Nicholas’ Pain Crisis

Assignment:

After completing the activity on Nicholas’ Pain Crisis answer the following questions:

1) **Suppose a second mutation occurs in HbS, which changes the amino acid residue Phe85 to Glu. What effect would this have on sickling of red blood cells? Explain your answer with an illustration to support your reasoning.** (Hint: Use iCn3D to create a view of the HbS fiber formation to explain your answer).

2) Read the review article found here: <https://pubmed.ncbi.nlm.nih.gov/30715679/>, and design plasmid vector(s) for gene editing of human hematopoietic stem cells to correct sickling of RBCs. What approach do you favor? What do you need to take into consideration while designing the vector? Make sure you address the following topics:

a. What is your target,

b. What will the gRNA sequence be? What regulatory elements are there in the vector to drive the expression of gRNA?

c. How will you select the cells that received the vector(s),

d. How will your vector(s) be delivered to the human cells,

e. How will you know that your treatment is successful? What will your endpoint be?