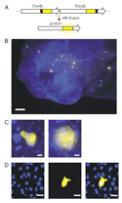
MOD1 – DNA ENGINEERING

Fall 2012

Natalie Kuldell (lectures and lab)
Bevin Engelward (lectures)
Jennifer Kay (TA)

MOD1 – DNA ENGINEERING LECTURE 1



About this Module

Goals for this Module

Brief background: HR is not just for meiosis!

Overview of the Experiment

In preparation for your first experiment: Design Primers and Perform PCR

Review of DNA Replication

Chemistry of nucleotide addition (5' vs 3' end)

PCR - Cycling

How you can use PCR to add a restriction site to your PCR product

Key Conceptual Objectives for Mod1

- Enzymes and Reaction Conditions
- Engineering Gene Expression Vectors
- Transfection and Transformation
- Cell Culture (mammalian cells)
- Flow Cytometry

Objectives for Research Skills (Mod1)

- Experimental Design
  - -Quantitative Measurements
  - -Controls
  - -Experimental Variability
- Data Interpretation and Presentation Skills
  - -Statistics
  - -Data Interpretation
  - -Written & Oral Communication
- Basic Laboratory Skills
  - -Record Keeping
  - -Sources of Error
  - -Basic Laboratory Equipment
  - -Manipulation of enzymes, DNA and mammalian cells

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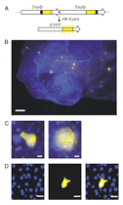

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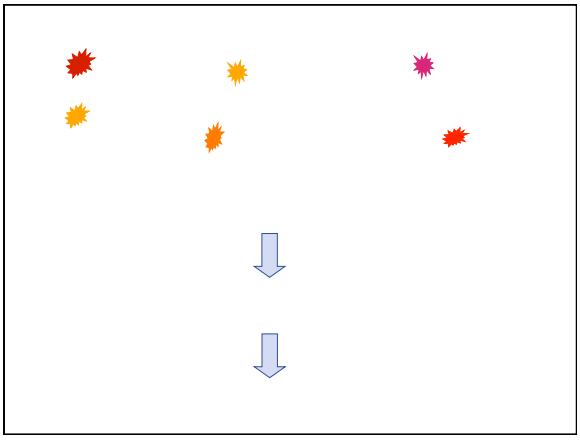
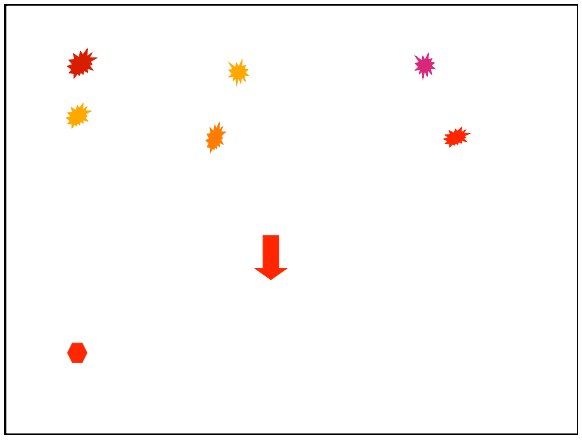
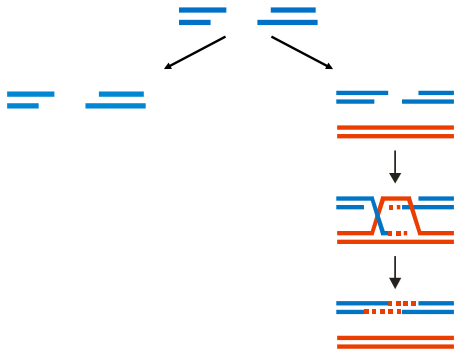
Homologous Recombination & Why it is important to you





DNA double-strand break repair



Homologous Recombination Repairs DNA

Defects in HR Promote Aging, Cancer, & Diseases

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Why else should you care about HR?