

Raman spectroscopy for detection of imatinib in plasma: A proof of concept

Sanhita Rath, Aditi Sahu, Vikram Gota, P. G. Martínez-Torres, J. L. Pichardo-Molina, C. Murali Krishna.

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Abstract

Imatinib is the standard first line treatment for chronic myeloid leukemia (CML). Owing to dose-related toxicities of Imatinib such as neutropenia, there is scope for treatment optimization through therapeutic drug monitoring (TDM). Trough concentration of 1 g/mL is considered the therapeutic threshold. Existing methods for the detection of Imatinib in plasma are limited by long read out time and expensive instrumentation. Hence, Raman spectroscopy was explored as a rapid and objective tool for monitoring Imatinib concentration. Three approaches: conventional Raman spectroscopy (CRS), Drop coating deposition Raman (DCDR) spectroscopy and surface-enhanced Raman spectroscopy (SERS) were employed to detect the required trough concentration of 1 g/mL and above. Detection of therapeutically relevant concentrations (1 g/mL) using SERS and suitable nanoparticle substrates has been demonstrated. Prospectively, rigorous validation using clinical samples is necessary to confirm the utility of this approach in routine clinical usage.