Minutes of the sixth iGEM meeting

04/30/2010

Participants: Habib Bukhari, Victor Gordeev, Sarah Mansour Adithya Nagarakodige, Mareike Roth, Lucas Schirmer, Jonathan Tam, Charanya Sampath Kumar
Supervisor: Johnson Madrid

Organization

1. Sponsorship and Funding

- Mareike has prepared a Curriculum Vitae in anticipation for the ‚Bonding' job fair on the upcoming Monday and Tuesday.
- Monday: Adithya and Svea
- Tuesday: Mareike, Jonathan and Victor

2. Theoretical and practical FRET training at the MPI

- Johnson has been in contact with a Professor at the MPI who has shown interest in holding a theoretical seminar for every member of the iGEM team.
- However, due to size constrains, only two (maybe three) students have been invited to take part in the practical component. The two students are Jonathan and Adithya. They are expected to reiterate what they have learnt to the rest of the team.
- Location and date to be announced

3. Idea presentation on Friday, 07/04/2010

- Every member will be presenting a novel idea to the team and supervisors. The format of this presentation will not be a simple round table discussion.
- Instead it is expected that every member prepares a concrete 5 minute powerpoint presentation that underlies at least the following: (i) background information/ problem to be solved/ why it is meaningful for us to consider this project, (ii) a working model of your idea. Figures would work great, and (iii) problems that we can expect to encounter and possible workarounds or solutions.
- The presentation will be followed by a 10 – 15 minute discussion session. Constructive criticism is very welcomed.

Project ideas

1. Biosensor that detects and quantifies tumor cell in blood

- http://141.30.151.132/igem/index.php/Turmor_quorum_Sensing
- Minimal residual disease is the condition in which small numbers of leukemic cells remain in the patient during or after treatment. In the

majority of cases, there are no observable symptoms or indications that these cells are still present. However, this is the major cause of cancer relapse. Only recently have sensitive molecular biology techniques been applied to measure the cancer markers that exists in minute quantities.

- In the case of Leukemia, the following tumor specific antigens (TSA) have been identified: ß-CLL, Fibromodulin, CD23, Ki-67, Ly9/CD229, MDM2, ALL and CD33.
- Lucas has outlined two approaches to detect minute concentrations of these TSAs.
    i. Engineer a TSA specific receptor on the surface of yeast based on a scFv-GFP protein construct. In this case, scFv should be responsive and bind to a particular TSA. Direction evolution was suggested as a possible method to enrich for variants of interest.
    ii. However, the selection process for the scFv of interest will be problematic.
    iii. For this reason, Lucas proposed another model, in which we use the native ß-cell receptor and corresponding signaling pathway.

2. **Differentiating between the different types of nanomaterials using a biological system**
    - After the synthesis of certain nanomaterials, it is expected that the products are not homogenous. Adithya would like to design a biological system that is capable of distinguishing between the different forms of nanomaterials according to geometry and properties.
    - A working mechanism has not yet been developed but will be presented during the presentation sessions on Friday.

3. **Construction of a bacteriophage system that upon lysis from a bacteria triggers the destruction of tumor cells.**
    - Charanya presented the idea of constructing a bacteriophage that targets bacterial cells. Upon subsequent lysis from the bacteria, products will be released that can target and destroy tumor cells.
        - However, some points have to be considered: (i) the release of whole bacteria and/or their components into tissue or blood will trigger an immune response and other side effects. For example, in the case of immuno-compromised cancer patients, the use of a ‚normally non-pathogenic' bacteria as a chassis can prove to be fatal as a result of opportunistic infections. (http://en.wikipedia.org/wiki/Opportunistic_infection), and (ii) is it really necessary to use a „bacterial middle man" to reach our end point? It may be simpler to just use a viral system to deliver the „payload".

4. **Using Yeast to produce Extracellular Matrix.**
    - Mareike presented an idea involving the use of yeast to produce different types of extracellular matrix for pharmaceutical uses. This system should be tunable in order to produce different types of ECM for different purposes.
    - A working model will be presented during the seminar on Friday.