



YALE NATIONAL INITIATIVE

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Curriculum Units by Fellows of the National Initiative
2018 Volume V: Manipulating Biology: Costs, Benefits and Controversies

Exploring CRISPR Gene Drives for Schizophrenia and Superpowers

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Imagine a world where the government issued a vaccination to lower aggressive behavior in your community without your knowledge. Their failed attempt killed test subjects, began a new era of drug abuse in your neighborhood, and also created a few people with superhuman powers. Drawing from these events in the DC Comics' superhero series, *Black Lightning*, this unit will explore the idea of using CRISPR/Cas9 gene drive technology to treat mental health, specifically schizophrenia, in African Americans, who have demonstrated a higher propensity for the disease. Students will learn to describe the biochemistry of CRISPR and its functions in treating gene-related disorders using core topics aligned with Next Generation Science Standards such as intermolecular forces, DNA and RNA, and amino acids. Students will assess the benefits, risks, and controversies concerning the use of such groundbreaking advancements in genetic research. Ultimately, students ought to be able to reflect on the impacts of science on their world and evaluate how our increasing understanding of DNA empowers scientists to make new biomedical discoveries. The unit was designed for use with grade 10 chemistry students enrolled at the Middle Years Program of an International Baccalaureate school. The suggested timeframe for teaching the unit is approximately 10 days.

(Developed for Chemistry, grade 10; recommended for Biology and Biochemistry, grades 10-12)

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