2016 ACS GCI Pharmaceutical Roundtable Research Grant for Greener Biologics Purification Methods

The ACS GCI Pharmaceutical Roundtable (Roundtable or ACS GCIPR) is a partnership between the ACS Green Chemistry Institute® and pharmaceutical related corporations united by a shared commitment to integrate the principles of green chemistry and engineering into the business of drug discovery and production. Current members include Amgen, AstraZeneca, Boehringer-Ingelheim, Bristol-Myers Squibb, Codexis, Dr. Reddy's, Eli Lilly and Company, F. Hoffman-La Roche Ltd., GlaxoSmithKline, Johnson & Johnson, Merck & Co., Inc., Novartis, Pfizer Inc, Sanofi, and ACS GCI.

The ACS GCI Pharmaceutical Roundtable is seeking a 1 year R&D commitment to assist the Roundtable's biopharma initiative. The focus of the R&D will be toward optimizing the water use in downstream processing steps for monoclonal antibody (mAb) production. Proposals are invited from public and private institutions of higher education worldwide. This collaborative project is intended for a student within the selected Principal Investigator's research group. One grant is planned to be awarded and the total award is limited to $50,000 for a grant period of 12 months. Interested PI's are required to provide a written proposal describing the investigator's capability to carry out the Roundtable's proposed research. Deadline for receipt of proposals is **January 31, 2016 at 5 pm EDT.** All submissions must be emailed to gcipr@acs.org. The Principal Investigator with the selected proposal will be notified by **March 1, 2016.** It is expected that research will commence in the principal investigator's lab by May 2016 and last approximately 12 months.

Requirements for Submission

Proposals will only be accepted from public and private institutions of higher education. The grant is not limited to institutions in the United States. Proposals must be submitted as a single pdf file by email to gcipr@acs.org through the appropriate institutional office for external funding. For international submissions, if there is no comparable office, submit a pdf of a letter signed by an appropriate university official recognizing the terms of the grant.

Detailed Project Description

Preliminary environmental assessments have suggested that the purification process consumes much of the water required to produce a mAb, with column chromatography and ultrafiltration/diafiltration consuming 100–1000 kg of water per kilogram of purified protein. These unit operations account for >50% of the total water used due in part to the need for purified water and/or water-for-injection (WFI). The ACS GCIPR biopharma focus group is seeking research proposals that provide new technology or innovation that has potential to reduce the amount of water needed for downstream processing in biologics manufacture. Examples include but are not limited to:

- Analytical methods that provide real-time/in-line parameter monitoring or detection
- Continuous processing methods
- Optimization of buffer utilization (e.g. minimum volumes for equilibration, etc)
- Optimization of downstream process cleaning strategies

- Single-use technologies and novel applications of these technologies (e.g. multi-operation usage, alternatives to column chromatography, or process intensification approaches, etc)

Project Goal

Provide innovative methods or technologies that are widely applicable in mAb processing, which optimize water use in one or more unit operations in downstream processing as compared to typical three column/ one UF/DF purification platform. The Roundtable is seeking proposals that can reduce water usage in downstream processing within the following parameters:

- Proposals related to improvement in any downstream unit operations will be considered (i.e. all downstream unit operations are in-scope.)
- Proposed methodology has potential for broad application in mAb processing schemes within the industry (i.e. improvement is not targeted to optimize a single mAb product/process)
- Proposed methodology could be implemented within cGMP manufacturing environments with reasonable development of compliance/validation strategies

Preference will be given to proposals that reduce water usage without significantly increasing energy or material usage since the overall goal is to reduce the environmental footprint of biologics production.

Project Timeline

It is expected that one year of research support will be sufficient to provide progress toward intended goals.

Proposal Format (Maximum 3 pages as described below + CVs)

All of the information below must be submitted as a single PDF file. All components described in sections A, B, and C must be included in the same PDF file to assure the proposal is reviewed in its entirety.

A) Title Page (1 page, 12 pt font, 1-inch margins)
1. Project Title:
2. Principal Investigator:
3. Title / Position(s):
4. Telephone Number(s):
5. Fax Number(s):
6. Postal Mailing Address:
7. E-Mail Address:
8. Research Group website:

B) Proposed Plan of Work *(2 pages, 12 pt font, 1-inch margins)*
1. Summarize the student's (undergraduate, graduate student and /or postdoc) capabilities to perform the Roundtable's proposed work.
2. Brief description of the PI's research facilities.

3. Proposed milestone deliveries (primary project and side project) with brief description of the manner in which the researcher intends to achieve them.
4. The PI should list any existing background intellectual property and/or collaborations they are aware of that might limit the freedom to operate any of the results arising from any research funded by ACS GCI. The priority of the Roundtable is to encourage research utilizing conditions that are commercially viable with the freedom to use.
5. References (Does not count toward your page limit.)

C) Curriculum Vitae of Project Team Members: Please submit a two page curriculum vitae of all project team members. (Does not count toward your page limit.)

Report Requirements

- As a collaborative research project, the Roundtable will work closely with the principal investigator and student(s) to provide industrial direction, when appropriate, in a manner that respects the independence of the researcher/student.
    - Progress updates are due at 1 month intervals from initiation of research and discussed in arranged teleconferences.
    - Updates are to include research milestones/significant outcomes, summary slides with supporting data, deviations from the proposal, and next steps for the coming months.
- A final comprehensive report including research outcomes and final budget is due one month after the end of the grant period.
    - The report must be submitted as an Adobe PDF document electronically to gcipr@acs.org. The report will be shared with the member companies of the Roundtable.
    - The content of the report will be targeted for publication in a peer review technical journal within six months of the conclusion of the research. As a collaborative research project, the paper will be written by the principal investigator and student(s) performing the work, with the Roundtable as co-authors.

Intellectual Property, Publication Acknowledgement, and Terms of the Grant

- The primary purpose of this grant is to publish research to make information publicly available.
- Every patent, United States or foreign, that results from research funded (in part or in its entirety) by the ACS GCI Pharmaceutical Roundtable Grant shall be immediately dedicated to the public, royalty free.
- Publication of results is expected within 6 months of work completion.
- Each publication prepared in connection with the ACS GCI Pharmaceutical Roundtable Grant shall make acknowledgement to the ACS GCI Pharmaceutical Roundtable Research Grant, in the following manner. "Acknowledgement is made to the ACS GCI Pharmaceutical Roundtable Grant for support (or partial support) of this research."
- Acceptance of a Roundtable Grant will be conditioned upon agreement by the grantee institution that in the event the principal investigator is unable for any reason to conduct the research proposed, the funds, if previously paid by the Roundtable, shall, upon demand, be returned in full to the Roundtable, and further, that in the event the PI is unable for any reason to continue with the research after it has commenced, this grant

shall be terminated forthwith and the unexpended and unencumbered balance of any funds theretofore advanced shall be returned to the Roundtable.

- The grantee institution, by acceptance of this grant, provides assurance that support normally provided by the institution for research of the faculty member will not be diminished.
- Applicants may have only one research grant with the ACS GCI Pharmaceutical Roundtable at a time. In order to close a grant, the required reports must be received and approved by the ACS GCI Pharmaceutical Roundtable.

For additional information:

Website: www.acs.org/gcipharmaroundtable
Email: gcipr@acs.org