**Title:** Study on genome size and phytochemical diversity in *Scutellaria*

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The *Scutellaria* genus contains over 470 species of plants, which occur throughout the Northern Hemisphere. The root extract of *Scutellaria baicalensis* has been widely used for medicine in Asia for more than 2,000 years, and it has a variety of bioactivities such as anti-cancer, anti-oxidant, antiviral and neuro-psychologic properties. Phytochemical profiles for *S. baicalensis* have been well characterized and special flavonoids are highly accumulated in their roots. Its reference genome sequence has been recently completed. But, little is known about the hundreds of other *Scutellaria* species. This study aims to extend the current knowledge of phytochemical profiles and genome properties in *Scutellaria* by analyzing a large set of species representative of the diversity in the genus. Targeted metabolite analysis of fresh samples and herbarium samples was completed with High Performance Liquid Chromatography (HPLC) to quantify 15 flavones. Our study indicates that some species show distinctive features of phytochemical profiles compared with *S. baicalensis*. Inconsistences in site of accumulation between the proposed flavonoid biosynthesis pathway for *S. baicalensis*. and chemical analysis results for multiple species indicate that significant differences in flavonoid biosynthesis pathway exist among species. We also estimated the genome sizes of eight species using flow cytometry and found that seven of them have about 400 Mb genomes which is similar to *S. baicalensis*. A better understanding of phytochemical diversity in phytochemical rich genus *Scutellaria* will aid in the development of new drugs and treatments from the extracts of the plant.

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