**Title:** An analysis of genome size and phytochemical diversity in *Scutellaria* to identify species with medicinal potential

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*Scutellaria baicalensis* is a medicinal plant whose root extracts have been widely used in Asian medicine for more than 2,000 years. Flavonoids in these extracts possess anti-cancer, antioxidant, antiviral, and neuro-psychologic properties. Because of interest in the medicinal properties of these flavonoids, the reference genome of *S. baicalensis* has been recently completed. Although *S. baicalensis* has been well-studied, the majority of the 470 species in the *Scutellaria* genus have not been analyzed at all. This study aims to extend the current knowledge of *Scutellaria* by analyzing a large set of species representative of the diversity in the genus. Targeted metabolite analysis of fresh and dried samples was completed with High Performance Liquid Chromatography (HPLC) to quantify 15 flavones. The genome sizes of eight of the species analyzed were also estimated with flow cytometry. A comparison of phytochemical profiles indicate diversity in site and identity of accumulation for multiple species when compared to *S. baicalensis*. Inconsistences in site of accumulation between the proposed flavonoid biosynthesis pathway for *S. baicalensis* and chemical analysis results imply significant differences in the pathway for several species. Flow cytometry results revealed 7 of the 8 species analyzed have similarly sized genomes as *S. baicalensis* and should be considered for further study. Researchers studying *Scutellaria* can use the results of this work to identify previously uncharacterized species with medicinal potential. A better understanding of phytochemical diversity in *Scutellaria* will aid in the development of new drugs and treatments from the extracts of the plant.

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