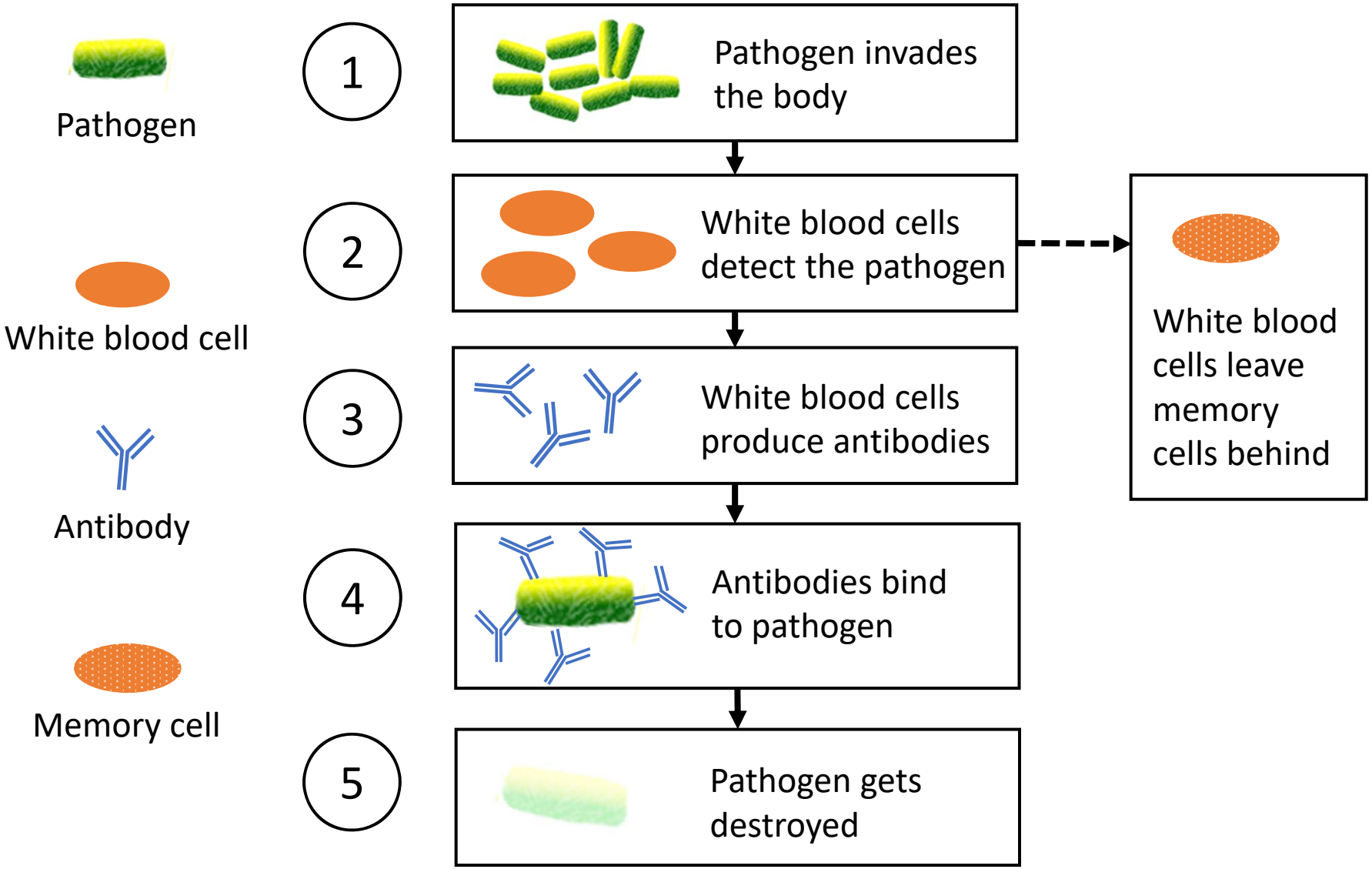


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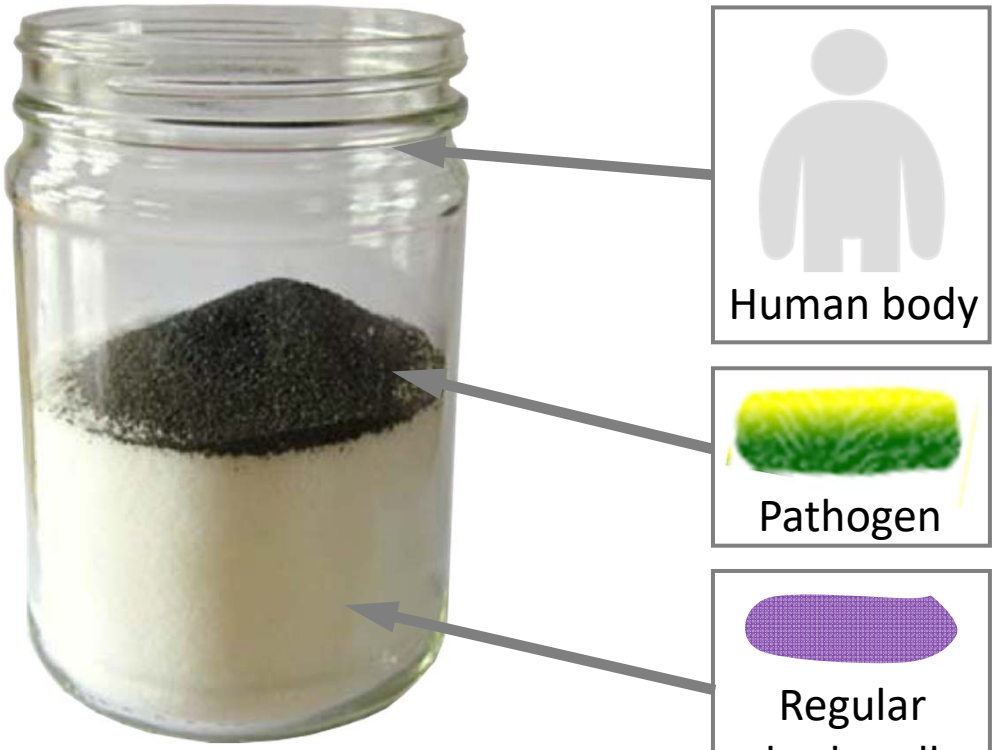
Immune response after infection

(simplified and not to scale)



Immune system model

(not to scale)

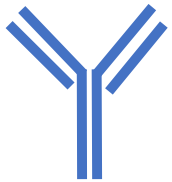


Human body = Jar

Pathogen = Iron filings

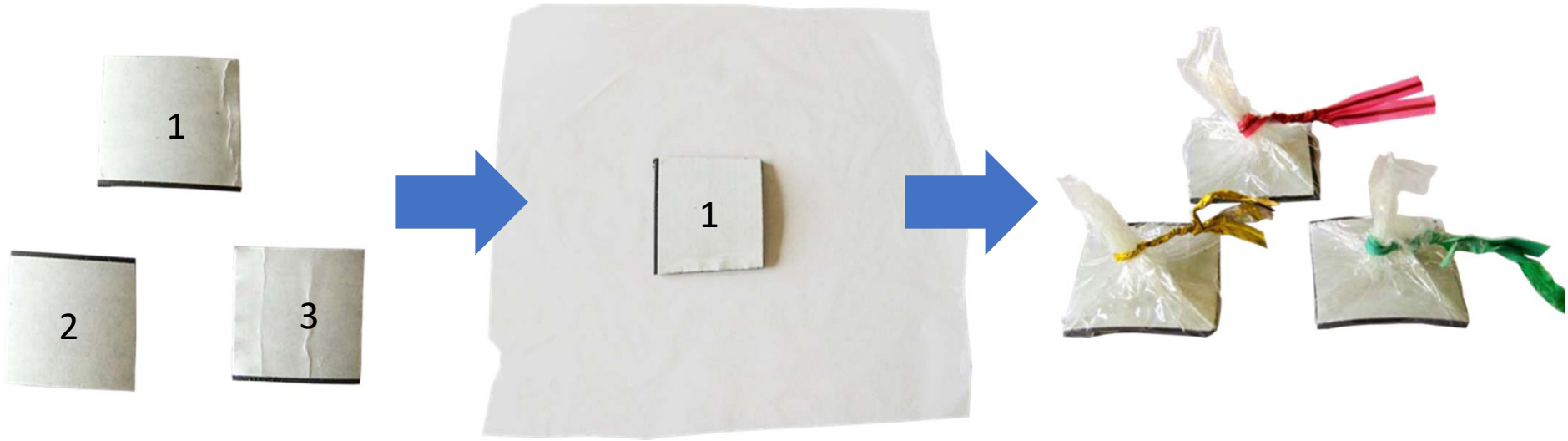
Regular body cell = Salt





Antibody = Magnet

Make three antibody models



- Label each magnetic tape on the back with ”1”, “2”, and “3”
- Wrap each magnetic tape square in plastic wrap
- Close the wrap around the magnetic tape with a twist tie
- Make sure there are no openings in the plastic wrap!

Weigh each piece of tape



Antibody	Mass [g]
1	
2	
3	

Set up your immune system model



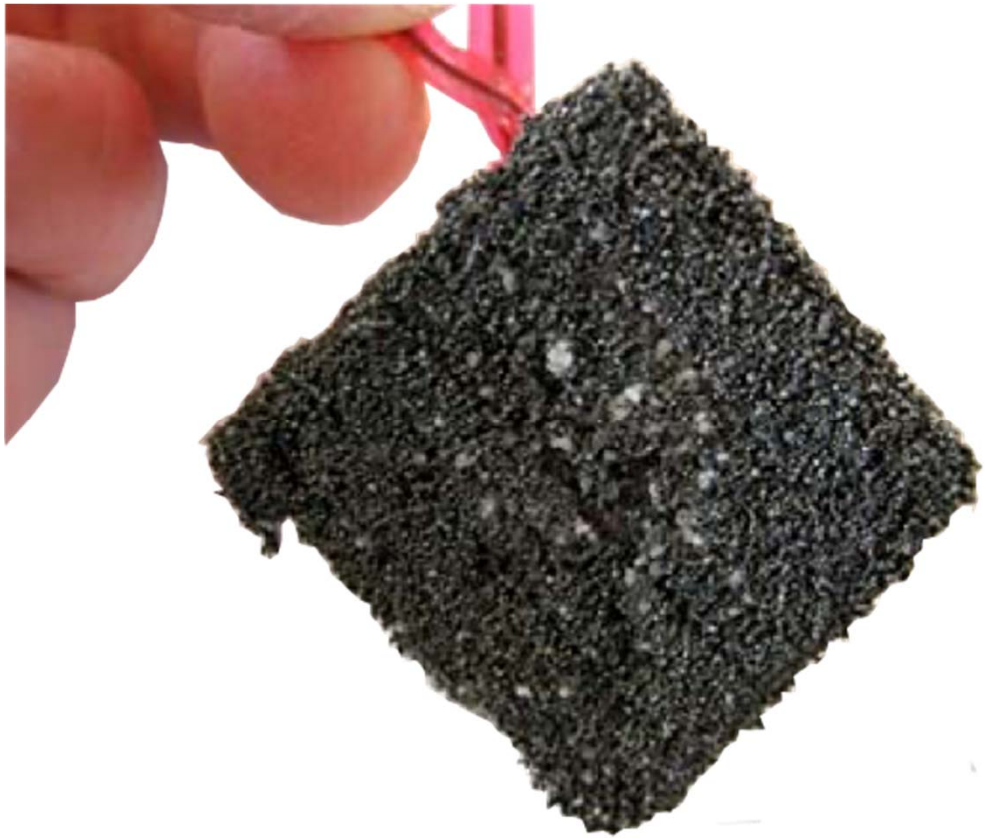
- Add 1 cup of salt and 1 tablespoon of iron filings to the jar
- Put the lid on tightly and mix until everything is evenly dispersed

Simulate the primary immune response



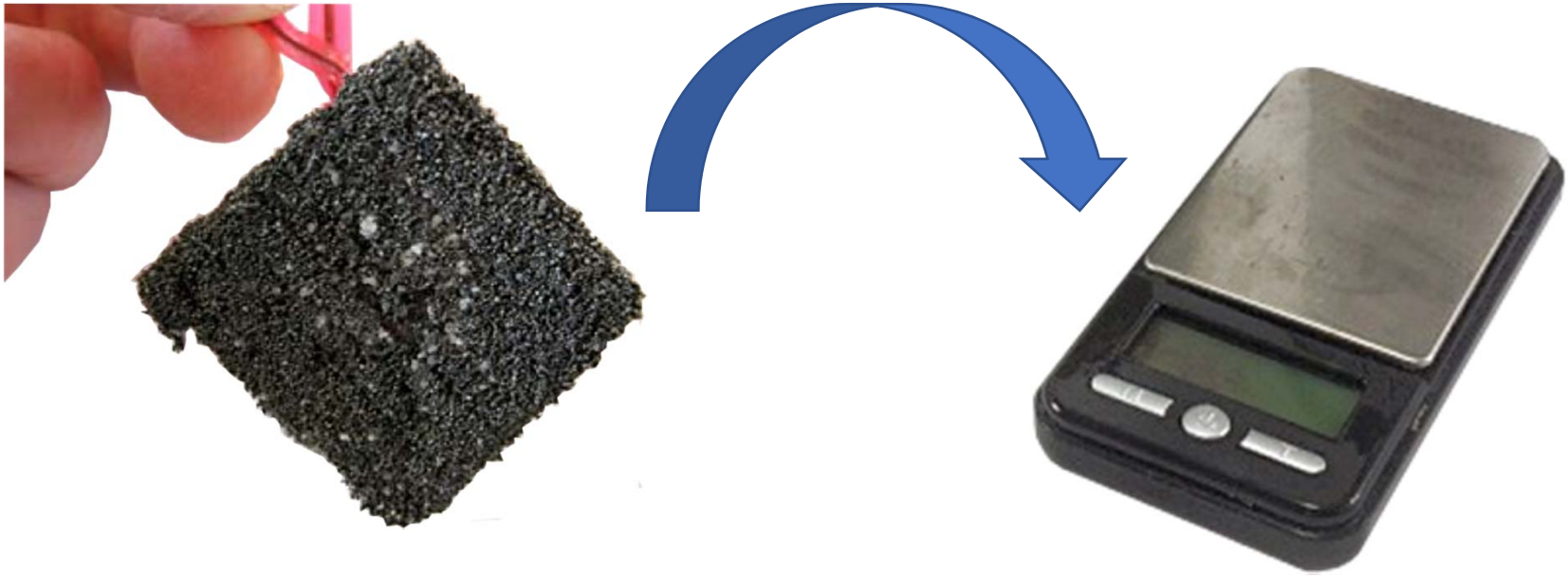
- Add one piece of magnetic tape to the jar
- Put the lid on and flip the jar 10 times

Simulate the primary immune response



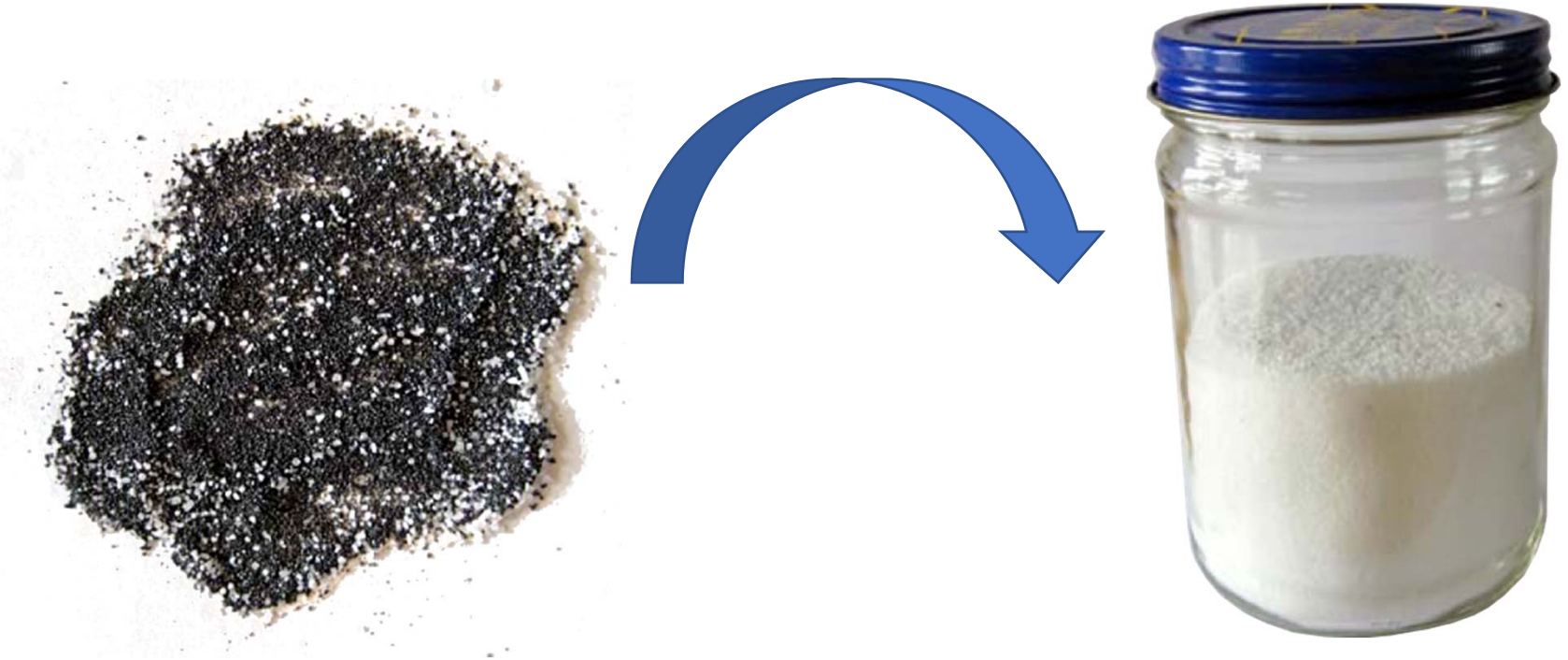
- Remove the magnetic tape from the jar
- Turn it upside down to remove any salt that is trapped in the twisted plastic wrap
- Examine the bottom of the magnetic tape and write down your observations

Weigh the magnetic tape
(including the attached particles)



- Place a piece of paper onto the scale
- Zero the scale
- Measure the mass of the magnet (including attached particles)
- Record this value on the student worksheet

Put attached particles back into the jar



- Unwrap the antibody over a piece of paper to collect the attached particles
- Funnel the iron filings and salt on the paper back into the jar and mix again

Simulate the secondary immune response



- Repeat same steps as for the primary immune response BUT add all three pieces or magnetic tape to the jar
- Record the combined mass of **all** magnetic tape pieces including attached particles

Analyze your data

- Calculate the mass of bound iron filings (“pathogens”) for the primary and secondary immune response scenarios
- Plot your data and answer the questions in your worksheet

