Imaging of single liver tumor cells intoxicated by heavy metals using ToF-SIMS

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摘要.

Human liver tumor cells intoxicated with five different Cd, Cu, Cr, Hg and Zn metals were analyzed using imaging time-of-flight secondary ion mass spectrometry (ToF-SIMS) to visualize the metal distributions in a single cell basis. A protocol was developed by combining rapid freezing, freeze-fracture and imprinting for transferring the intoxicated cells to a silicon wafer. As shown in the ToF-SIMS images, the cellular morphology was preserved indicating that this protocol can be used to prepare a representative cell for ToF-SIMS imaging analysis. Among the five metal ions investigated in this study, only Cr and Cu ions show preferential diffusion into the cell after simulated intoxication while the signals of the other three ions are either too low to be detected or unable to be distinguished from background intensity.

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