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**Laser Ablation Electrospray Ionization: A Molecular Probe for Biological Tissues** PETER NEMES, ALEXIS A. BARTON, YUE LI, AKOS VERTES, George Washington University — Interaction of light and matter has long served as the basis of probing and modifying physical and chemical properties of materials. Recent biomedical applications focus on the mid-infrared (mid-IR) region to couple the laser energy into samples through absorption by the native water. For example, mass spectrometry (MS), relying on atmospheric pressure mid-IR matrix-assisted laser desorption ionization, takes advantage of the small amount of ions in the laser plume. In mid-IR laser ablation, owing to the recoil pressure buildup in the sample, most of the material is expelled in the form of neutral molecules, clusters, and particulates. To enhance ion production, we intercept this plume with a cloud of charged droplets to post-ionize them for MS. As a result, laser ablation electrospray ionization (LAESI) can directly probe the molecular makeup of water rich targets with superior ion yield and dramatically extended mass range (up to 66,500 amu). LAESI also enables two and three dimensional imaging of live tissues. Fast imaging of the plume-plume interaction reveals the mechanistic aspects of LAESI.

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