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Cooperating Institutions and Universities within the PARSEL-Project:



## For Teachers

# Chemistry in a Class of Its Own: Building Blocks of Life – “To become fit and strong eat eggs all day long” – The Truth about Proteins in My Body

A Module for Science Instruction – especially Chemistry – for Grades 10 to 13

## Module Content

Everything we eat once lived or comes from a living organism. First of all, the nutrients which these organisms provide are digested by our body (catabolism) and these are subsequently used for the synthesis of natural structures in our body (anabolism). In the module at hand, the emphasis is put on the digestion of chicken protein and the following question will be answered: “How does the chicken protein get into my muscles?” The students will investigate the digestion of protein in the human body: Diluted chicken egg white is put into a dialysis tube and an enzyme which decomposes the protein (protease) is added. The amino acids which are split off the polymer are small enough to pass through the pores of the dialysis tube and so reach the outer medium. The amino acids are now detectable using UV-spectroscopy. Afterwards the experimental setup and the result are applied to the processes in the human body.

The main theoretical emphasis of this module lies on the composition and decomposition of proteins (peptide bonds) as well as the primary, secondary, tertiary and quaternary structures of proteins. Furthermore, the unit refers to the biological effect/representatives of this class of substances in our body, e.g. enzymes, fibrous proteins (in hair) and hemoglobin.

A cooperation with a university or a similar institution is advisable since the experiment described above is quite complex in terms of equipment (e.g. UV spectrometer). However, this is worthwhile as the students are involved in hands-on activities in small groups and do not only gain an insight into certain experimental methods and equipment (which a “normal” school could not offer) but also into professional areas and life at university. At the same time the group activities help to enhance the students’ social skills.

## References

Bolte, Claus - Streller, Sabine (2007): Chemie (in) der Extra-Klasse: Bausteine des Lebens. In: Höttecke, D. (Hg.): Naturwissenschaftlicher Unterricht im internationalen Vergleich. Zur Didaktik der Physik und Chemie. Probleme und Perspektiven. Lit-Verlag (S. 598-600).

Streller, Sabine - Bolte, Claus: An Extra Class (in) Chemistry – Building Blocks of Life Paper presented at the European Science Educational Research Association (ESERA), Malmö, Schweden, August 2007 (Polyskript).

Versuchsanleitung "Eiweißverdauung" nach: Grundkurs Tierphysiologie (2001) - Biochemie und Stoffwechselphysiologie an der Freien Universität Berlin für Studierende des Faches Biologie.