Final Project Proposal

A paper was published in *Science* Magazine on March 11 2016, detailing the discovery of a bacterium (successfully isolated in this case),Ideonella sakaiensis 201-F6, that is capable of uses PET (polyethylene terephthalate) as its primary carbon source1. This can be a rather significant discovery if such bacterium can be replicated/isolated at a low cost, and may be the solution for eliminating plastics pollutants in area where the altitude or extreme climate poses difficulty for the collection of plastic waste by hand. The journal details that two enzymes are essential in hydrolyzing PET, and convert the PET into more environmental friendly products: benign monomers, terephthalic acid, and ethylene glyceol.

There have been many other efforts in promoting Biocatalysis as a solution for PET pollution, yet this discovery could be a game changer, that is- if this type of bacterium could survive the test of time. Although it may seem like a long time, the PET pollutant really haven’t been introduce into the environment until about 70 years ago—polystyrene in 19292. However, the short amount of time that mankind has been enjoying the convenience brought by this synthetic material has already cause detrimental pollution to the environment, especially to organisms that resides in the oceans3.

Therefore, my proposal for the final project is to use computational tool to further study the candidate bacterium that could perform PET hydrolysis, in hopes of finding the sequence motifs and structure motifs for genetic coding regions that codes for enzymes that are essential for PET hydrolysis process, such as proposed by Pellis et al. in 2016 Thc\_cut1 from T.cellulosilytica4. Using these motif and BLAST, if time allots, it will be interesting to see if it is practical to generate a list of candidate marine organisms that have the potential to be genetically engineered to create optimal environment for PET hydrolysis.

1. <https://www.ncbi.nlm.nih.gov/pubmed/26965627>

2. <http://www.bbc.com/news/magazine-27442625>

3. <http://jpioceans.eu/sites/jpioceans.eu/files/public/EPHEMARE/Images/News/Avio%20et%20al.%2C%202016.pdf>