

Preliminary study of urinary biomarker, miR-21, for kidney injury detection

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Abstract: Herbicide, namely glyphosate, has long been reported to cause adverse effects in human especially the induction of kidney injury and disturbance of kidney functions. Several biomarkers were demonstrated to be used for early kidney injury detection. However, some biomarkers have a limitation and low sensitivity to detect early phase of kidney injury. Therefore, we aimed to establish two urinary kidney injury biomarkers, urinary kidney injury molecule-1 (KIM-1) and microRNA-21 (miR-21), in glyphosate-exposed farmers. Two spot urine samples consisting of pre-work urine sample (before glyphosate application) and post-work urine sample (after glyphosate application 24 hours) were obtained. Urinary KIM-1 concentrations and miR-21 were analyzed. The average level of urinary KIM-1 was 1.34 µg/g Cr in pre-work urine and 1.26 µg/g Cr in post-work urine. The average fold of miR-21 expression was 1.40 and 1.21-fold in the pre- and post-work urine sample. There were no significant differences of the two biomarkers between the pre-work and post-work urine sample. However, the ΔmiR-21 expression moderately correlated with the volume of glyphosate used. Although two biomarkers were not significant different between pre- and post-work urine sample, the miR-21 expression may relate with the dose of glyphosate application in farmers. The number of subjects in this is limited, therefore a population size should be increased in future study.

Keywords: glyphosate, urinary biomarker, KIM-1, miR-21, occupational exposure, kidney injury



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