Thermo Scientific Exactive Plus EMR Orbitrap LC-MS System

Sensitive identification, characterization,

and quantification of intact proteins

Impurities in mAb • Antibody-drug conjugates • PEGylated proteins • Oligomerization • Glycoproteins • Protein assemblies

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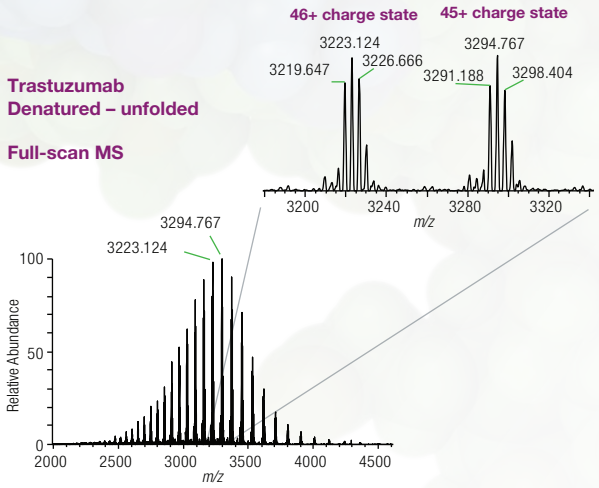
Facilitating biopharmaceutical and biological research

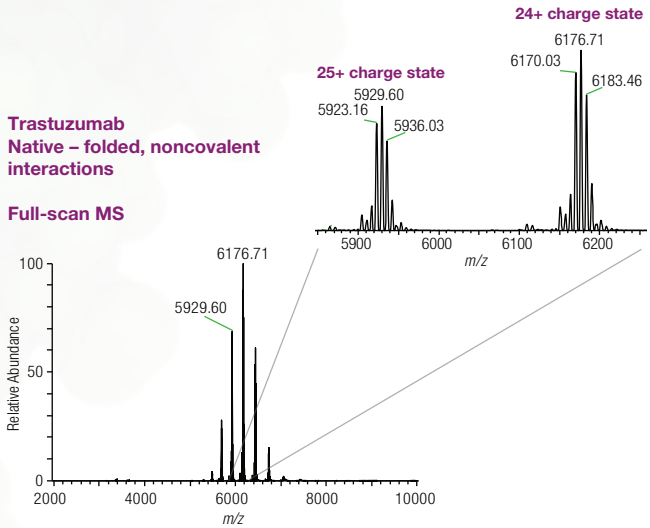
While analysis of denatured proteins may be the most common LC/MS protein analysis, many biopharmaceutical and biological research applications require analysis of proteins in their native (intact) state. The Thermo Scientific™ Exactive™ Plus EMR mass spectrometer combines unsurpassed high-resolution accurate-mass Thermo Scientific™ Orbitrap™ analysis with an extended mass range (EMR) option to create an outstanding tool for investigating the structure, topology, and architecture of native-like tertiary and quaternary protein structures. Common targets include impurities in monoclonal antibodies, antibody-drug conjugates (ADC), PEG-ylated proteins, oligomerized protein-based drugs, glycoforms, and protein assemblies. At the same time, the Exactive Plus EMR MS retains all of the capabilities that make it the ultimate solution for screening peptides and small molecules.

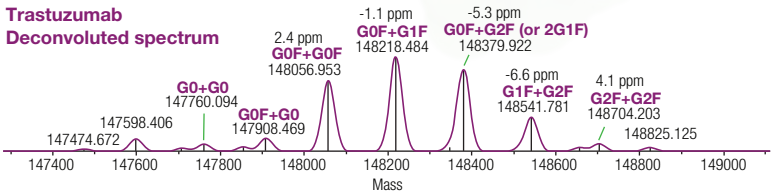
EMR upgrades to the Exactive Plus instrument include:

- Extended *m/z* range of 350–20,000
- Improved transmission of higher-mass ions for stronger signals
- Modified HCD cell pressure and controls for easy optimization of experimental conditions
- Access to short transients for improved signal-to-noise ratios

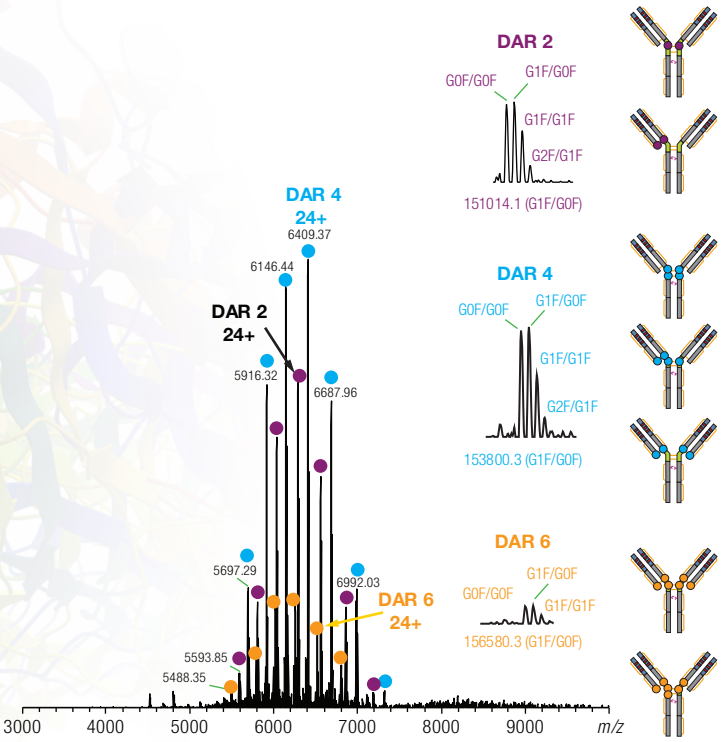
Exactive Plus EMR mass spectrometer with TriVersa NanoMate® chip-based electrospray ionization source from Advion, Inc.





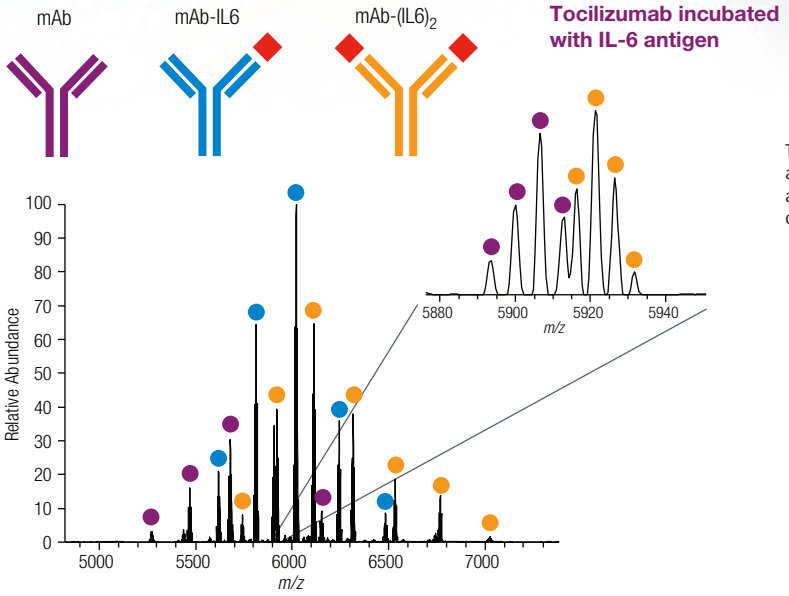


Trastuzumab (Herceptin®) is a monoclonal antibody that interferes with the HER2/neu receptor and is primarily used to treat patients with specific breast cancers. Here, the Exactive Plus EMR system easily separates isoforms of both denatured and native trastuzamab and determines glycosylation states with excellent mass accuracy.



The E xactive Plus EMR system easily distinguishes between antibody drug conjugates with different payload levels.[1]

1 Data courtesy of Sarah Sanglier-Cianférani et al., CNRS UMR 7178, University of Strasbourg

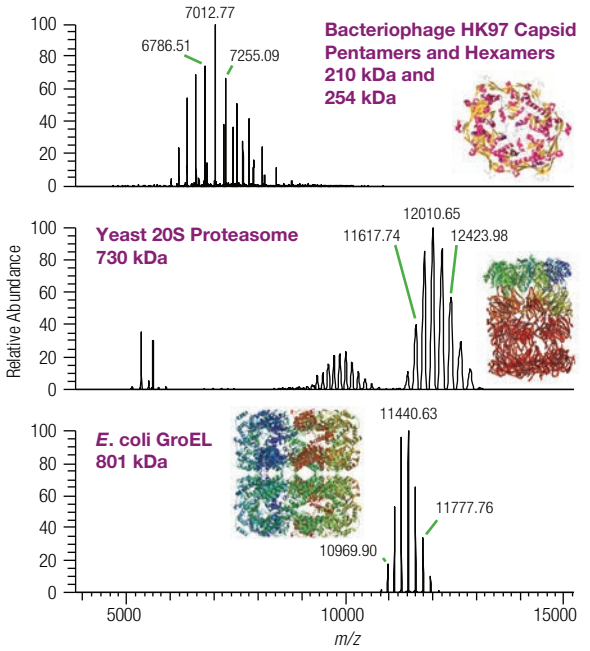


The Exactive Plus EMR system is well suited for investigation of antibody-antigen binding. In this spectrum of native anti-interleukin 6 antibody incubated with IL-6 antigen, it easily resolves multiple degrees of binding as well as glycoforms with similar *m/z* values (inset).[2]

An integrated solution for the investigation of native proteins

The Exactive Plus mass spectrometer with the extended mass range (EMR) option is the core of a complete solution for analysis of proteins and protein complexes in their native states. A system can include:

- Advion TriVersa NanoMate ion source for long, stable automated infusions that enhance high-throughput analysis of intact proteins
- Thermo Scientific™ Nanospray Flex ion source for flexible, ultrasensitive nanoelectrospray performance with excellent stability
- Thermo Scientific™ Dionex™ UltiMate™ 3000 liquid chromatography system for faster runs, better resolution, and lower operating costs.
- Thermo Scientific Protein Deconvolution software for more effective, accurate deconvolution of spectra from intact proteins



Exactive Plus EMR analysis of protein complexes in native-like states[3]

2, 3 Data courtesy of Albert J.R. Heck et al., Utrecht University

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BR63889_E 08/16

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