Minutes of the 11th iGeM meeting 31/05/2010

Participants: Habib Bukhari, Svea Grieb, Victor Gordeev,Sarah Mansour, Adithya Nagarakodige, Mareike Roth, Lucas Schirmer, Jonathan Tam

Supervisors: Kaj Bernhardt, Johnson Madrid

Organisation:

1. Thu, 3th of June, 5.30-7.30 pm – Meeting with Raik Grünberg at the MPI
2. Fri, 4th of June, 4.00 pm – Meeting Prof. Carsten Werner at the Max-Bergmann-Zentrum
3. T-Shirts - for the Biolympic, Habib is designing a logo for our group t-shirts
4. Visa – Sarah is working on the Visas

Project Ideas:

Adithya, Mareike and Lucas updated there project ideas.

1. GreenLife: Bacterial Scaffolding system for organizing functional materials for photo-splitting of water – Adithya

   Adithya presented an idea of a working model to split water by a bacterial system. Main parts of the system are the IrO_2 binding peptide from M13 virus and the photosensitizer ZnDPEG both connected to the bacterial surface. By harvesting photons from the sunlight free electrons would be carried from ZnDPEG to split the water to hydrogen and oxygen. The IrO_2 binding peptide part could be build with Display-O-Matic System from Berkley, IGEM 2009. To capture spontaneous splitted IrO_2 the IrO_2 binding protein would be overexpressed. To stabilize the bacteria small beads of hydrogel could be used. It would also be possible to culture the bacteria without hydrogel in a bioreactor with common growth media or immobilize the bacteria on a surface or a secreted protein. After the presentation the use of voltage to gather the protons and the need of a bacterial scaffold for the reaction was discussed.
   The idea is based on
   Nam, Yoon Sung, Andrew P. Magyar, Daeyeon Lee, Jin-Woong Kim, Dong Soo Yun, Heechul Park, Thomas S. Pollom, David A. Weitz, und Angela M. Belcher. "Biologically templated photocatalytic nanostructures for sustained light-driven water oxidation." Nat Nano 5, Nr. 5 (Mai 2010): 340-344.

2. Antimold foil – Mareike

   Mareike extended her idea to use bacteria to defeat mold by a set of enzymes to break down the mold. The most important enzyms are the chitinases to degrade molds chitin and use it as carbonsource for the bacteria. Bacterial periplasmic endochitinase ChiA is able to breakdown both, the α- and β-chitin to cellobiose. The E.coli ChiA binds only poorly to cellulose, the material most wallpaper are made of. Despite that it is able to degrade cellulose also what could be a problem to face in this project. The cellobiose can be utilized by E.coli using Cel, an enzyme splitting cellobiose to N-Acetylglucosamine(GlcNac), as a proper carbon source. After the degradation of chitin the antimold organism would die by the lack of a carbon source or by a self destruction quorum sensing mechanism. Another self destruction mechanism should be implemented to kill the antimold in case of spontaneous mutationas as a kind of sheet anchor. For example a lacZ coupled self destruction device could be used. So IPTG or even galactose wouldn't harm human but kill the antimold.
   One more idea was to use *Serratia marcescens* as chassis because of its ability to grow at room temperature. Mareike asked a few people if they would use antimold instead of harsh chemicals and got a quite good response.

3. Biosensors – Lucas

   Lucas updated his project with the opinions of Prof. Bachmann (Immunology, TU Dresden) and Prof. Rödel (Genetics, TU Dresden). Prof. Bachmann would contribute scFvs for the project. Prof. Rödel doesn't thinks that it is possible to express a protein of this size on the yeast surface because of the cell wall. In addition to the previous approach an amplifier (Cambridge, IGEM 07) and traffic light quantify device (British Columbia, IGEM 09). A new approach from Kaj would be to split the system an express the part of the senor in yeast and then detect it by bacteria. Lucas will work on this idea.