Current Topics

Pharmaceutical Research for Quality Evaluation and Characterization of Foods and Natural Products

Foreword

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Natural products are used in various aspects of our daily life, as crude drugs, Kampo medicines, food additives, and health foods. The first step in ensuring the quality of natural products is to begin with the appropriate raw materials. If the quality of natural raw materials cannot be secured, proper natural products cannot be achieved. To solve this problem, it is necessary to recognize the essence of each natural product, including ingredient information. Since natural products are multi-component systems, a comprehensive characterization of their components is one of the most important factors in evaluating the quality of products based on certain materials. Regulatory science, based on the accumulation of scientific data, including information on various ingredients, should be a factor in the quality assurance of natural products.

This Current Topics section of Chemical and Pharmaceutical Bulletin contains two reviews and four regular articles addressing recent research in the identification of characteristic components of natural products, including an index of components and active ingredients, the development of evaluation methods, and the use of these as indices, as well as tests of pharmacological activity.

First, two reviews address the development of functional foods, using compounds isolated from natural materials as indicators, and evaluating the quality of existing additives. The first review, entitled “Isolation and Characterization of Neuroprotective Components from Citrus Peel and Their Application as Functional Food,” is summarized by Dr. Yoshiko Furukawa (Matsuyama University) et al. This review describes the characterization of 3,5,6,7,8,3’-heptamethoxyflavone and auraptene in the peels of Kawachi Bankan (Citrus kawachiensis), analysis of their activity in the brain, the mechanism of their abilities, and a food development trial focused on retaining their functions. The second review, entitled “Characterization of Components in Natural Products for the Evaluation of Existing Food Additives in Japan,” written by our group, describes an example of our research on the characterization of marker constituents in existing food additives from natural products.

Next, four regular articles contribute to the research on the elucidation of characteristic components contained in natural products, quality evaluation, and their pharmacological activity. These studies present developments based on regulation of the methods of analysis of the index components in crude drugs and existing additives from natural products, the correlation and evaluation of pharmacological activity based on the components contained in Kampo medicines, and the search for functional components derived from natural products. The first regular article, entitled “Determination of Mogroside V in Luohanugo Extract for Daily Quality Control Operation Using Relative Molar Sensitivity to Single-Reference Caffeine,” is reported by Dr. Naoko Masumoto (National Institute of Health Sciences) et al. Their results are of interest, as they proposed a quantitative (q)NMR method using single-reference caffeine with relative molar sensitivity, and found that it is suitable for the quantitative determination of mogroside V in luo han guo extract, and can be used as an alternative method for the current assays used in Japan’s Standards and Specifications for Food Additives.

In the second regular article, Dr. Nahoko Uchiyama (National Institute of Health Sciences) et al. contributed the study entitled “Determination of Absolute Purities of Hygroscopic Substances by Quantitative NMR Analysis for the Standardization of Quantitative Reagents in the Japanese Pharmacopoeia (Part 2).” The conditions that affect the determination of the purity of ginsenoside Rb1, saikosaponin a, and barbaloin were examined by qNMR, and optimal analysis conditions, including pretreatment, have been proposed.

Dr. Morio Yoshimura (Matsuyama University) et al. contributed the third regular article, entitled “Identification of Phenolic Constituents and Inhibitory Activity of Persimmon Calyx and Shiteito against Tumor Cell Proliferation.” Components of Shiteito and its compounded crude drugs were characterized, and the anti-tumor cell proliferative activity of each extract and its components were evaluated. Their results showed that Shiteito and Shitei extracts could enhance cancer drug treatment by preventing associated chronic hiccups.

The final regular article, entitled “Isolation of Three New Diterpenes from Dodonaea viscosa,” was addressed by Dr. Sachiko Sugimoto (Hiroshima University) and her colleagues. Twenty compounds, including new compounds, were elucidated from the stems of Dodonaea viscosa. The inhibitory effects of the obtained compounds on collagenase and tyrosinase were evaluated, and candidate compounds for cosmetic agents were discussed. Thus, key compounds have been derived from natural products, and further research into pharmaceutical applications has been developed.

Most natural products contain secondary metabolites that are characteristic of the material. Therefore, the reliability of these natural products will be improved if there are various examples of ingredient research on the material. The present topics are just a few examples. It is hoped that research in this field will continue to be actively pursued, and that research using characteristic components of natural materials, with distinct species as indicators, will be developed. Finally, I sincerely appreciate the work of all these authors and their significant contributions to this Current Topics in pharmaceutical research for the regulatory science of foods and natural products.