**Title**:

Nicholas’ Story

**Authors**:

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**Abstract**:

This case discusses sickle cell disease at the interface of biology and chemistry. It is focused on understanding the cause, symptoms, management, treatment, and possible cures for sickle cell disease in molecular detail. The case begins with a video in which Bridget, talks about her son (Nicholas) and his childhood/youth experiences, while living with sickle cell disease. The case was developed to enable introductory biology students to explore chemical interactions that stabilize the structure and functions of biological molecules, and also to engage introductory chemistry students in applying concepts learned in chemistry to authentic biological contexts. Although it starts with hemoglobin, the case is designed with a large amount of flexibility in the range of additional related topics and molecules that can be discussed, depth of content coverage, and it can even be used to teach students advanced concepts in biochemistry, cell and molecular biology, using either a flipped approach and/or in-class discussions. In the flipped approach, basic understanding of primary content is acquired by working through the handout and answering the questions and class time is devoted to discussion and interaction with the instructor. Detailed teaching notes, readable scenes, and discussion prompts for open ended discussions are available for download to guide the in-class activity.

**Subject Headings**: Biology (Introductory), Chemistry (Introductory), Biochemistry, Genetics, and Molecular Biology

**Objectives**: Learning objectives span the following fields

*A. Biology*

*B. Chemistry*

*C. Biochemistry*

*D. Modeling and Presentation Learning Objectives*

**Keywords**:

Sickle cell disease; anemia; fibrils; hemoglobin; mutation; hydrophobic; pain; anti-sickling; gene therapy; CRISPR;

**Topical Area**:

Scientific method; Molecular structure representation; Visualization

**Educational Level**: Undergraduate lower division

**Formats**: PDF and Website

**Type/Method**: Flipped, Interrupted

**Language**: English

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