**Title:** A Case of Severe Insulin Resistance

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**Abstract**: This case discusses an unusual insulin resistance phenotype where the insulin levels are high, yet the individual has diabetes! The case begins with reading a story of two close friends Megan and Jade. Jade's sister is diagnosed with insulin resistant diabetes at a relatively young age. Since Megan is biochemistry student, she is eager to understand what is going on. She comes across an article in a peer reviewed journal and wonders if the research results reported there describe the condition in her Jade's family. Megan explore the structures of the specific insulin signaling molecule discussed in the paper to understand why it is causing insulin resistance. Students get to explore the molecular structures along with Megan. The case closes with discussions about some ideas for how to handle insulin resistance. The case was developed to enable introductory biology students to explore intra- and inter-molecular chemical interactions that stabilize the structure and functions of biological molecules. In addition, the case includes an assessment suggestion.

**Learning Objectives**: The case was developed at the interface of biology and chemistry as an example of cell signaling in response to external stimuli (e.g., hormone receptor interactions) for cell biology and/or biochemistry students. By the end of the case, students should develop some basic understanding of biomolecular structure-function relationships and interconnected signaling and metabolic pathways.

**Molecules explored**: The key molecules explored here include inactive Akt-2 kinase protein and its activated complexes with substrates bound to the protein.

**Implementation**: The case can be implemented using either a flipped approach and/or in-class discussions.

**Subject Headings**: Biology (General), Cell Biology, and Biochemistry

**Keywords**: Insulin signaling; mutation; diabetes; inherited; kinase; phosphorylation

**Topical Area**: Scientific method; Molecular structure representation; Visualization

**Educational Level**: Undergraduate lower division

**Formats**: Word document and Website

**Type/Method**: Directed, Interrupted

**Language**: English

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