**Title**:

Waking Up Anna

**Authors**:

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**Abstract**:

This case discusses Anna's sleeping disorder, a condition that was disrupting her normal life. When most of the standard treatment approaches for treating her condition had failed, researchers examined her cerebrospinal fluid and found a substance in it that was acting like a sleeping pill! Understanding the molecular basis for where and how this substance was acting helped doctors develop a treatment for Anna. The case explores the structure function relationships of receptor molecules in the brain targeted by the treatment. It also examines how the binding of other small molecule drugs can impact the function of this receptor target. The case was developed for introductory biology courses for undergraduate students to become familiar with scientific literature, learn to use data from various bioinformatics resources, and have a chance to explore chemical interactions that stabilize the structure and/or enable the functions of complex biological molecules. Depending on the details included in the discussions, it may also be used to teach slightly advanced physiology, cell biology, and neuroscience students. By the end of the case, students should develop some basic understanding of biomolecular structure-function relationships. 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, and discussion prompts 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 Neuroscience*

*C. Physiology.*

*D. Modeling and Presentation Learning Objectives*

**Keywords**:

GABA-A receptor; Flumazenil; GABA; agonist; antagonist; membrane channel; Chloride ions; hypersomnia.

**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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