

STEM Faculty Fellows Program 2009-2010 Proposal
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1. Abstract

Work in the McReynolds lab focuses on the design, synthesis and biological evaluation of novel glycodendrimers. Glycodendrimers are macromolecules with polymeric cores with pendant carbohydrates on the external surfaces. These structures, when sulfated, are anticipated to have potent anti-viral activities. The McReynolds lab has successfully made many glycodendrimers with a variety of mono- and disaccharides appended to the surface. These compounds are now being tested using an in-house bioassay to determine how strongly the glycodendrimers bind to a viral target protein. The preliminary work described above was externally funded by CSUPERB, Research Corporation and the NIH. PI McReynolds is now in the process of seeking renewal funding from the NIH to continue this work. The results from the preliminary work will be used in the design of the next generation of compounds, and as such, the new NIH proposal will focus on the development of new and higher yielding strategies for appending the sugars to dendrimers, the creation of a variety of novel dendrimer cores, and ultimately, the synthesis of new and more potent glycodendrimers as anti-viral agents. The in-house bioassay, will be used to quickly determined how well the 2nd generation glycodendrimers bind to a viral target protein. This information will then be used to make structural modifications to the glycodendrimers to make them more effective at binding the viral target protein. Every stage of this process will involve undergraduate and graduate researchers working alongside the PI. The PI expects these students to disseminate their research findings at appropriate scientific meetings, and when enough data has been gathered, to participate in the writing of peer-reviewed publications.

2. Campus STEM Activities

Dr. McReynolds is a staunch supporter of student research. Having the time resources available will allow Dr. McReynolds to focus on writing a successful proposal, such that she can continue these research activities at the highest level possible once the grant is funded. At any given time, she has between 6-9 research students at various levels, from beginning

undergraduate through Master's candidates. These students work collaboratively and participate in regular research group meetings by giving PowerPoint presentations of their research findings. Additionally, these students are expected to attend at least one research meeting per year and present their results. Dr. McReynolds feels strongly that a well-rounded chemistry student needs to not only have laboratory skills, but also experience in dissemination of their results. Students who graduate from the McReynolds lab are well prepared for continuing on as either graduate students in chemistry at another institution, or as industrial researchers in private industry. All of the above described activities support campus STEM activities in that STEM students are actively participating in research, learning new skills, and disseminating their results to an external audience. These STEM activities are leading to the training and preparation of these young STEM students for bright futures off-campus. The success of these students once they leave Sacramento State is expected to leave their graduate advisors/employers with a positive impression of the high quality of STEM students from this university.

3. Potential Funding Agencies

Dr. McReynolds will be submitting a proposal to the National Institutes of Health, division of NIAID, through the AREA (R15) RFP (<http://grants.nih.gov/grants/guide/pa-files/PA-06-042.html>). This is a 3-year grant, which will be increasing in value in the new RFP to be released in September. The funding level for the new RFP has been already been announced, and will be \$300,000 in total direct costs. This is a significant jump in funding for this program, as the PI's current AREA grant was funded at the maximum of \$150,000 in 2005. Dr. McReynolds is planning on submitting the renewal grant proposal for the February 25th 2010 deadline. Dr. McReynolds will be the only PI on this grant.

4. Other Support

Dr. McReynolds plans on nominating two outstanding undergraduate students in her lab for the Howell-CSUPERB research award in the fall of 2010. This award provides \$3000 per student of support for their research activities.

The website for the RFP is:

<http://grants.nih.gov/grants/guide/pa-files/PA-06-042.html>