Tumor Heterogeneity and Chemotherapy Resistance: The Fault in Our Cells

Koch Institute for Integrative Cancer Research
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Do you think all of the cancer cells in a tumor have the same mutations?
Chemotherapy Resistance

Different tumor cells will respond to chemotherapy in different ways.

Sensitive to therapy

Resistant to therapy
Chemotherapy Resistance

- Different tumor cells will respond to chemotherapy in different ways
- Tumors have cells with many different mutations
- How does this affect the tumor’s response to therapy?
Simulation Rules

1. Put 10 of each color bead in your bag. This is your tumor.

2. In each of 5 cups, put:

<table>
<thead>
<tr>
<th>Color</th>
<th>Beads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pink</td>
<td>1 bead</td>
</tr>
<tr>
<td>Orange</td>
<td>1 bead</td>
</tr>
<tr>
<td>Yellow</td>
<td>2 beads</td>
</tr>
<tr>
<td>Purple</td>
<td>2 beads</td>
</tr>
<tr>
<td>Green</td>
<td>3 beads</td>
</tr>
</tbody>
</table>

This represents division of the cancer cells
Simulation Rules

- Person 1 = **Chemotherapy**: kill cells by taking them out of the bag one-by-one

- Person 2 = **Cancer cell division**: Every 30 seconds, add one cup of cells

- Person 3 = **Chemo resistance**: When 3 of your resistant cells have been killed, put 2 back in the bag

- Look at your instructions to see which cells are resistant for your group
Simulation Results