

# MOLECULAR BIOLOGY WITH DR MIKE WOLYNIAK

## TALKING POINTS

1. Why did Mike's project involve students, rather than just using seasoned academics?
2. What makes *S. cerevisiae* a good model organism?
3. What are the differences between transcription and translation? Are there any similarities?
4. Does gene disruption directly affect transcription or translation? How?
5. What are some potential ethical implications for genetic modification, *in-vitro* fertilisation and cloning?
6. What is so great about the Polymerase Chain Reaction?
7. How might Mike's project ultimately lead to benefits for society, large or small?

## MORE RESOURCES

- This website has a comprehensive list of the best apps for learning about or teaching molecular biology. Check it out: <https://www.commonsense.org/education/top-picks/best-molecular-and-cell-biology-apps-and-websites>
- Bozeman Science has a YouTube video dedicated to the key processes in molecular biology. Find it here: <https://www.youtube.com/watch?v=yYIZgS-L5Sc>
- The Thought Emporium does lots of intriguing genetic experiments with yeast, such as engineering it to produce spider silk, or glow in the dark. Find out more: <https://www.thoughtemporium.com/genetics>

## ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

1. Imagine you are one of Mike's students. Visit [yeastgenome.org](http://yeastgenome.org), which is the site that Mike's students used for much of their initial research. Use the keyword 'flocculation' in the search bar to find which genes affect flocculation rate.

The brewmaster wants you to decrease flocculation rate in a strain of yeast. Which genes might you want to a) suppress or b) enhance? How might you go about this?

2. Many molecular biologists are currently exploring gene therapy, which involves altering a patient's DNA to protect them against disease. This can be achieved by disrupting a disease-causing gene, or inserting healthy or disease-fighting genes. This technique is still in its experimental stages.

This idea brings with it a number of practical and ethical challenges. Construct a list of 'pros' and 'cons' of gene therapy, by researching the following questions:

- What sort of diseases could gene therapy treat?
- Could gene therapy eradicate genetic diseases? How?
- Research the following genetic disorders: thalassemia; Down's syndrome; cystic fibrosis. Would these make likely candidates for gene therapy?
- What is the difference between a genetic disease and other potentially disadvantageous genetic traits (e.g. short sightedness)?
- What is our level of understanding of the human genome?
- How would gene therapy transition from laboratory studies to applications on humans?
- What is the likely cost of gene therapy?
- Who sets the rules on application of gene therapy?
- Who can access gene therapy?

In your opinion, is gene therapy a good idea? Write a paragraph on why or why not.