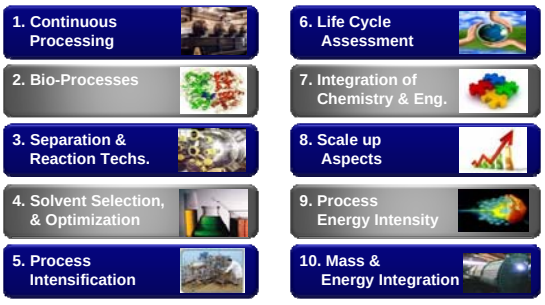
ACS GCI PHARMACEUTICAL ROUNDTABLE
2011 YEAR IN REVIEW

The ACS GCI Pharmaceutical Roundtable is a partnership between the ACS Green Chemistry Institute® and pharmaceutical corporations united by a shared commitment to integrate the principles of green chemistry and engineering into the business of drug discovery and production. From its launch in January 2005 through 2011, the ACS GCI Pharmaceutical Roundtable has made significant contributions to green chemistry in the industry by focusing on four strategic priorities: Informing and Influencing the Research Agenda, Defining and Delivering Tools for Innovation, Educating Leaders, and Collaborating Globally. The collaborative work of the Roundtable in 2011 is highlighted here.

- Membership

  The Roundtable grew to 18 paid members in 2011 compared to three in 2005. Members currently include Abbott Laboratories, ACS GCI, Amgen, AstraZeneca, Boehringer-Ingelheim, Bristol-Myers Squibb, Codexis, Dr. Reddy's, DSM Pharmaceutical Products, Eli Lilly & Company, GlaxoSmithKline, Johnson & Johnson, Lonza, Merck & Co., Inc., Novartis, Pfizer, Inc., Roche, and Sanofi. The Roundtable continues to thrive with a 100% member retention rate since 2005.

- Informing and Influencing the Research Agenda
  - Awarded $25,000 to Professor Wei Zhang of the University of Massachusetts Boston to study greener solvents for Grignard reagent preparation and reactions. Since the beginning of the ACS GCI Pharmaceutical Roundtable Research Grant Program, the Roundtable has funded nine research grants for a total in excess of $1 Million contributed to pharmaceutically-relevant research.
  - Awarded the 2012 ACS GCI Pharmaceutical Roundtable Research Grant focused on green engineering to $150,000 to Professor Charles Liotta of Georgia Institute of Technology for work beginning in 2012. The research proposes to develop continuous, multistep synthesis of ring-fused heteroaromatics important for the production of biologically active molecules.
  - Published "Using the Right Green Yardstick: Why Process Mass Intensity Is Used in the Pharmaceutical Industry To Drive More Sustainable Processes" (*Org. Process Res. Dev.*, **2011**, *15* (4), pp 912–917) describing the philosophical and technical arguments on why the Roundtable chose Process Mass Intensity above other related metrics such as E factor or atom economy.
  - Published "Key Green Engineering Research Areas for Sustainable Manufacturing —A perspective from pharmaceutical and fine chemicals manufacturers" in *Organic Process Research & Development* and subsequently issued a request for proposals to fund research in these areas. The paper is a complement to the Roundtable's first publication in 2007 identifying the key green chemistry research areas.



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- Defining and Delivering Tools for Innovation
    - Publicly released the ACS GCI Pharmaceutical Roundtable Solvent Selection Guide, a collaborative guide providing a comparison of the environmental, health, and safety characteristics of over 60 solvents.
    - Published a requirements document to encourage standardized incorporation of green chemistry into electronic lab notebooks.
    - Publicly released version 1 the Process Mass Intensity Calculator to facilitate the calculation and communication of green chemistry metrics across the supply chain. Presentations were also given at Informex in the US in February and CPhI in Europe in October.
    - Performed a survey of the use of continuous processing within the member companies. An analysis of the results is expected to be published in 2012.
- Educating Leaders
    - Published two manuscripts of the "Green Chemistry Articles of Interest to the Pharmaceutical Industry" in *Organic Process Research & Development*. (January 2011 and June 2011)
    - Influenced editorial policy in *Green Chemistry* and *Organic Process Research & Development* to include a policy that papers containing strongly undesirable solvents (e.g., benzene, carbon tetrachloride, chloroform) would only be considered if accompanied by an analysis of alternatives or convincing justification. Discussion is ongoing with additional journals and to request inclusion of green metrics with manuscript submissions.
    - Sponsored Prof. Matthias Beller from Leibniz-Institut für Katalyse e.V. to provide a research lecture to one site per member in the EU. The Roundtable covered the cost of travel and honorarium for the lecture tour which enabled members to welcome a world renowned chemist into their facility for a lecture on current research relevant to the pharmaceutical industry.
    - Developed a medicinal chemistry focus group to specifically address the challenges of green chemistry and engineering in the medicinal chemistry/Discovery organizations within the member companies. The group compiled a list of current Green Chemistry activities in med chem at the member companies as a reference to others and any new companies that join in the future. In 2012, there is a plan to prepare a brief review article summarizing greener alternative methods in med chem.
- Collaborating Globally
    - All activities of the Roundtable are global in nature to meet the needs of our member companies as well as the mission to catalyze the integration of green chemistry and green engineering in the pharmaceutical industry globally. In 2011, the Roundtable continued to hold an annual meeting in Europe, this time in Hoddesdon, UK hosted by Merck & Co., Inc.
    - To capitalize on the benefits of leveraging as a larger chemical enterprise, the Roundtable began collaboration with other ACS GCI industrial roundtables. A joint project will be addressed in 2012.

The work of the ACS GCI Pharmaceutical Roundtable in 2011 far exceeds the accomplishments highlighted here. For brevity, projects were selected to showcase progress towards the group's mission.

The Roundtable thanks all of its members for their commitment to green chemistry and green engineering, and looks forward to another productive year in 2012.

For references or membership information,
email gcipr@acs.org or go to www.acs.org/gcipharmaroundtable.