

*Fig.1*

Most of living beings can't exist without molecules, the main function of which is to bind free iron, to transport or to store it. Typically these molecules are proteins or polypeptides derivatives.

1. What is the class name of such molecules produced by bacteria, fungi and plants? **(0.5 points)** Why, despite natural iron is widespread, should the organisms use additional tools for such a "mining" (i.e. to excrete molecules to exterior and to take them back with iron)? **(0.5 points)**
2. Why are there any needs for iron in organisms? So why are there any free form of iron of extremely low concentrations? **(1 point)** Give several examples of iron-storing molecules in human body and briefly describe their main functions. **(1 point)**

Compound **A** (fig. 1.), being quite a simple molecule, forms one of the strongest iron complexes.

3. Is **A** produced by bacteria or animals? Where could **A**-producing organisms live in? **(1 point)**
4. Draw or briefly describe the structure of the iron complex (1:1) with **A** and explain the main causes of its great stability. What is the role of the marked fragment of **A** (fig. 1)? **(2 points)** How could organisms extract iron out of such an ultra stable complex (and from other ones such as those at fig. 2)? **(1.5 points)**
5. Briefly explain how can such iron binding compounds be used in medicine? Explain which compounds can be used: are they iron complexes or free compounds, bacteria-originated or human-originated? **(2 points)**

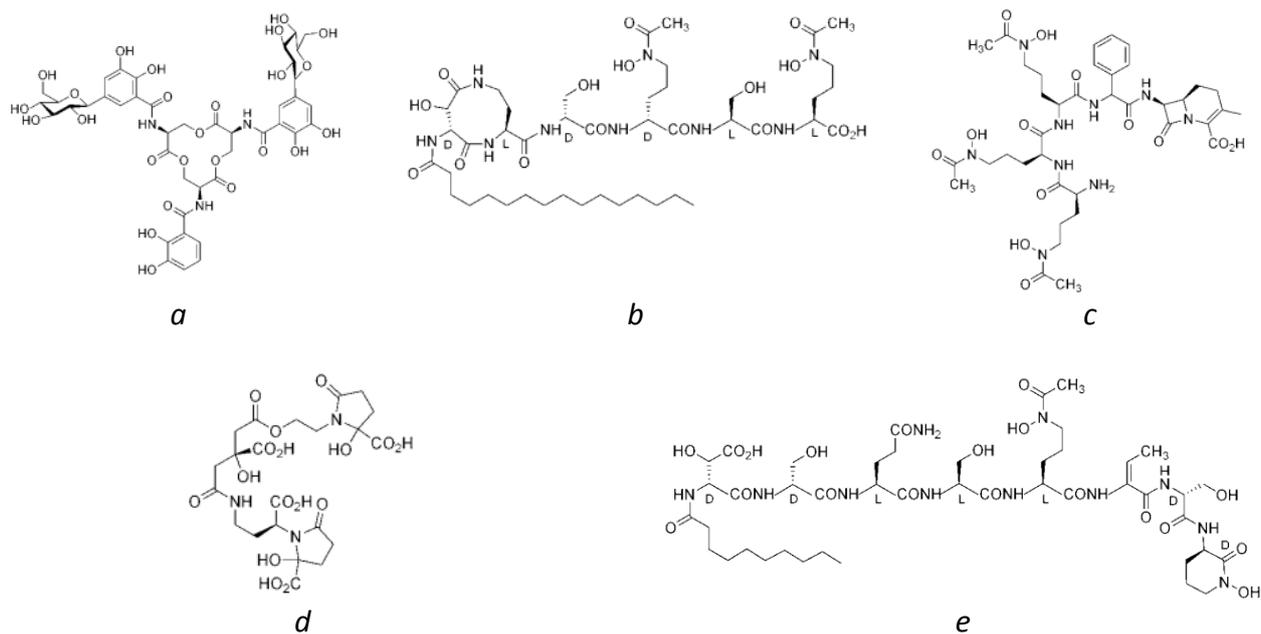


Fig. 2

6. Find out a molecule in fig. 2. which is designed to do something else than the others and explain the purpose of its design. (2.5 points)

Total – 12 points