Farmer Brown's wife found dead in barnyard!

The body of Farmer Brown's wife was found hidden under a haystack behind the barn at the couples farm, east of Oklahoma City. Mrs. Farmer Brown was found after an extensive search of the area. A team of police, highway patrol and volunteers had been searching the area for several hours when a search and rescue dog nosed in on the haystack. She had been reported missing by one of the ladies in her sewing circle after she failed to show up with her famous lemon tarts at the meeting the day before. The sewing circle lady thought something must be afoul and was very upset that there was no dessert for the sewing circle!

After the haystack was removed, the body of Mrs. Farmer Brown was found with a knife in her heart! She had been dead since the day before.

Farmer Brown suggested that a passing stranger must have killed his wife while he was out on the tractor plowing a field. He thought she had gone to the sewing circle and decided to spend the night in town with friends. He also denies that the bloodstains on his jeans are from Mrs. Farmer Brown and insists they are from normal farm work. He claims that the blood is either from the dog or the cat he kicked that morning OR from the rooster he killed for last night's dinner!

Your job, is to test the bloody jeans, to see if the blood is animal or human, using the "immunoassay technique." If it is animal blood, no further testing on the bloody jeans needs to be done. **HOWEVER!** If it is HUMAN Blood, then other tests can be run to determine if it is the blood of poor Mrs. Farmer Brown!

As a Crime Scene Investigator, you must know the following:

Immunoassay uses serum-antiserum tests. (antigen-antibody)
Each antiserum is specific for each serum (like human blood).
Each serum has unique electric charge and 3-D shape.
When the antiserum hits the right serum, a visible band (or line) forms.

You will have these materials to use:

2% agar in a Petri dish
1 soda straw
droppers
1 set of sera and antiserum
1 permanent marker
bottles of undiluted yellow and blue food coloring

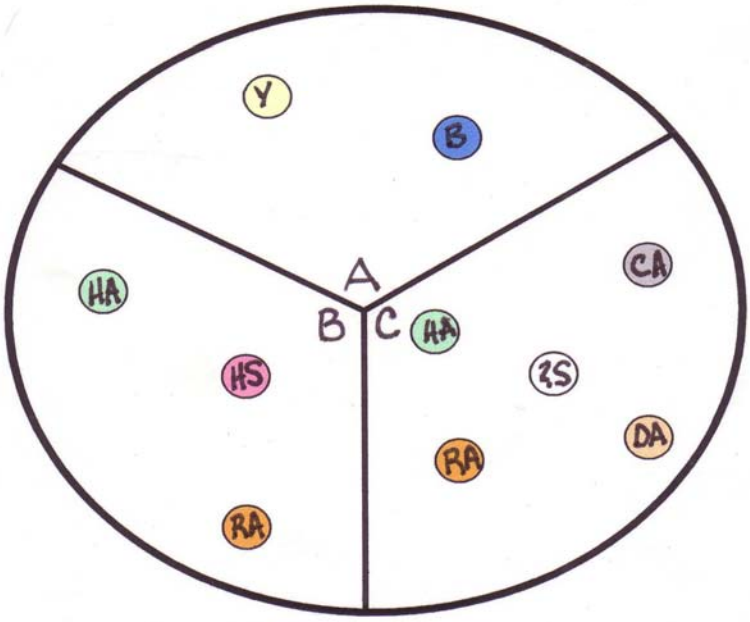
When you are ready at your laboratory station, and have all the above equipment you can solve this mystery and either help put Farmer Brown away OR set him free to kick more dogs and cats and kill more chickens!

Back in the Laboratory:

Get Ready:

Step 1. Place the Petri plate upside down and divide it into three even sections, label them A, B, and C (like the diagram below).

Step 2. Label well sites (places you are going to cut holes to fill) like the diagram below. Measure 1 cm between the holes in each section.



Prepare the gel:

Step 3. Turn the plate right side up and remove the cover.

Step 4. Fold a soda straw over and squeeze the air out of it.

Step 5. Cut wells in the agar where you marked them (like in the diagram) by sticking the end of the folded straw into it and twisting.

Step 6. Release the folded top of the straw and remove the piece of gel (it sucks it up)

Step 7. Repeat until all wells are made in the gel.

Load samples:

Step 8. (Put just enough liquid in each well to almost fill it)

Section A: add blue dye to **B**, yellow dye to **Y**

Section B: add Human Serum (**HS**) to center well (by the B), add Human Antiserum to **HA** and Rooster Antiserum to **RA**.

Section C: add Human Antiserum to **HA**, add Rooster Antiserum to **RA**, Cat Antiserum to **CA**, Dog Antiserum to **DA** and the blood from Farmer Brown's jeans to **?S.**

Give it time!

Step 9. Place the plates where they will not be disturbed. Check them in 45 minutes or so.

Your Expert Analysis:

1. Describe what happened in section A.

   _____

   _____

   Section A is used as a control to show that diffusion is occurring. How do you know it did? _____

2. Describe what happened in section B. _____

   _____

   Section B is a **control**: that **serum only interacts with its own Antiserum**.

   Human serum doesn't react with cat antiserum. How does it show that?

   _____

3. Section C is the experimental section. What are the results?

   Does **?S** interact with **CatA**? _____

   Does **?S** interact with **DogA?** _____

   Does **?S** interact with **RoosterA**? _____

   Does **?S** interact with **Human A**? _____

4. Since you were the Crime Scene Investigator, you have to tell the Detective: (circle your answer)

   Arrest Farmer Brown **Don't Arrest Farmer Brown**

_____ _____

Your signature as CSI date

“Farmer Brown’s Wife Found Dead in Barnyard!”

Identification through Immunoassay

(Adapted from the Shoestring Biotechnology Project of NABT)