

The oral exam in Biochemistry, *Stora Tentan*, 15 hp – some hints

The purpose of *Stora Tentan* and the TIBS exam is that students being awarded a PhD degree from our Department should have a good basic knowledge in Biochemistry, knowledge wider than their own thesis area.

Stora Tentan is based on the assumption that the PhD student has the general knowledge that is required to pass the undergraduate courses in Biochemistry at Stockholm University. Furthermore it is assumed that the student has taken part in the seminars and dissertations given at DBB, getting information about the research at DBB as well as the research topics at the international level.

Stora Tentan is not an exam where the student is expected to know all details, but the structure and characteristics of the peptide bond, the different groups of amino acids, the structure of DNA and similar basic facts that are not regarded as details.

During the exam emphasis is put on being able to discuss based on general knowledge. There are three examiners and the duration is about 3 hours. No specific textbook is required, but Lehninger the most recent edition, is an example of one suitable. Experience has shown that having discussions with other PhD also studying for *Stora Tentan* has been very efficient way to prepare for the exam.

In the following topics with some examples of questions have been listed. These should however be regarded as examples. Not all topics will be covered for every student, and the questions are given may vary a lot.

What do you regard as the most important differences between the three kingdoms of life from a biochemical viewpoint? This is usually the first question during the exam and it can lead in almost any direction. Usually the discussions take at least 45 min.

Protein structure is of course central to understanding most phenomena in the cell, and in the discussions the structure itself and how it is formed, will be in focus.

Enzymes and catalysis are prerequisites for life. How can an enzyme be so specific and efficient as catalyst? Which kinetic constants do you find most interesting and why?

Lipids and membranes constitute yet another topic that is dealt with in most exams. What defines a lipid? How can a membrane form? What are the specifics of membrane proteins? What is the function of a membrane?

Metabolism is of course a very big topic, including anabolism as well as catabolism. Regulation and the different regulatory mechanisms are usually discussed, as well as the interrelation between the major metabolic pathways in the cell. The way chemical energy in the foodstuff is converted to forms of energy that the cell can use is clearly very important. Especially the way redox reactions release energy that eventually leads to the production of ATP. The mechanism of the latter is a beautiful example of a molecular machine.

The Central Dogma, i.e. the process in which genetic information is converted into products, mainly proteins, which together constitute the cell and the processes making it

the basic form of life as we know it today. Again regulation is a central part of the discussion, but also what determines the life-time of a polypeptide, as well as more recently discovered phenomena such as epigenetics.

Finally it should be emphasized that every exam is unique, to a large extent depending on the student. Depending on what is discussed in the first topic listed here, the other topics may be covered in more or less detail, even not at all.

Good Luck!!!