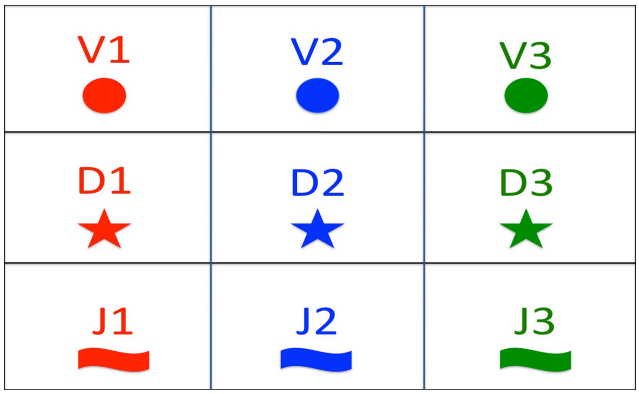
VDJ Recombination Activity: Match the Pathogen!

OBJECTIVE: To demonstrate the principles of VDJ recombination and the production of antibodies specific for unique pathogens.

MATERIALS: Each pair of students will need: 1) circle, star and rectangle stickers in red, green and blue* 2) blank note cards or paper 3) a VDJ gene handout, cut into individual squares.

Cut these out →



** Alternatively, students can use red, green and blue markers to draw the shapes on their notecards.*

INSTRUCTIONS:

- Divide students into groups of two. One student will be the PATHOGEN and the other student will be the B-CELL.

- The PATHOGEN will **secretly** design a unique pathogen by choosing a combination of three antigens. To your pathogen (represented by a note card), add:

  1) A circle (red, green, or blue)
  2) A star (red, green, or blue)
  3) A rectangle (red, green, or blue)

  The completed PATHOGEN will have one circle, one star, and one rectangle. The color of each shape will be unknown to the B-cell.

- Once the PATHOGEN has been created, the B-CELL will attempt to select a combination of V, D and J genes to generate antibodies that match the unknown PATHOGEN.

***EXAMPLE**: The PATHOGEN chooses a red circle, green star, and red rectangle. The B-Cell selects V1, D2, and J3. The PATHOGEN would tell the B-CELL they have ONE correct match (the V1 that corresponds to red circles). The B-CELL would then regroup and guess a new combination of V, D and J genes, trying to correctly match all three antigens.*

- The B-cell has FOUR chances to correctly match the pathogen.

- If the B-CELL correctly identifies the three antigens on the PATHOGEN, the B-CELL wins! If the B-CELL does not make a correct match, the PATHOGEN lives!