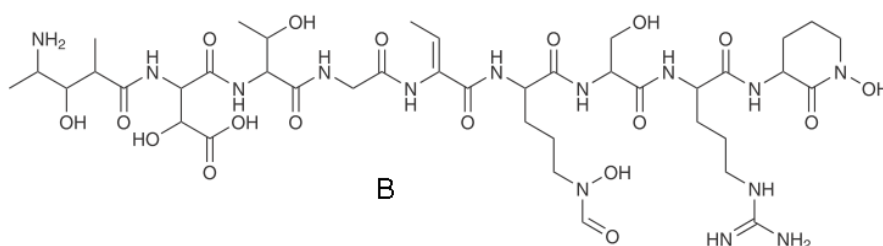
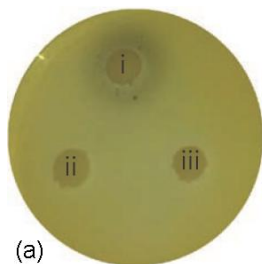


National Student Team Contest (first stage)
Task 3. Gold and bacteria



Unusual bacteria **X** excrete molecules **B** which bind selectively gold ions and turn them into gold nanoparticles (Fig. (a), I, for comparison are shown bacteria not producing **B**: cells II and III). **B** production increases with the iron concentration decrease in the medium:

[Fe ³⁺]	0	100 nM	1 μM	10 μM	100 μM
[B], μM	206	196	149	21	2.2

1. Explain such an unusual behavior of bacteria **X**. Where could we find such bacteria? **(2 points)**
2. Mark the main structural features of **B** which could assist in gold nanoparticles production, give the examples of simple compounds used in gold nanoparticles synthesis, which possess these functional groups. **(3 points)**
3. Explain the influence of iron ions on **B** production. Describe a possible evolutionary mechanism for evolving **B** in the bacteria. Give an example of similarly evolved features in nature. **(4 points)**
4. How could these properties of the bacteria and **B** be utilized? **(1 point)**

Total – 10 points