

# Preface

The publication of this volume marks the reintroduction of the *Recent Advances in Phytochemistry* (RAP) series, an annual journal supported by the Phytochemical Society of North America. In the past, *RAP* was a proceedings book representing the focus of the PSNA annual meeting, and production of the annual RAP volume was largely the responsibility of an editor in chief with the assistance of the local organizing committee of the annual Society meeting. Recent years have brought significant changes to biological science in general and phytochemically related fields in particular. As a result, the annual meetings of the PSNA are no longer centered on a single theme, but rather represent the most interesting advances and newest technologies developed by the membership of the Society in the broadest sense. The meetings are now organized to be of interest to all members of the Society, whether they study the biosynthesis of natural products or regulation of metabolism, the ecology of specialized metabolites or the evolution of their pathways, or the effects of natural products or plants on human health, or whether they are involved with genomics, proteomics, metabolomics, natural product structural determination or new technology development, medicinal chemistry or metabolic engineering, or any of the myriad of fields that are now closely associated with what may be called “traditional phytochemistry” and plant biochemistry. The advent of post-genomics-based ways of thinking, of systems biology, of synthetic biology, of comparative genomics/proteomics/transcriptomics/metabolomics, and especially of the introduction and establishment of a mentality that leads to support of large collaborative projects, has opened up many new doors to scientists interested and versed in the (bio)chemistry of plants. In response to these changes, an Editorial Board was established to oversee the reintroduction and future production of the *RAP* series.

With the reintroduction of the *RAP* series, the Editorial Board decided to include two main types of articles in the journal format: Perspectives and Communications. Perspectives in *RAP* are expected to synthesize results from the primary literature and perhaps from new/novel results and place these in perspective relative to the broader field. These articles may be similar to review articles, but also are intended to present important ideas and hypotheses, and may present proposals for interesting directions in the field. It is the hope of the Editorial Board that these

articles will be of great value to a large audience. Communications are intended to represent new advances in the field that will be of interest to a large audience. Articles of both types are typically solicited from the Society membership based on the content of the annual meeting talks, but in keeping with the title “Recent Advances in Phytochemistry,” the editorial board reserves the right to solicit additional Perspectives and/or Communications from non-attendees as well (e.g., where an editorial board member has knowledge of an interesting recent advancement that would be of general interest to the society membership).

All submissions to *RAP* go through a rigorous peer review process, overseen by the Editorial Board, which includes external review. Starting this year, all *RAP* papers will be published electronically on SpringerLink.com with *Springer* journals as well as in book format.

This marks a significant change from past volumes of *RAP*, and it is the hope of the Editorial Board that this will lead to broader dissemination of the contents of and greater interest in *RAP*.

This 41st volume of *RAP* includes a total of 12 articles, all based on talks presented at the 49th annual meeting of the PSNA. These eight Perspectives and four Communications give a very good picture of the state of plant (bio)chemistry research in North America, which is also indicative of the state of the field world-wide. Each of these articles describes the integration of several different approaches to ask and then answer interesting questions regarding the function of interesting plant metabolites, either in the plant itself or in interactions with the environment (natural setting or human health application).

The first three Perspectives have a strong ecological focus. Tholl and Lee describe how volatiles such as homoterpenes are involved in ecological interactions between plants such as *Arabidopsis thaliana*, their herbivores and their parasites, such as by attracting parasitic wasps and mites in tritrophic interactions. Pedras outlines how natural products mediate molecular interactions between crucifers (Brassicaceae) with their pathogenic fungi, and how specific compounds are utilized by specific fungi in these interactions. Bernards et al. describe how complex metabolites such as the ginsenosides, a class of triterpenoid saponins, act to deter attack by non-pathogens but are potentially utilized by some pathogens as host recognition factors.

The next three Perspectives focus more on the biosynthesis of specific classes of natural products, although the roles of these compounds in their respective plants are also delineated. Umezawa et al. explain the importance of control of enantioselectivity in the biosynthesis of large numbers of specialized metabolites derived from the lignan, neolignan, and norlignan pathways. Guzman et al. describe recent advances in our understanding of color (e.g., carotenoid, flavonoid, chlorophyll), heat (capsaicinoid), and flavor (terpenoid, aldehyde) production in peppers. Owens and McIntosh outline what is known about flavonoid production in *Citrus* species, especially regarding the role that glycosylation plays in production of these compounds in these species, and make a strong case that future work on glycosyl transferases will be an important springboard for any efforts to alter flavonoid metabolism in these plants.

The Perspectives by Maschek et al. and by Stevens and Reed are more application oriented. Maschek et al. describe efforts to identify antiviral compounds from Antarctic red algae, and outline progress and challenges in following up on strong leads when very active compounds appear to be present at low levels. Stevens and Reed outline development and optimization of a fermentation procedure that resulted in efficient production of glucolimnanthin-derived isothiocyanate and nitrile natural herbicides from Meadowfoam (*Limnanthes alba*) seed meal, and they describe analytical methods used to characterize these compounds from complex sample extracts.

Four Communications are also included in this volume. McIntyre et al. describe how variation in ginsenoside content in Ontario-grown North American ginseng (*Panax quinquefolius*) is correlated with anti-glycation and antioxidant activities and propose that identifying variation in ginsenoside profiles is important for quality control and landrace development of ginseng. Kovinich et al. provide a perspective on anthocyanin biosynthesis in black soybean and potential strategies for engineering seed colors in light of substantial equivalence. Sharma et al. outline an efficient method to extract and fractionate proanthocyanidins from grape seed that can be achieved on a scale suitable for generation of sufficient material for bioactivity assays and animal feeding studies. Finally, Luu et al. describe how ginsenosides in ginseng extracts inhibit CYP3A4 but not CYP2C9 in vitro, suggesting that CYP3A4 inhibition by ginsenosides warrants further study in a clinical setting.

We hope that you will find these Perspectives and Communications to be interesting, informative, and timely. It is our goal that *RAP* will act not only as the voice of the PSNA, but that it will serve as an authoritative, up-to-date resource that helps to set the gold standard for thought and research in fields related to plant biochemistry.

We welcome suggestions for future articles and comments on the new format.

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