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Determination of the effect of *Pinellia ternata* (Thunb.) Breit. on nervous system development by proteomics

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Abstract

Ethnopharmacological relevance:

Banxia (BX) is the dried tuber of *Pinellia ternata* (Thunb.) Breit., a commonly prescribed Chinese medicinal herb for the treatment of cough, phlegm, and vomiting in pregnant women. However, raw BX has been demonstrated to exert toxic effects on reproduction and the precise and comprehensive mechanisms remain elusive.

Aim of the study:

We applied an iTRAQ (isobaric tags for relative and absolute quantitation, iTRAQ)-based proteomic method to explore the mechanisms of raw BX-induced fetal toxicity in mice.

Materials and methods:

The mice were separated into two groups, control mice and BX-treated mice. From gestation days 6–8, the control group was treated with normal saline and the BX group was exposed to BX suspension (2.275 g/kg/day). Gastrulae were obtained and analyzed using the quantitative proteomic approach of iTRAQ coupled to liquid chromatography-tandem mass spectrometry (LC-MS/MS). A multi-omics data analysis tool, OmicsBean (http://www.omicsbean.cn), was employed to conduct bioinformatic analysis of differentially abundant proteins (DAPs). Quantitative real-time PCR (qRT-PCR) and western blotting methods were applied to detect the protein expression levels and validate the quality of the proteomics.

Results:

A total of 1245 proteins were identified with < 1% false discovery rate (FDR) and 583 protein abundance changes were confidently assessed. Moreover, 153 proteins identified in BX-treated samples showed significant differences in abundance. Bioinformatics analysis showed that the functions of 37 DAPs were predominantly related to nervous system development. The expression levels of the selected proteins for quantification by qRT-PCR or western blotting were consistent with the results in iTRAQ-labeled proteomics data.

Conclusion:

The results suggested that oral administration of BX in mice may cause fetal abnormality of the nervous system. The findings may be helpful to elucidate the underlying mechanisms of