**Happy Blue Baby**

Shuchismita Dutta

Institute of Quantitative Biomedicine, Rutgers University, Piscataway NJ 08854

**Part 1: A Special Baby Girl**

A little baby girl, born in 2008 in Toms River NJ, showed cyanosis but was otherwise healthy and happy. She became the subject of clinical and scientific research and her case was reported in the New England Journal of Medicine in 2011.

Let’s begin learning about her story by reading a news article published in Patch, the local newspaper of Toms River (<https://patch.com/new-jersey/tomsriver/genetic-mutation-named-for-toms-river-may-shed-light-49e5fd1947>).

Questions:

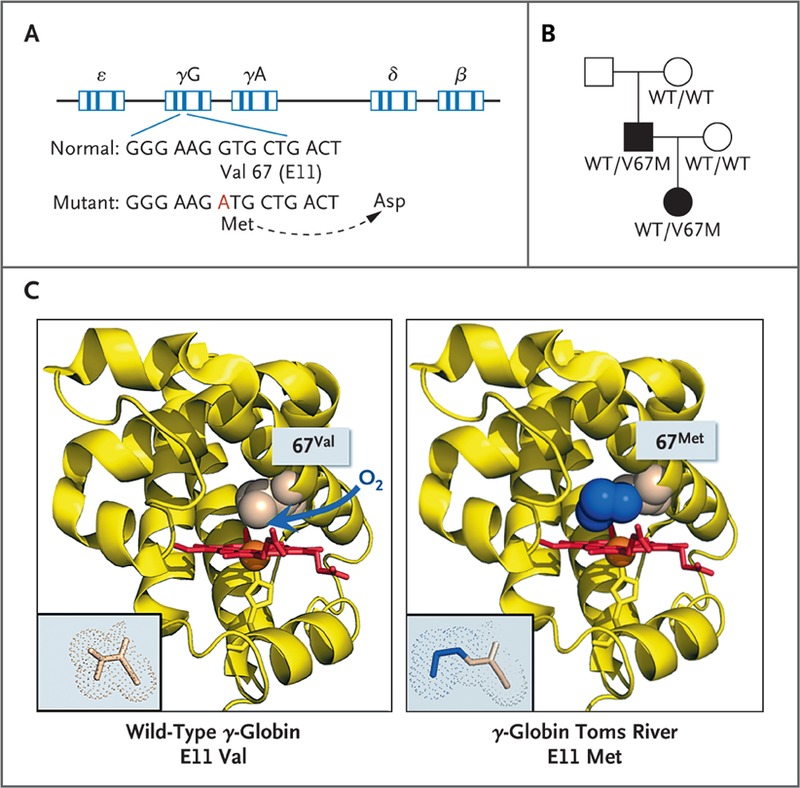
1. What symptoms did the newborn baby girl have when she was brought to the Children's Hospital of Philadelphia?
2. What tests did the doctors do to diagnose the baby’s condition?
3. Based on the test results, what was the diagnosis?

**Part 2: Grandma provides a clue**

While the doctors were testing the newborn baby, her Grandma’s comment 'My son had the same thing,' gave the doctors an important clue.

Questions:

1. What did this comment suggest to the doctors?
2. Draw a pedigree chart for the Newborn baby with information provided by Grandma.
3. Examine a figure from the New England Journal of Medicine article (<https://www.nejm.org/doi/full/10.1056/NEJMoa1013579>, Figure 1A) showing the DNA sequence seen in the newborn baby.



Based on the DNA sequence, what is the mutation seen in the newborn?

1. Is the mutated residue side chain similar to or different from that found in the native protein? Explain your in terms of the size and physicochemical properties.