# Liquid Chromatography-Tandem Mass Spectrometer (LC-MS/MS)

- **Liquid chromatography-mass spectrometry (LC-MS)** is now a routine technique with the development of electrospray ionization (ESI) providing a simple and robust interface.
- It can be applied to a wide range of biological molecules and the use of tandem MS and stable isotope internal standards allows highly sensitive and accurate assays to be developed although some method optimization is required to minimize ion suppression effects.
- Fast scanning speeds allow a high degree of multiplexing and many compounds can be measured in a single analytical run.
- Mass spectrometers operate by converting the analyte molecules to a charged (ionized) state, with subsequent analysis of the ions and any fragment ions that are produced during the ionization process, on the basis of their mass to charge ratio (*m/z*).

## Technical specifications

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| **Apollo II ion funnel electrospray source** | Flow rate: 1 µL/min – 1 mL/min |
| **Mass Range** | 20 – 40,000 m/z |
| **Quadrupole isolation** | Up to 3,000 m/z |
| **Quadrupole Mass Range** | Up to 40,000 m/z |
| **Mass resolution** | 60,000 FSR (full sensitivity resolution) at m/z 1222 |
| **Full scan sensitivity in MS** | ESI: Reserpine 1 pg S/N>1000:1 RMS With Ion-Booster (optional): Reserpine 100 fg S/N>100:1 RMS |
| **Full scan sensitivity in MS/MS** | The signal height obtained from a consumption of 2.5 fmol of Glu-Fibrinopeptide B will be better than 100 counts on the most intense y' sequence ion from the MS/MS spectrum of the doubly charged precursor ion. This shall correspond to a signal to noise ratio better than 100:1. The MS/MS sensitivity specification is met while using quadrupole isolation of the precursor ion demonstrating that there is minimal transmission loss through the isolating quad. |
| **Digitizer** | 5 G sample/sec ADC with 50 Gbit/sec |
| **Detector** | Very long-life micro channel plate detector |
| **Dynamic range** | 10-bit ADC for high quantitative dynamic range |
| **Acquisition rate** | up to 60 Hz MS & up to 60 Hz MS/MS (profile and peak detected spectra to disk) |

## Samples:

**Metabolomics, proteomics, and small molecule analysis**.

Samples should be in liquid form purified particle free with MS suitable solvent for analysis.

## Applications of LC-QTOF:

**Metabolomics** - Cancer screening and diagnosis, global metabolic fingerprinting analysis, biomarker discovery and profiling, biofuels generation and use, Lipidomics studies, and metabolic disorder profiling.

**Proteomics** - Characterization of proteins and protein complexes, sequencing of peptides, and identification of posttranslational modifications.

**Environmental sample** - Drinking water testing, pesticide screening and quantitation, soil contamination assessment, carbon dioxide and pollution monitoring, and trace elemental analysis of heavy metals leaching.

**Pharmaceutical analysis** - Drug discovery and absorption, distribution, metabolism, and elimination (ADME) studies, pharmacokinetic and pharmacodynamic analyses, metabolite screening, and preclinical development.

**Clinical samples** - Clinical drug development, Phase 0 studies, clinical tests, disease screening, drug therapy monitoring, analysis of peptides used for diagnostic testing, and identification of infectious agents for targeted therapies.

**Note:** Basic information required for data acquisition as source of sample, process of sample preparation, Stored buffer, concentration & purity of sample and aim of the sample analysis for better results and smooth operations.

## Details of LC-MS/MS

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| **Brand** | Bruker |
| **Model** | T-Rex LC-QTOF (Impact II + Elute UHPLC) |
| **Sponsored Agency** | RUSA 2.0 (Biological Science) |