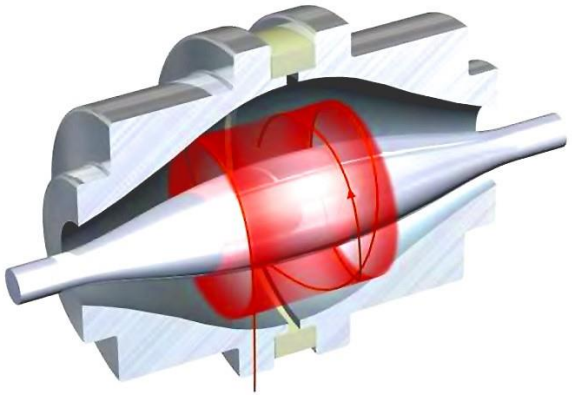
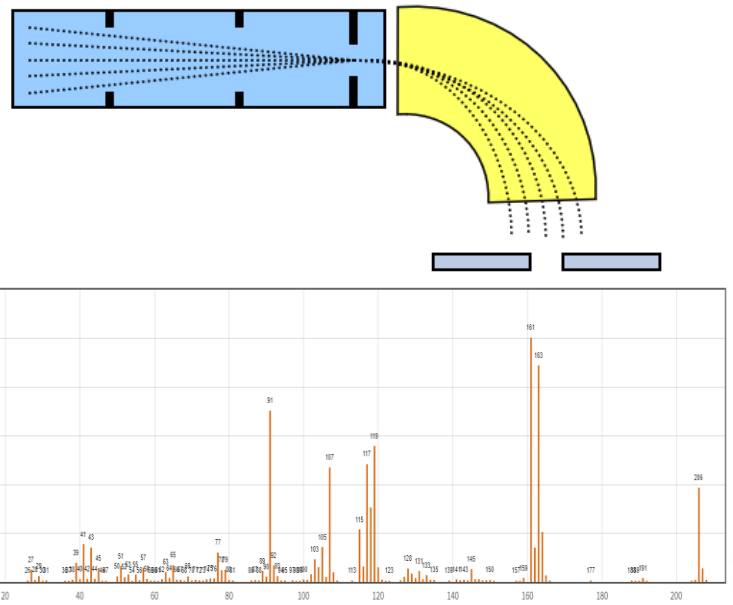
„Hvězdné“ hybridní spektrometry

Lukáš Plaček
&
Roman Hájek



Vývojová etapa 1

MS

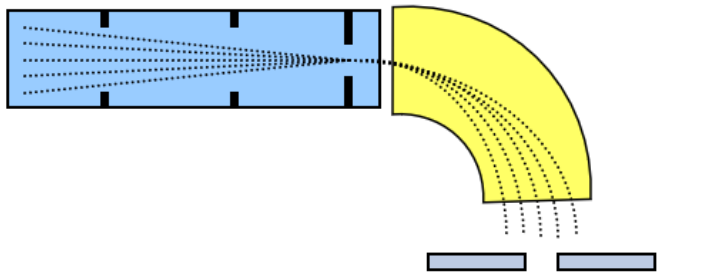


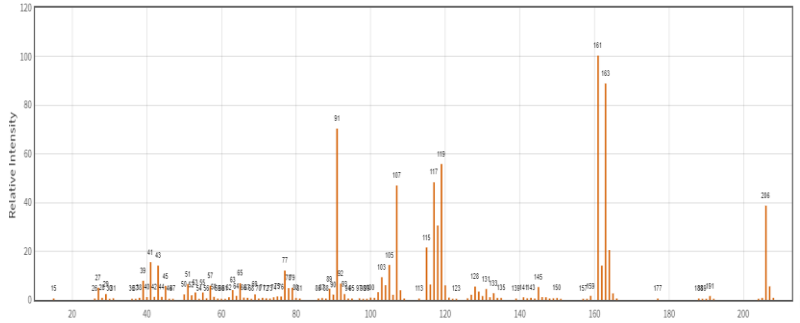
studium dějů
v plynné fázi

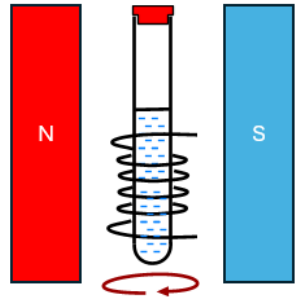
pragolab

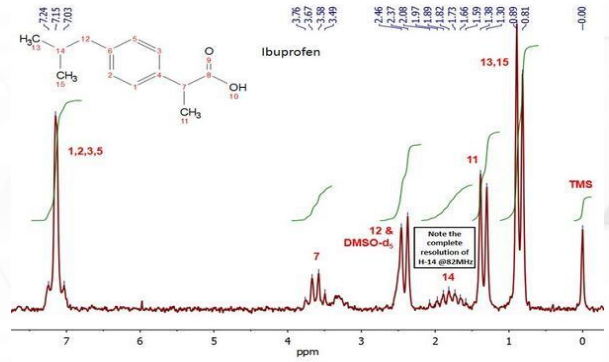
Vývojová etapa 2

MS + NMR







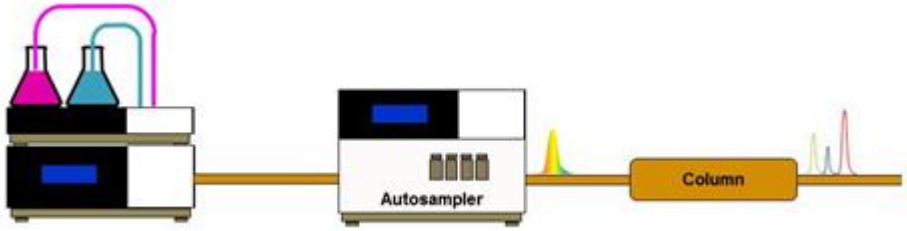


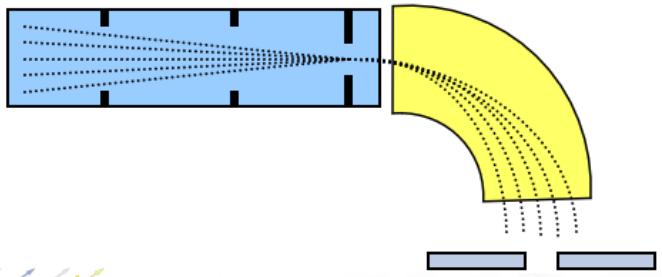
strukturní analýza

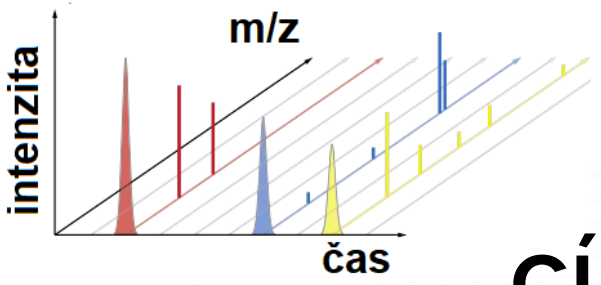
pragolab

Vývojová etapa 3

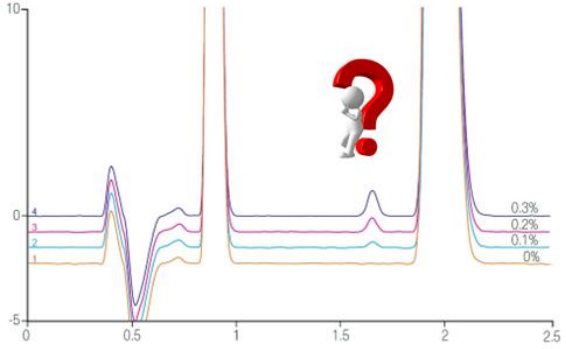
xC-MS



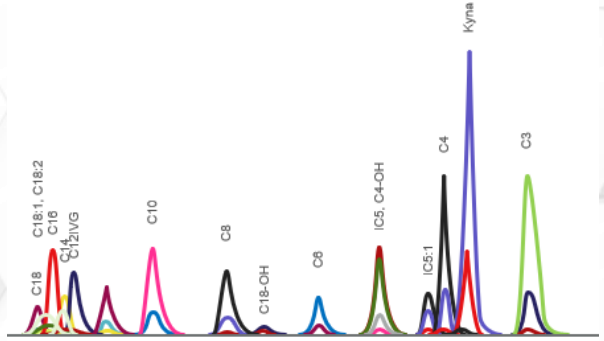




strukturní analýza analytů ve směsi

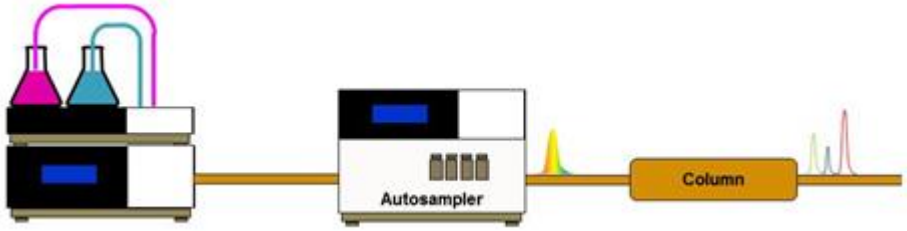


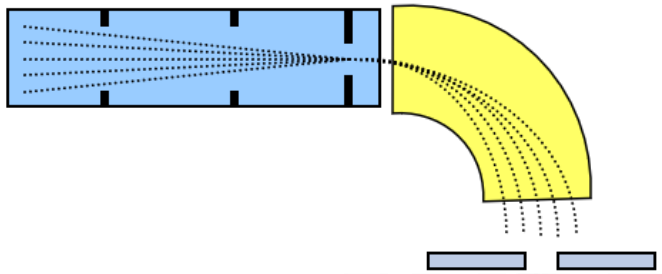
cílená analýza (kvantitativní)



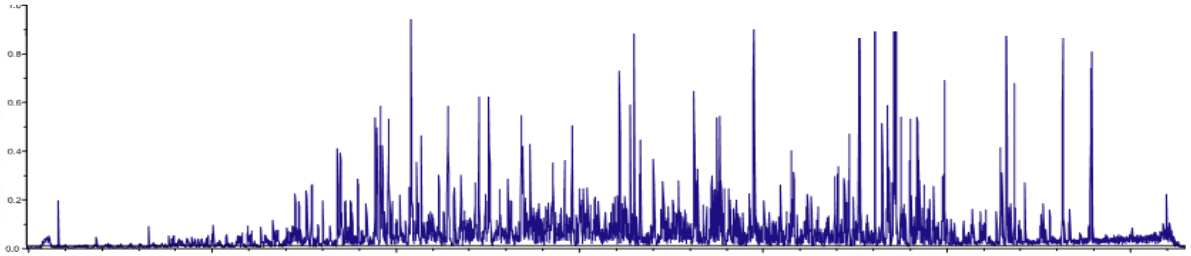
Vývojová etapa 4

xC-MS



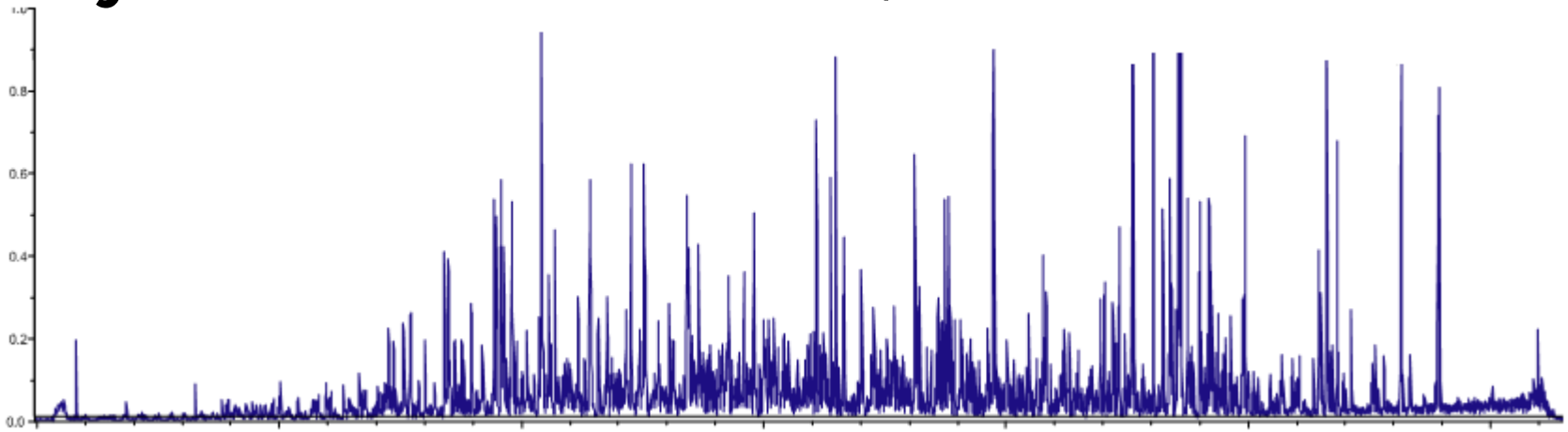


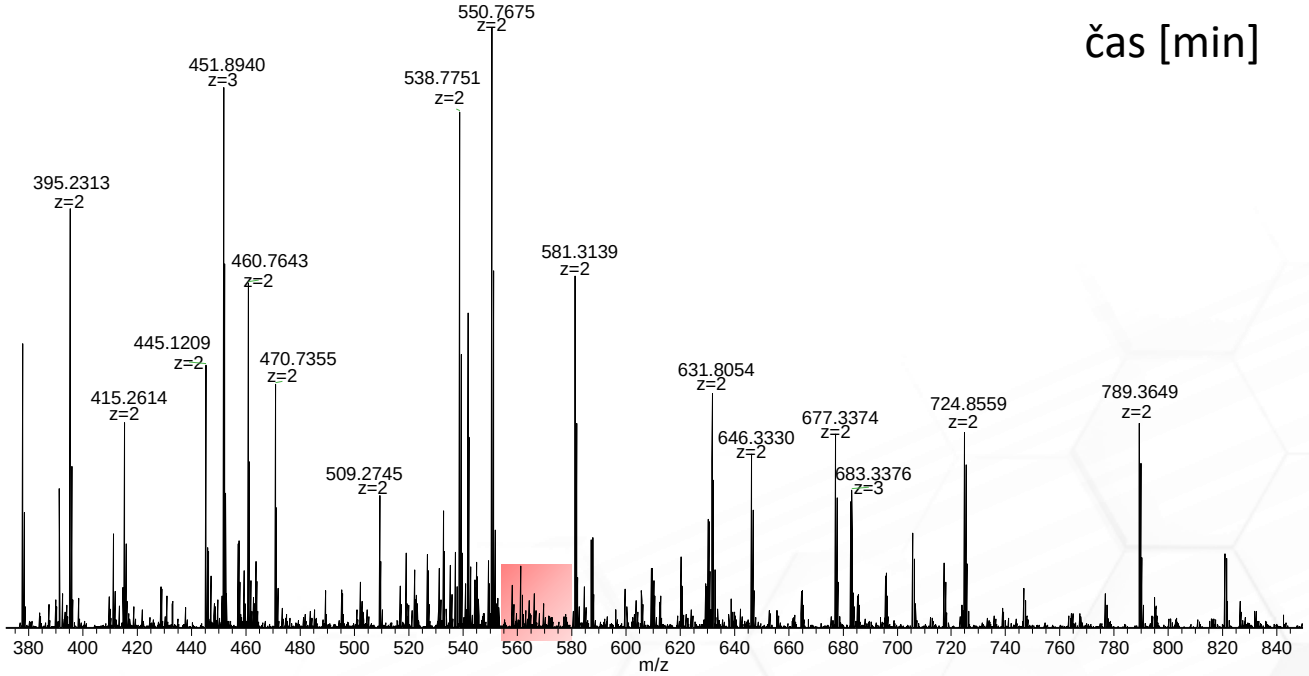
necílená analýza
(strukturní + semikvantitativní)



čas [min]

Objevování biomarkerů, -omics





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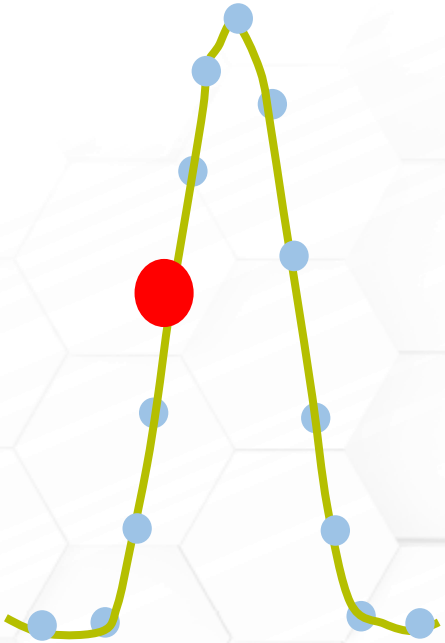
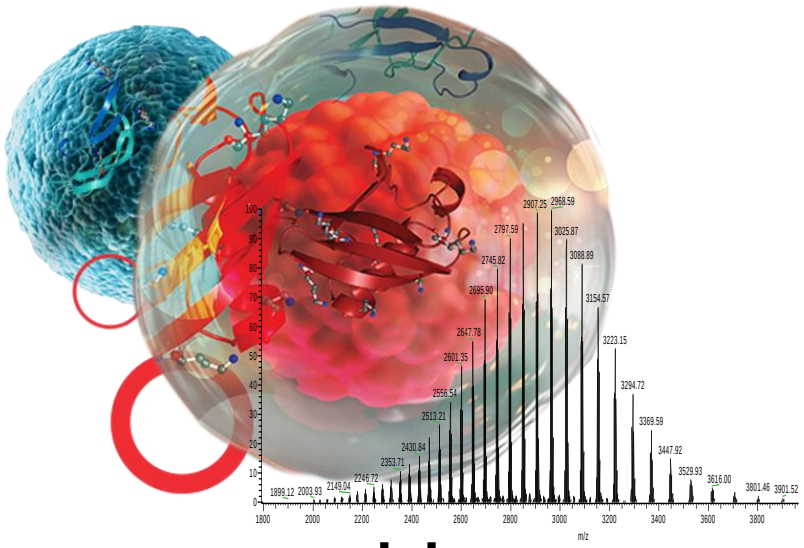
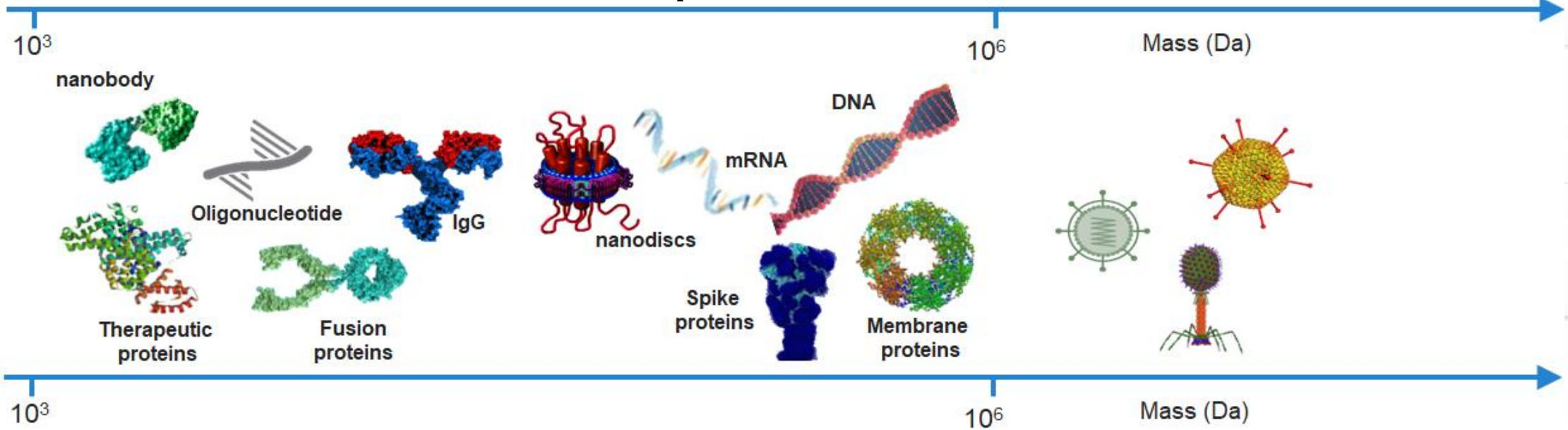


m/z

Hmotnostní spektrometrie v moderní léčbě

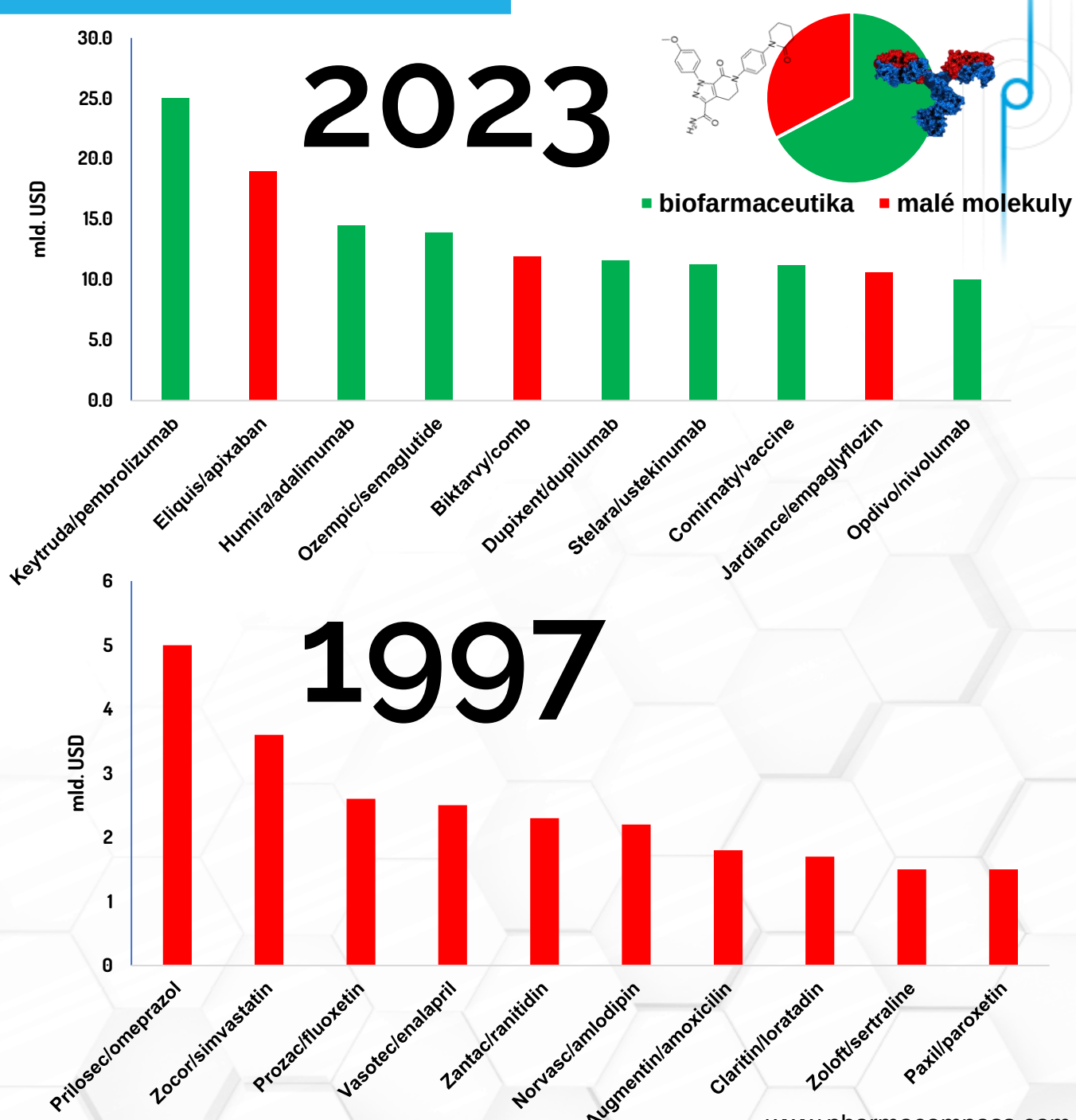


objev produkce použití



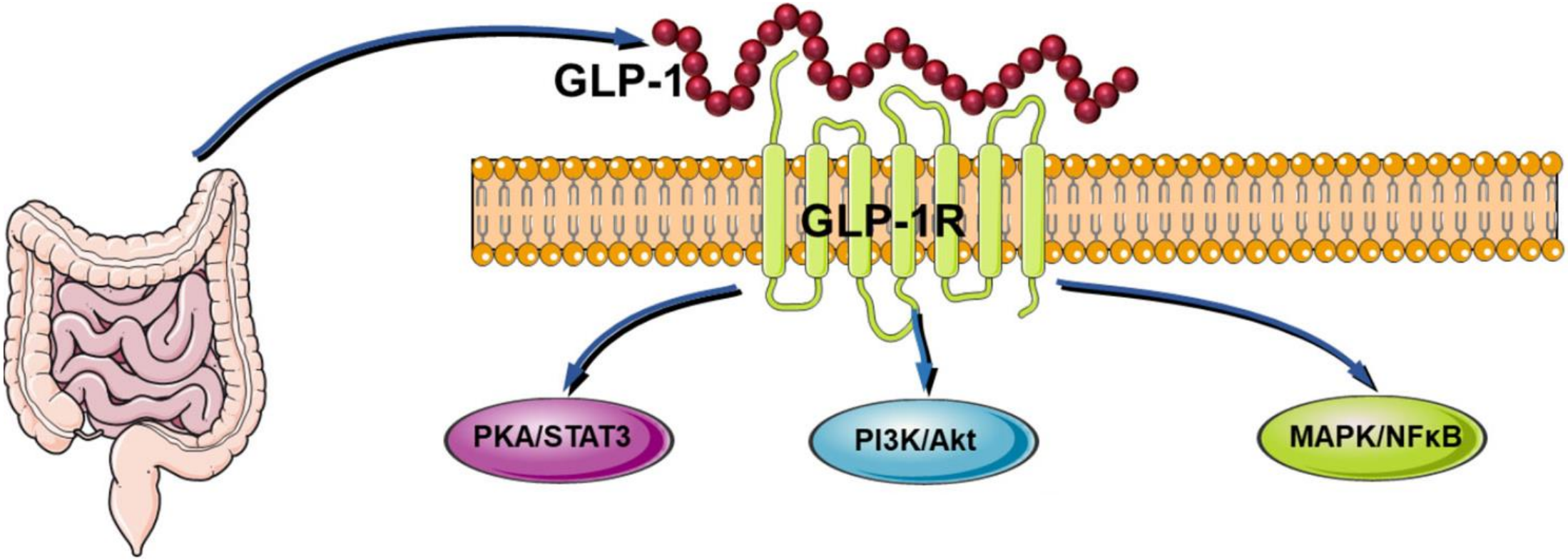
Tlak na rozvoj hmotnostních spektrometrů

Trendy moderní léčby



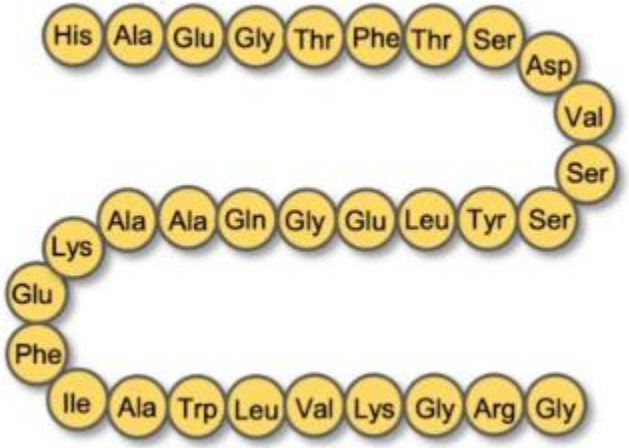
www.pharmacompass.com

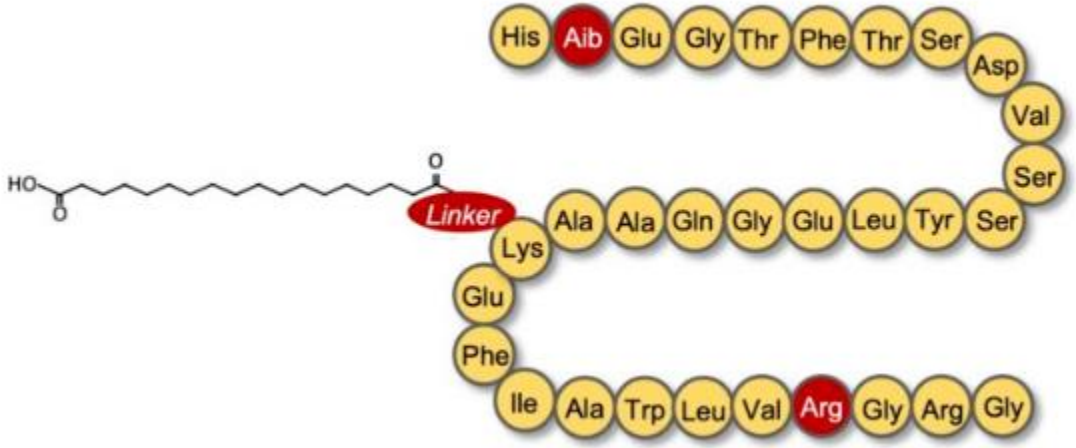
Ozempic - semaglutid



https://doi.org/10.3389/fimmu.2022.997578

Ozempic - semaglutid





HOSPODÁŘSKÉ NOVINY

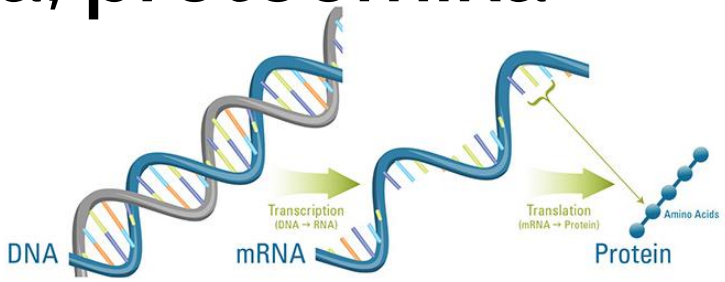
Hledat

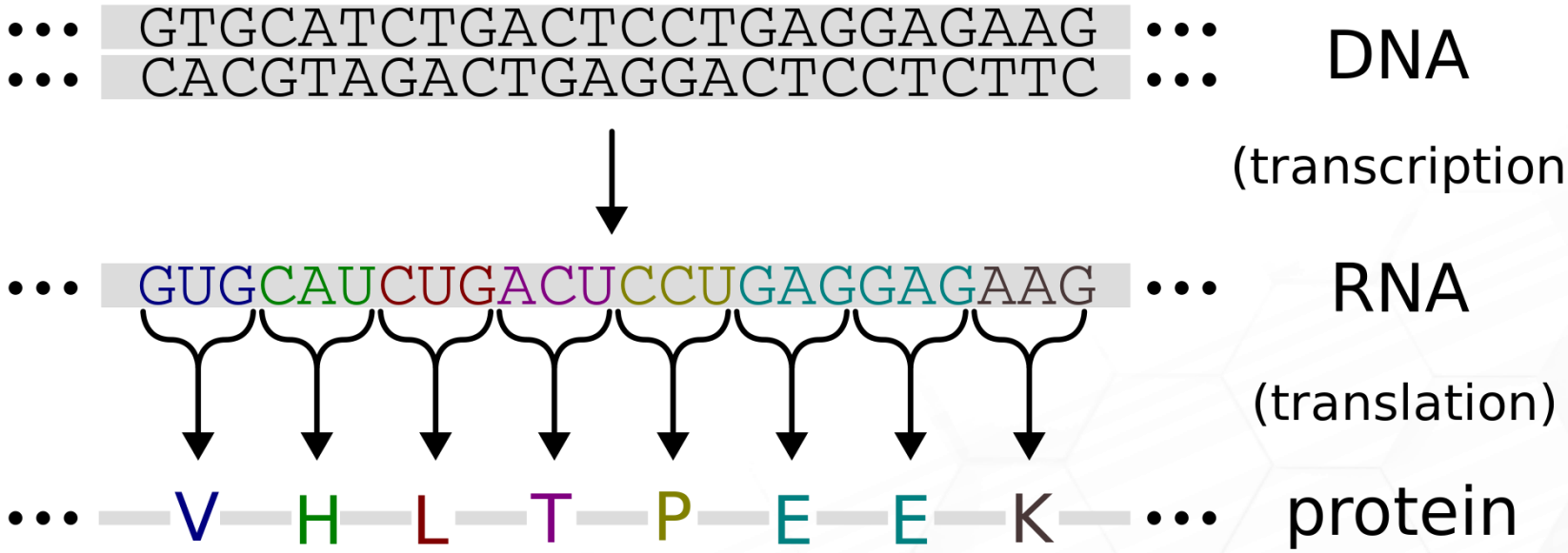
BYZNYS ZPRÁVY NÁZORY TECH REALITY INVESTICE PODCASTY Pročne ARCHIV DALŠÍ

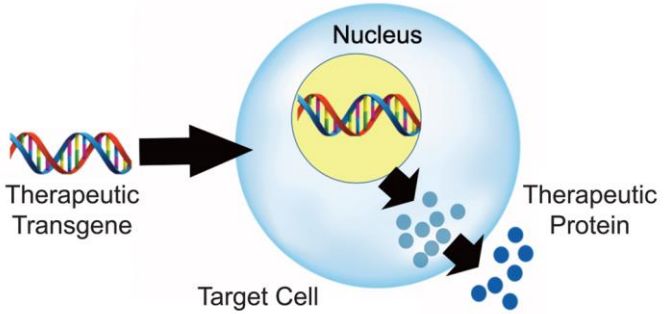
Největší evropská firma míří do Česka. Chce koupit závod, který teď vyrábí vakcíny proti covidu

https://observatoireprevention.org/

Genomika, transkriptomika, proteomika

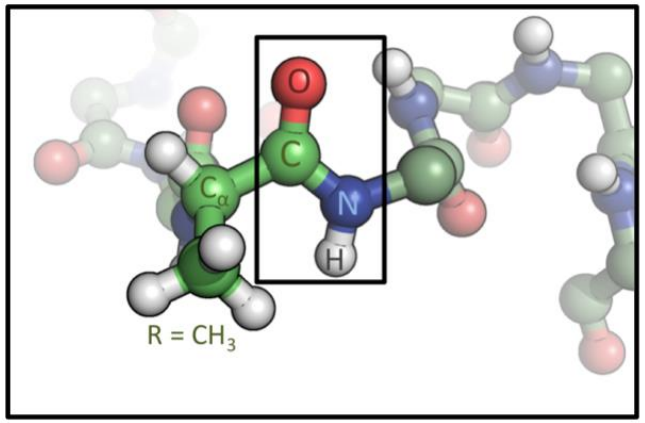


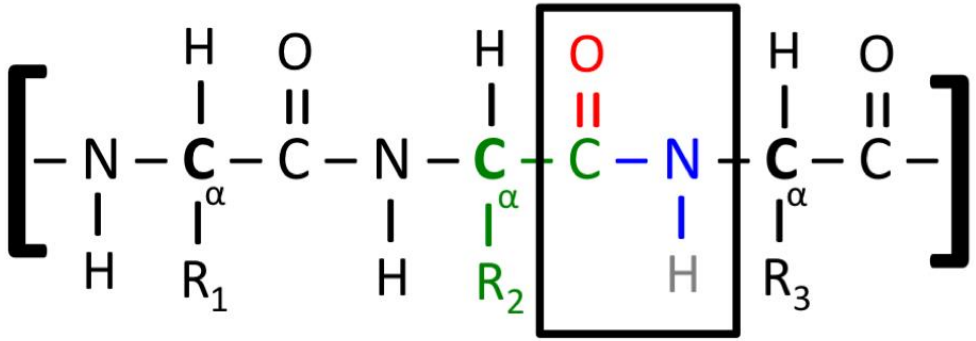


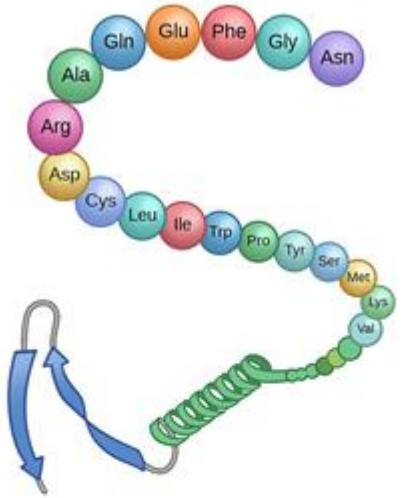


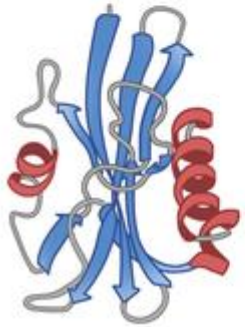
pragolab

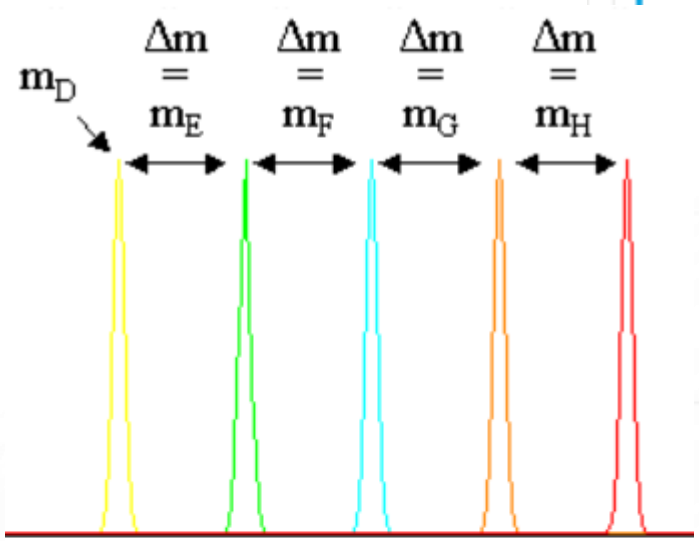
Proteomika a hmotnostní spektrometrie

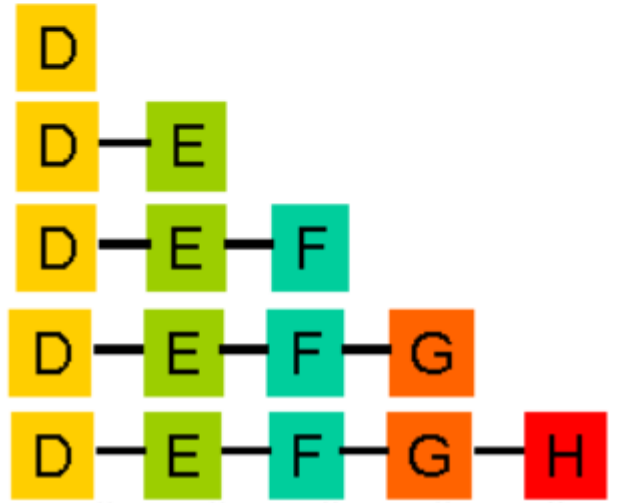






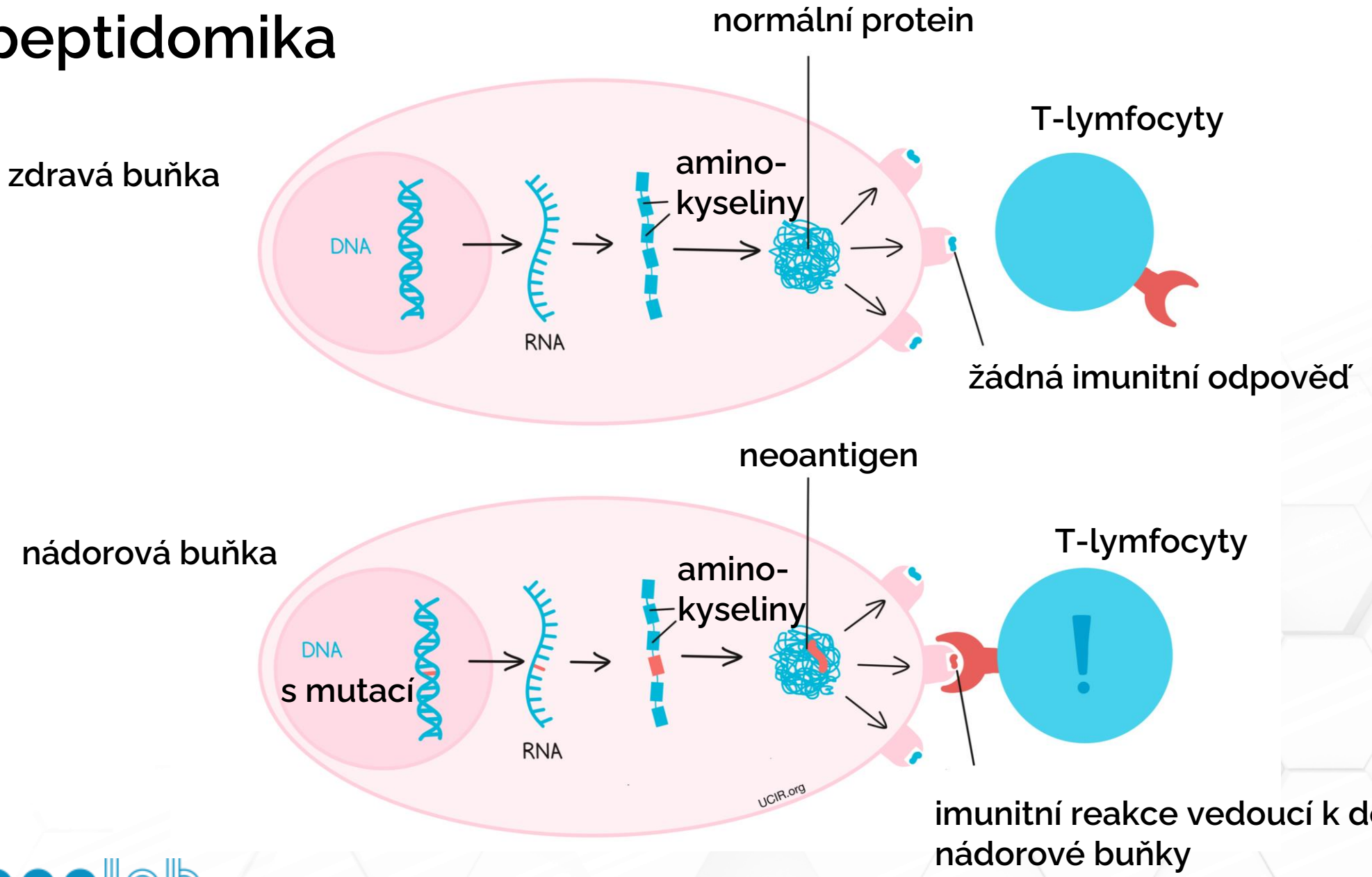




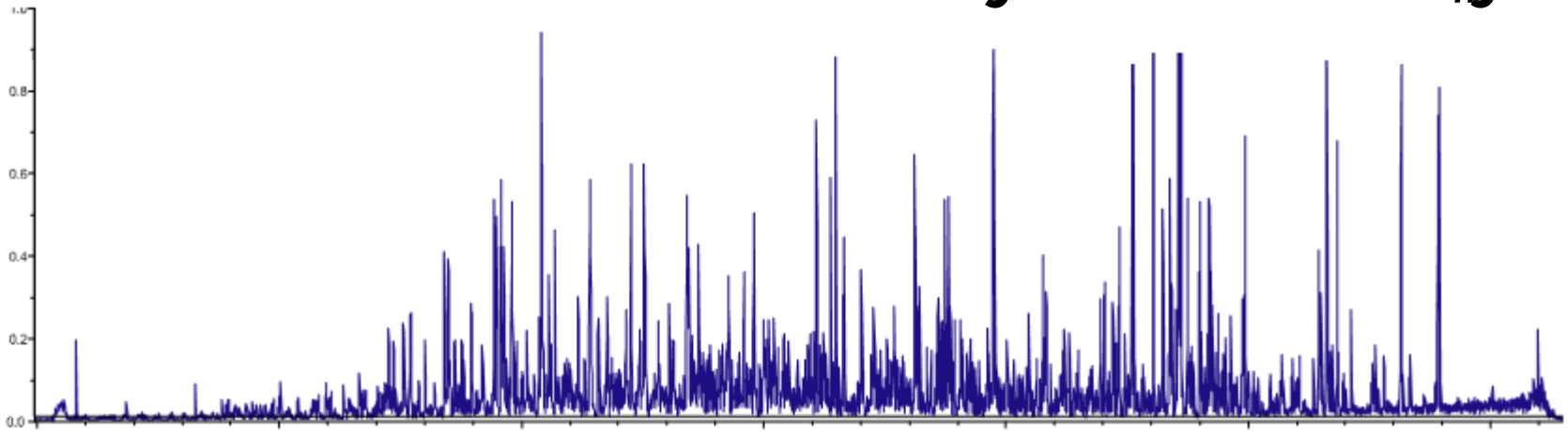


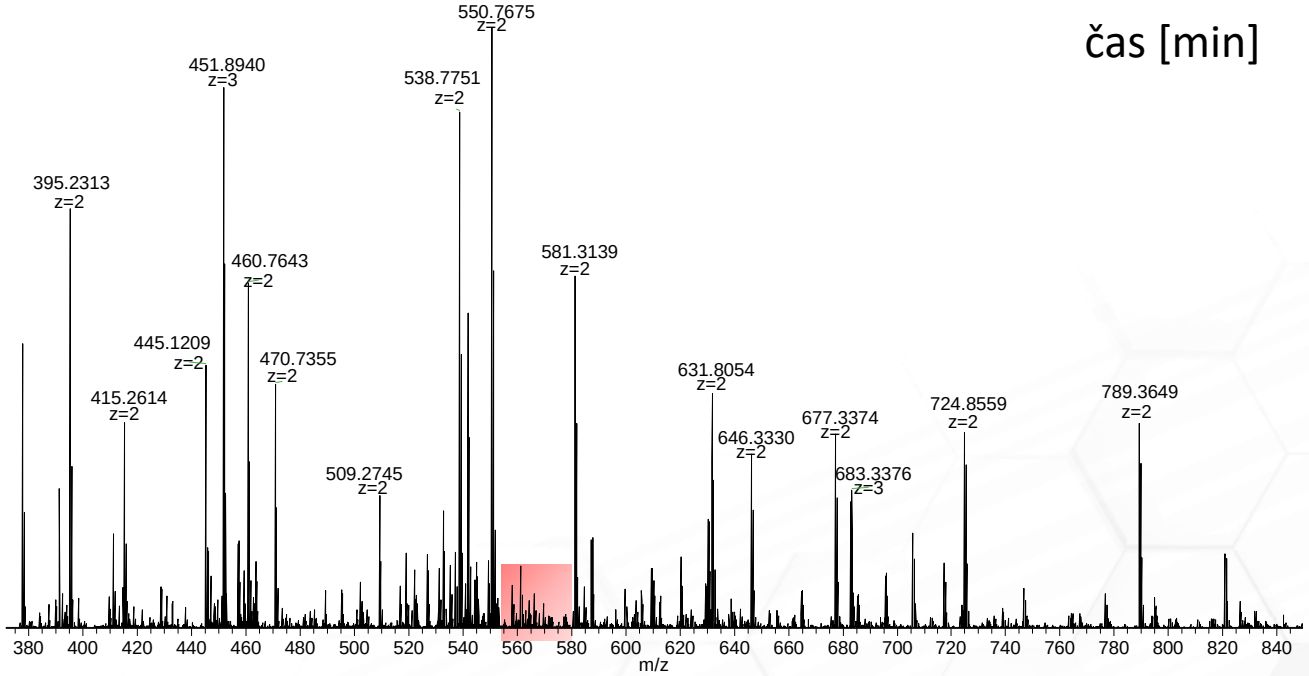
www.wikipedia.org

Imunopeptidomika



Potřeba efektivních nástrojů k hledání „jehly“





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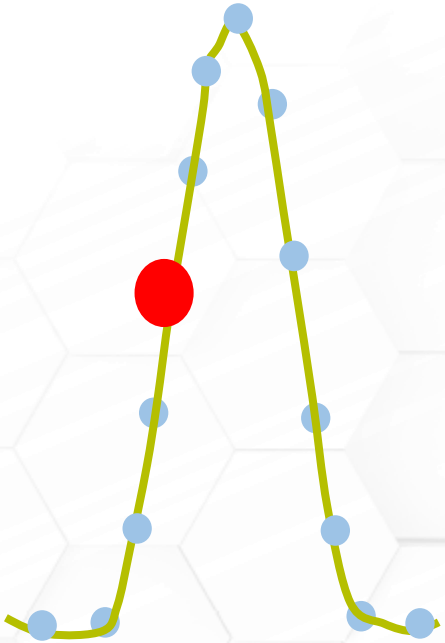
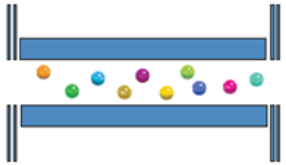


m/z

Rozvoj instrumentace hmotnostní spektrometrie

A

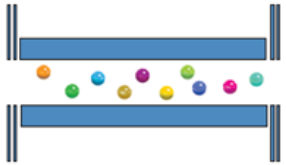
Q (LRMS)



OT (HRMS)

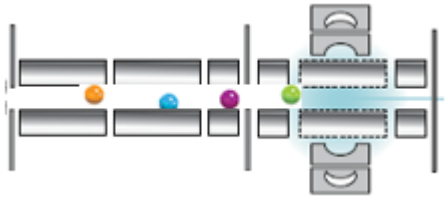
B

Q (LRMS)



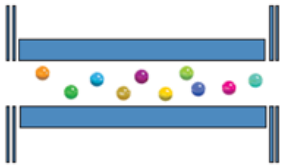
OT (HRMS)

LIT (LRMS)



C

Q (LRMS)

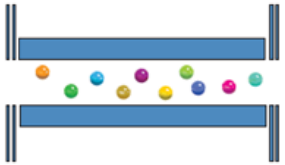


OT (HRMS)

OT (HRMS)

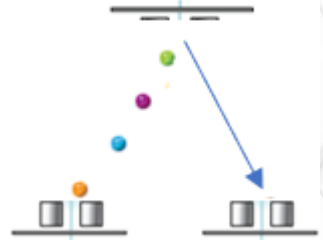
D

Q (LRMS)



OT (HRMS)

TOF (HRMS)



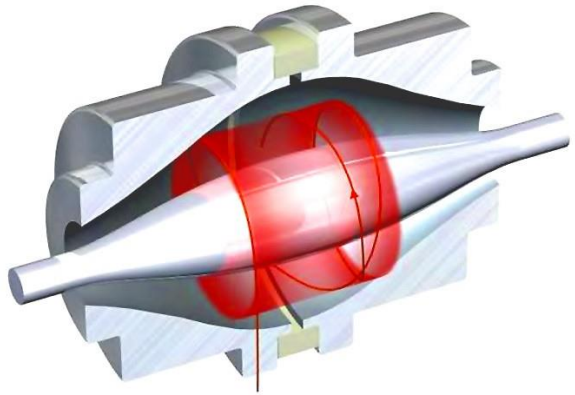
pragolab

pragolab

pragolab

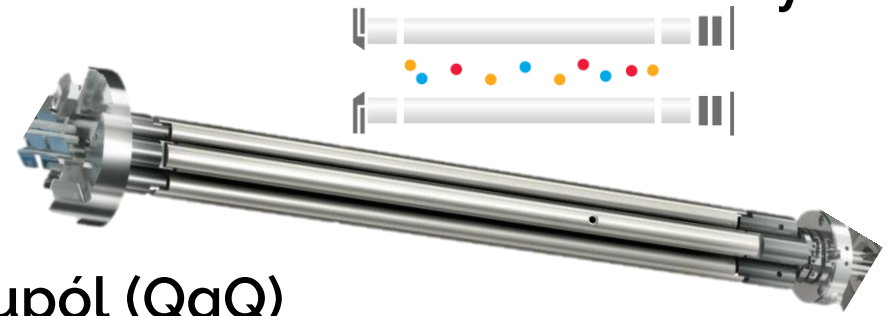
„Hvězdné“ hybridní MS

Roman Hájek



Hmotnostní spektrometry s nízkým rozlišením

Jednoduchý kvadrupól (Q)



ISQ EM

ISQ EC

Trojitý kvadrupól (QqQ)

TSQ Altis Plus

TSQ Fortis Plus

TSQ Quantis Plus

Kvadrupól s lineární iontovou pastí (QqLIT)

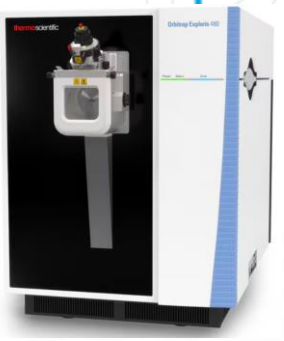
Stellar

Hmotnostní spektrometry s vysokým rozlišením

Řada Orbitrap Exploris (QqOT)

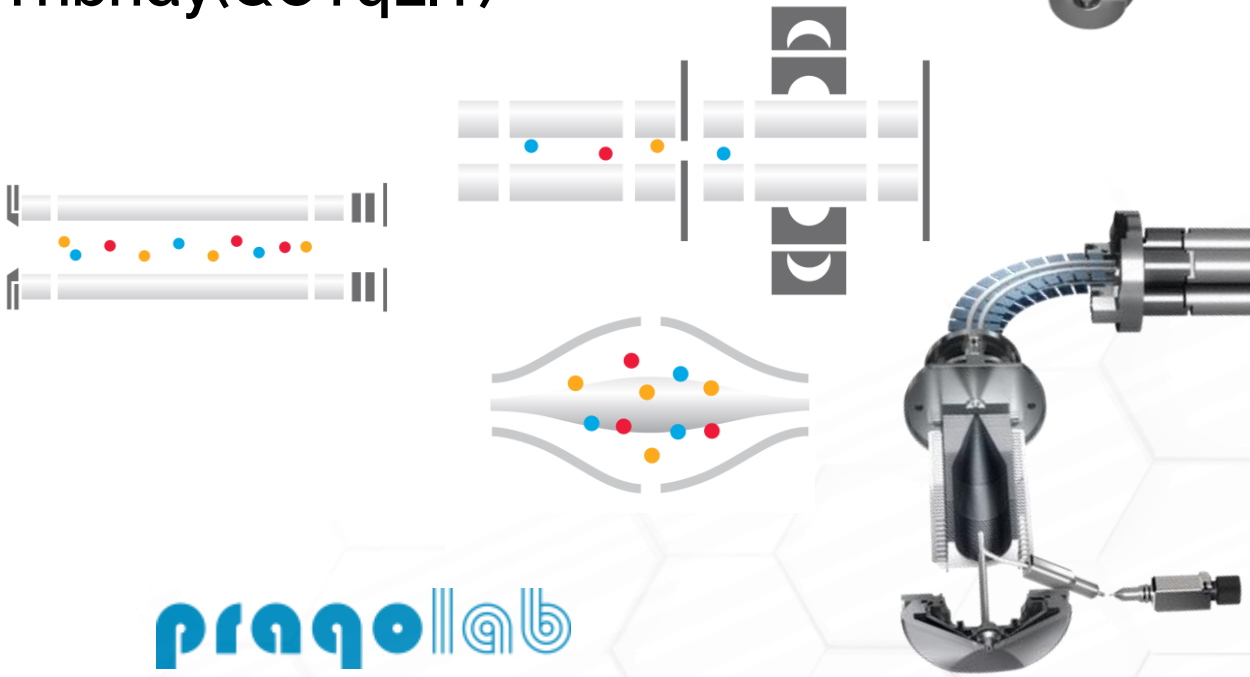
Exploris 120

Exploris 240



Exploris 480

Tribridy(QOTqLIT)



Orbitrap Eclipse

Orbitrap IQ-X

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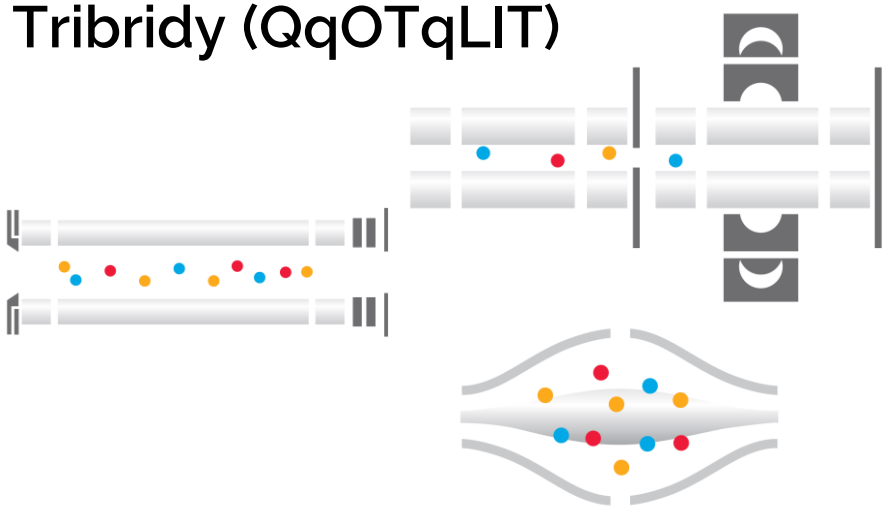
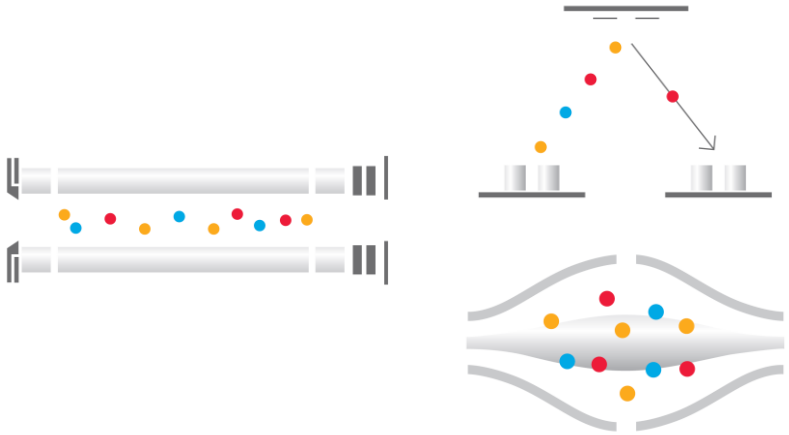
Hmotnostní spektrometry s vysokým rozlišením rozlišením

Tribridy (QqOTqLIT)



Orbitrap Ascend

Tribridy (QOTqToF)



Orbitrap Astral

pragolab


Uvedení
Thermo Scientific™ Stellar™ hmotnostní spektrometr

pragolab

StellarMS

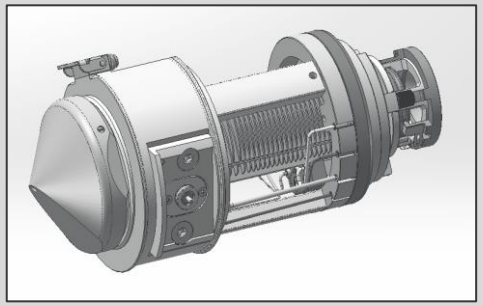

Electrodynamic Ion Funnel
OptaMax Plus Ion Source
High Capacity Transfer Tube
Auto-Ready Ion Source for Calibration
Advanced Active Beam Guide
QR5 Plus Segmented Quadrupole
Ion Concentrating Routing Multipole
HyperFast Dual Pressure Linear Ion Trap Mass Analyzer

Auto-Ready iontový zdroj pro kalibraci

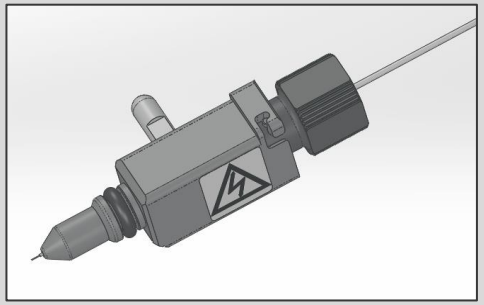
Automatizované / vzdálené / předem naplánované kontroly a kalibrace systému

Auto-Ready iontový zdroj

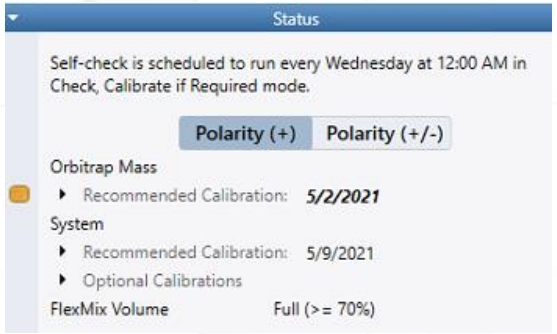
Samostatná trubice pro přenos iontů

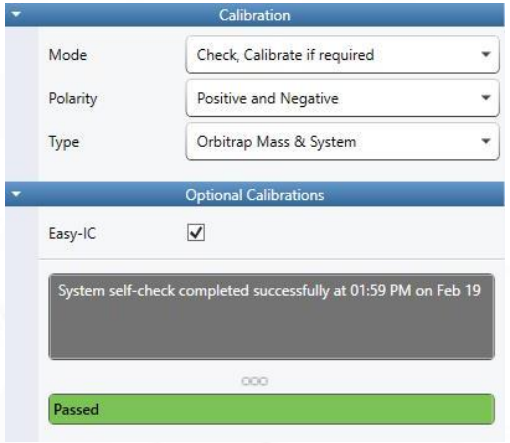


Dedikovaný emitér



Robustní systém

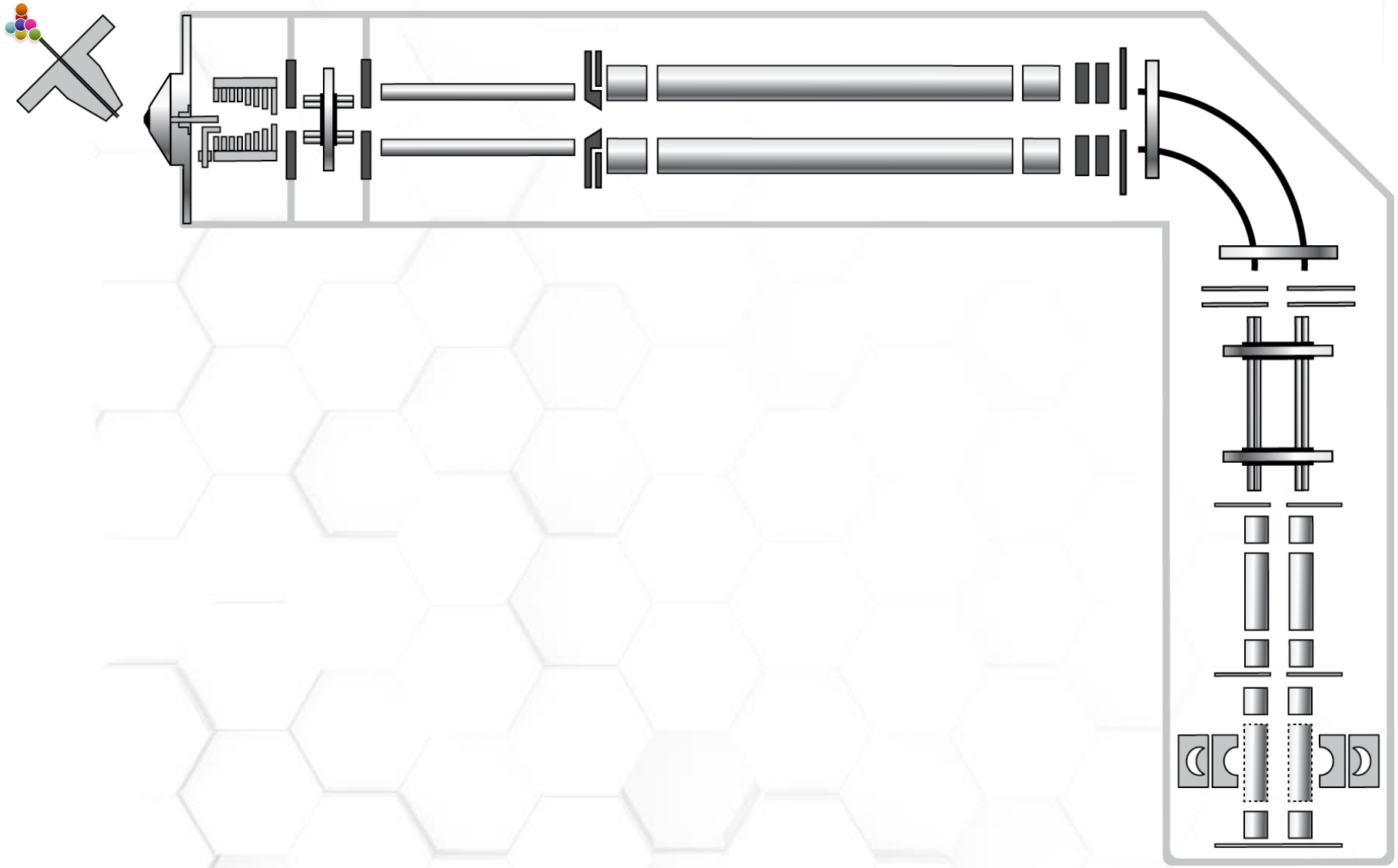




Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra

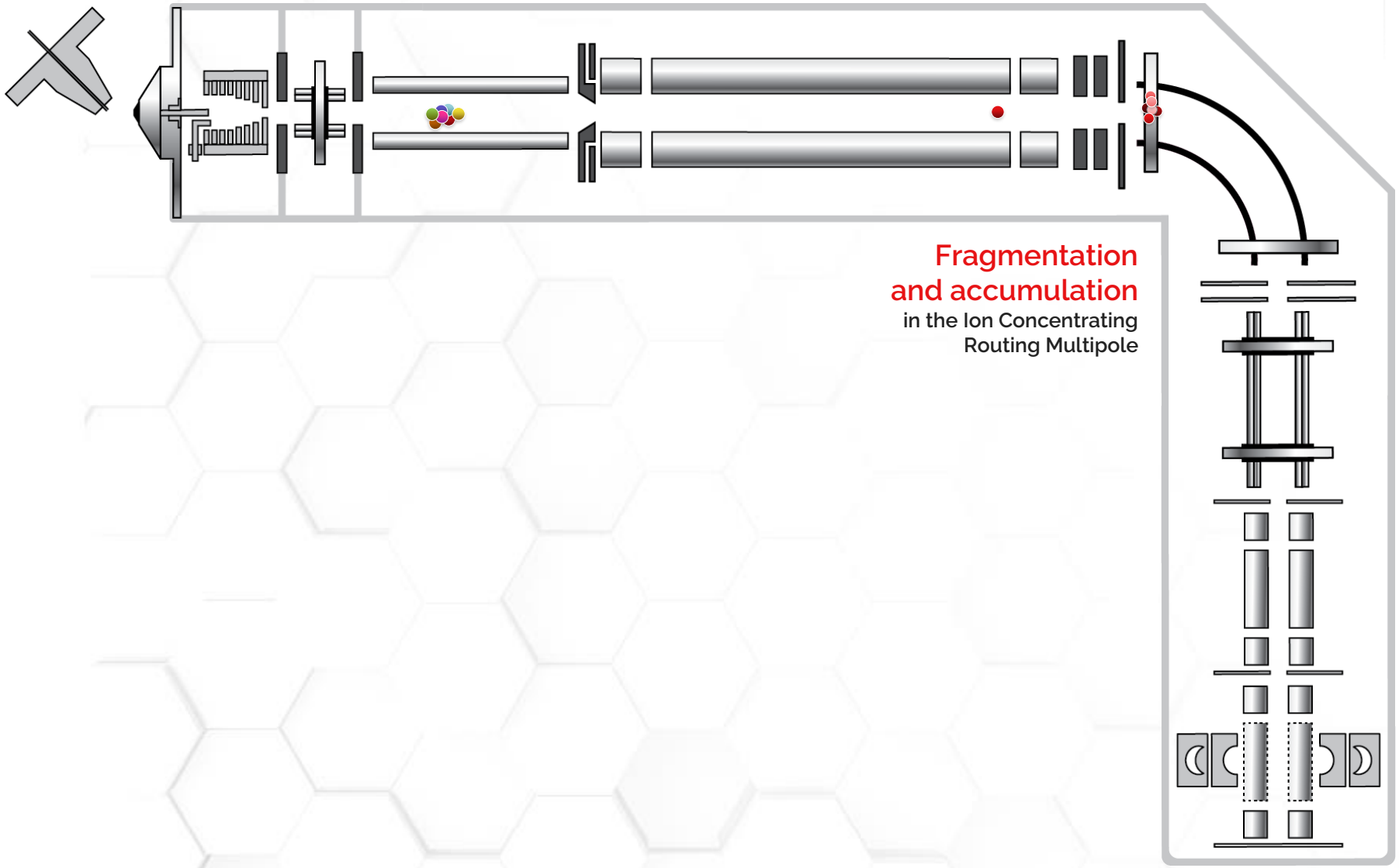
Coordinated control of ions in a step-wise manner

In the Stellar mass spectrometer



Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra

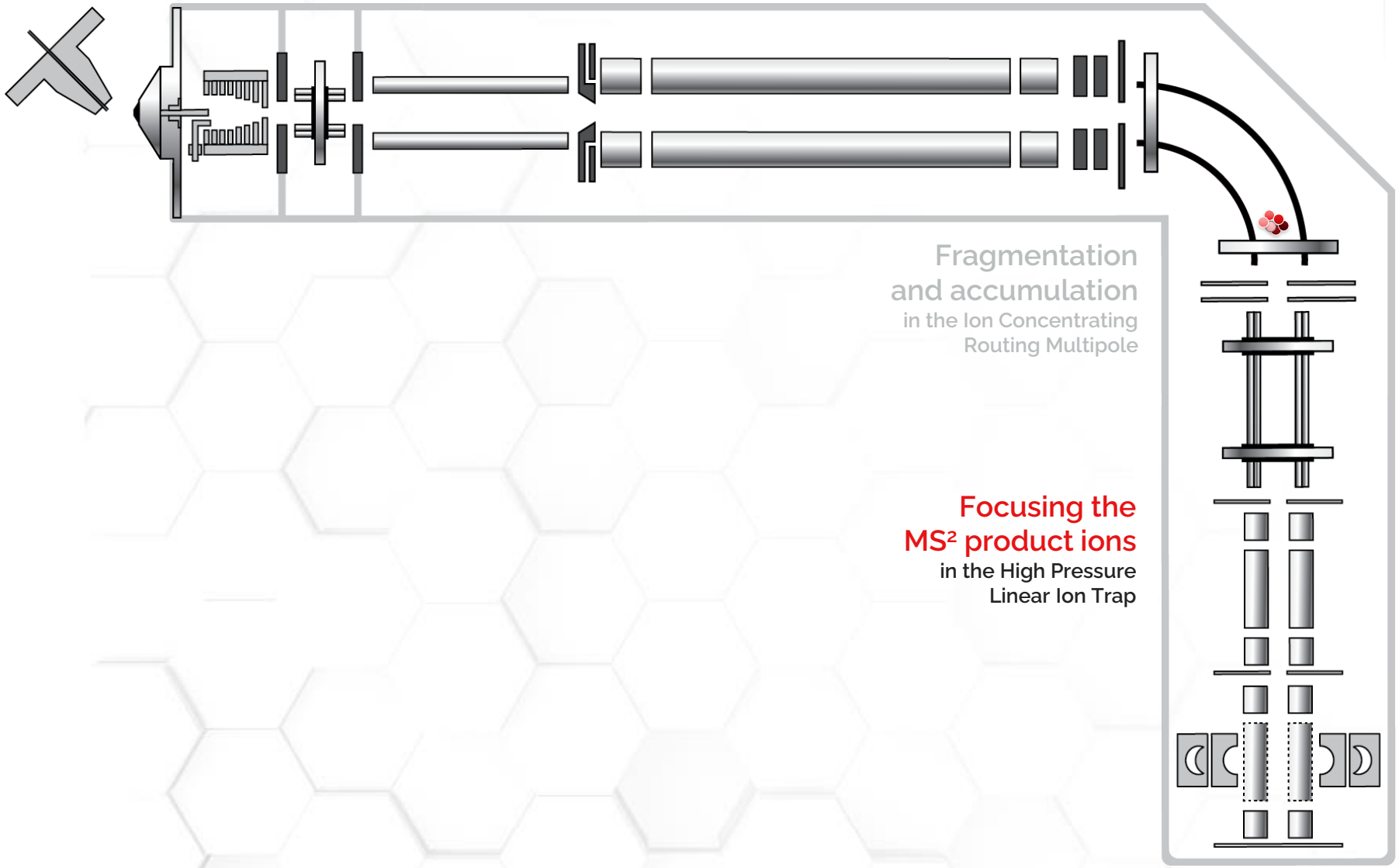
Precursor range isolation
in the Quadrupole Mass Analyzer



Fragmentation and accumulation
in the Ion Concentrating Routing Multipole

Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra

Precursor range isolation
in the Quadrupole Mass Analyzer

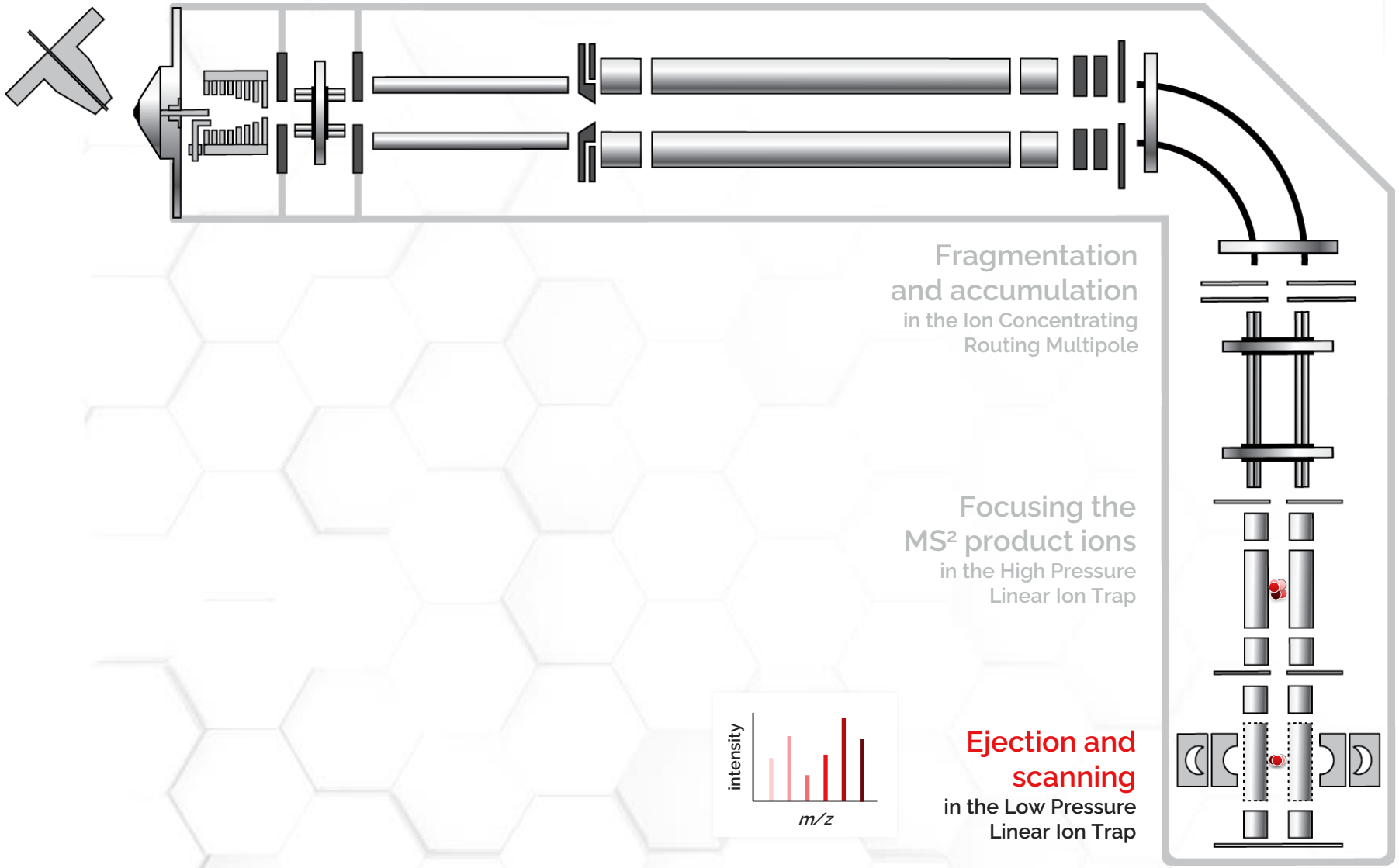


Fragmentation
and accumulation
in the Ion Concentrating
Routing Multipole

Focusing the
MS^2 product ions
in the High Pressure
Linear Ion Trap

Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra

Precursor range isolation
in the Quadrupole Mass Analyzer



Fragmentation
and accumulation
in the Ion Concentrating
Routing Multipole

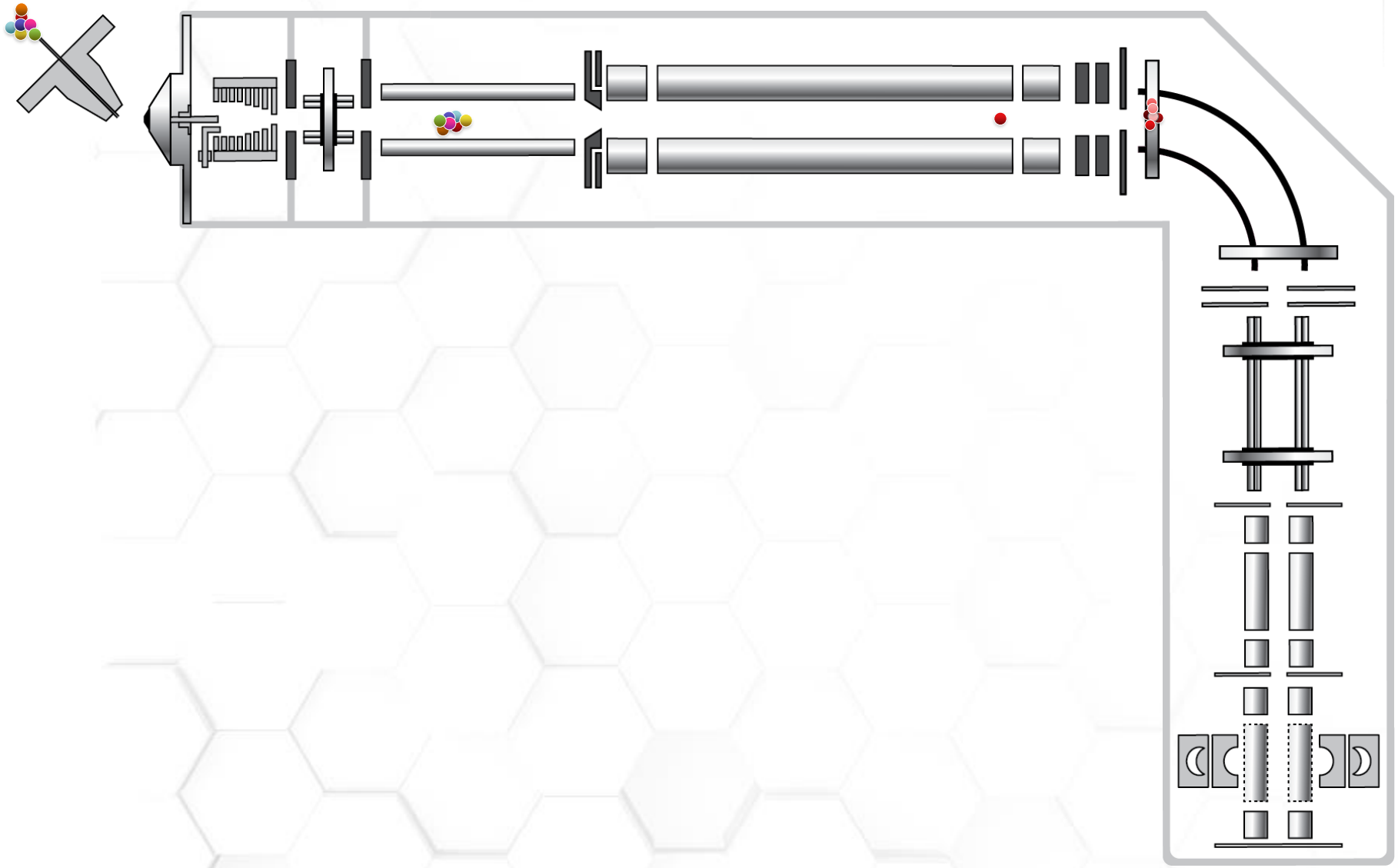
Focusing the
MS^2 product ions
in the High Pressure
Linear Ion Trap

Ejection and
scanning
in the Low Pressure
Linear Ion Trap

Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra

Increased ion utilization for faster MS^2 acquisition

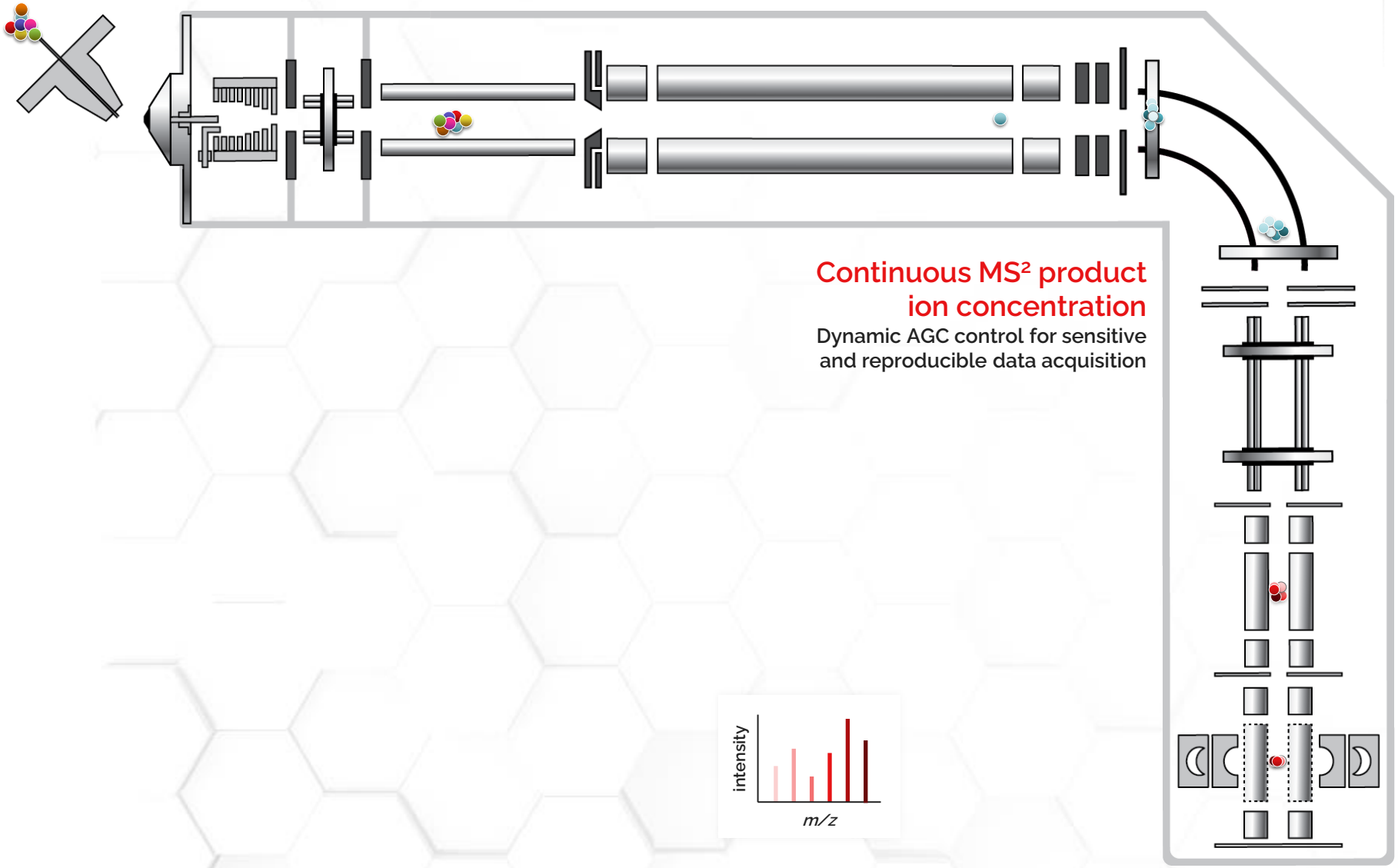
Synchronized dual ion packet processing with dynamic ion modulation



Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra

Increased ion utilization for faster MS^2 acquisition

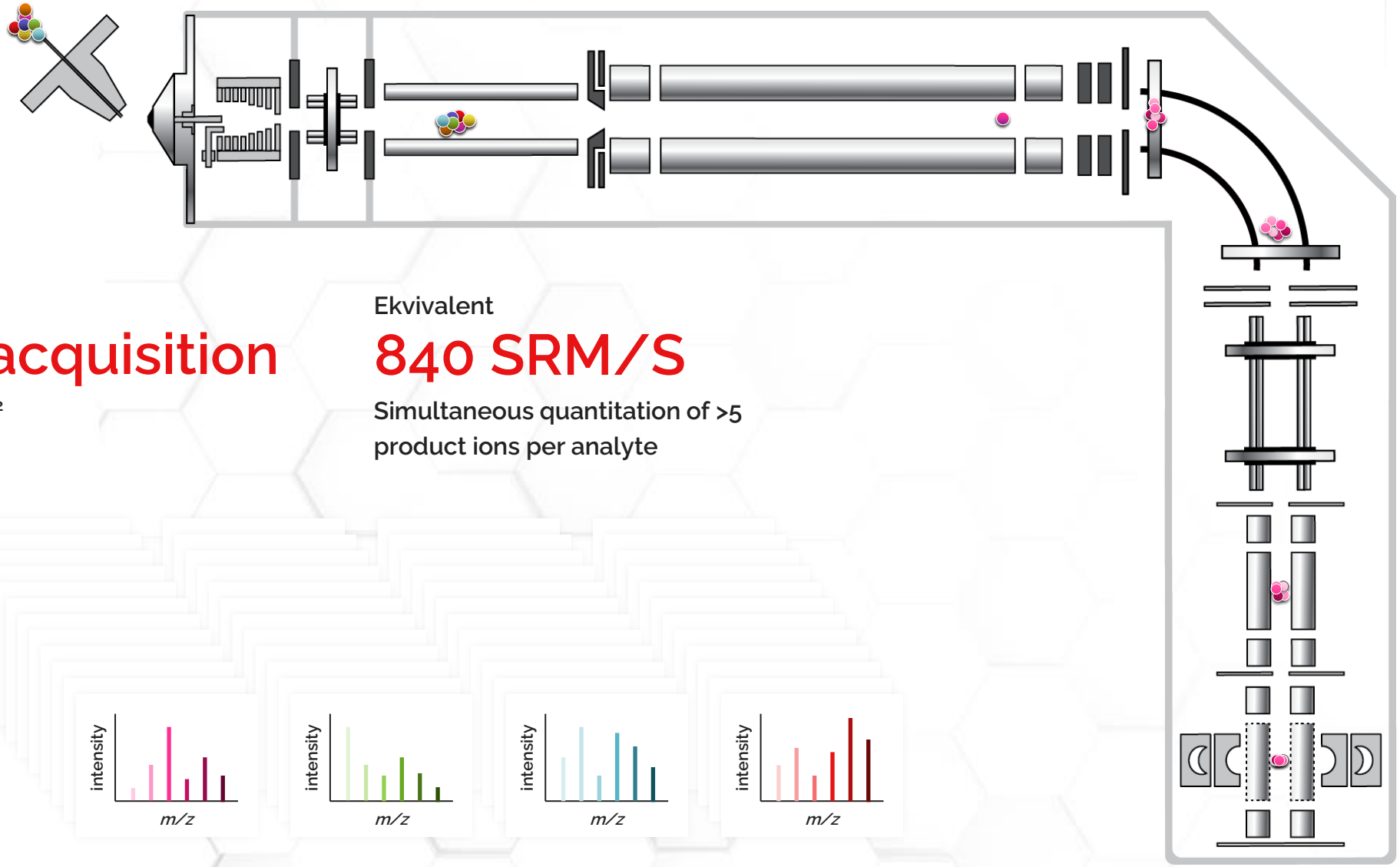
Synchronized dual ion packet processing with dynamic ion modulation



Continuous MS^2 product ion concentration

Dynamic AGC control for sensitive and reproducible data acquisition

Stellar hmotnostní spektrometr PRM akvizice pro MS^2 spektra



140 Hz
Scan rate

PRM acquisition
Full scan MS^2

Ekvivalent
840 SRM/S
Simultaneous quantitation of >5 product ions per analyte

Jak pracuje PRM akvizice pro MS^3 spektra

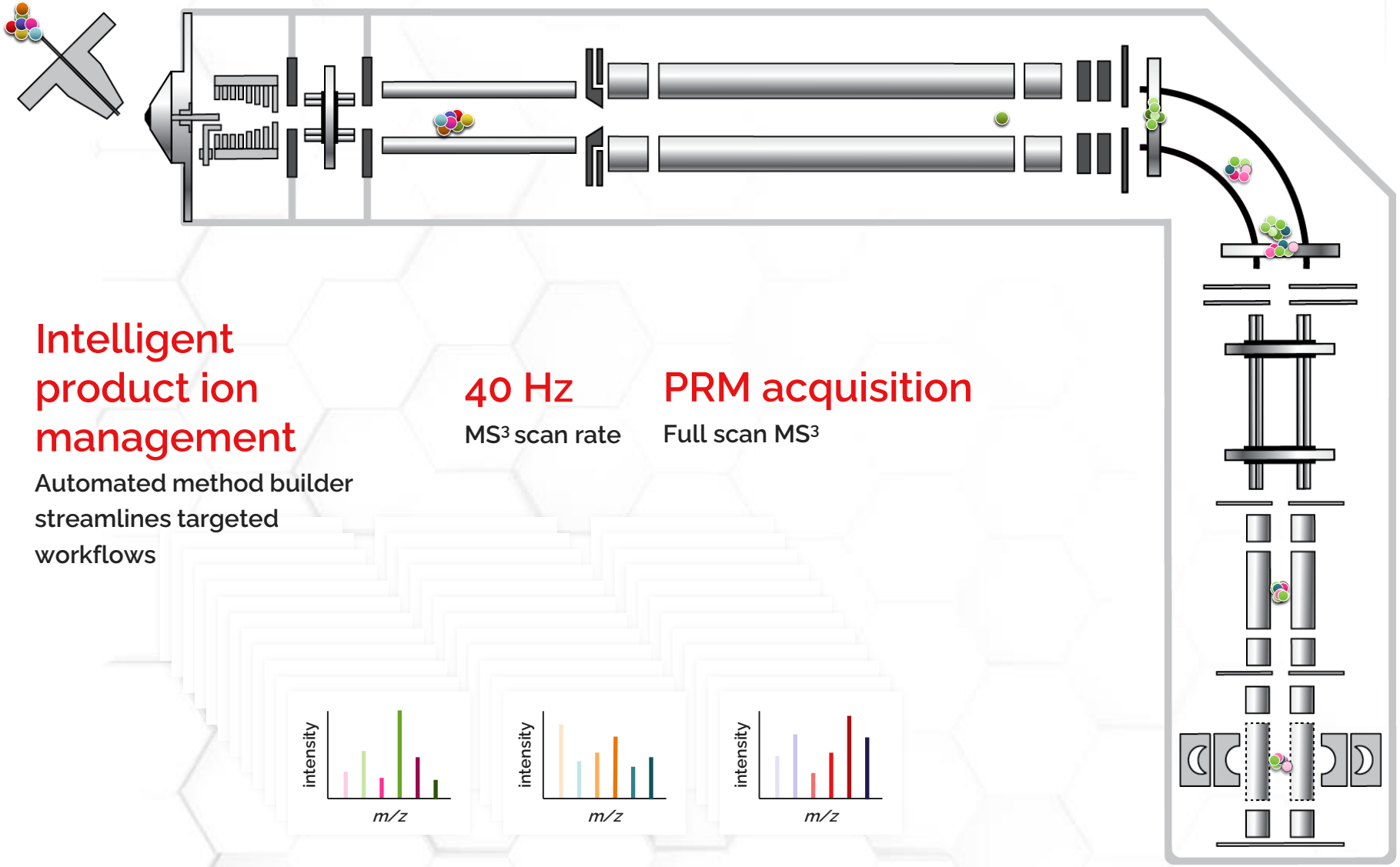
Stellar MS

PRM akvizice pro MS^3 spektra

Jak pracuje PRM akvizice pro MS^3 spektra

Maintain high ion utilization for fast MS^3 acquisition

Synchronized dual ion packet processing with dynamic ion modulation



Synchronous precursor selection

Increase specificity, selectivity, and sensitivity

Intelligent product ion management

Automated method builder streamlines targeted workflows

40 Hz

MS^3 scan rate

PRM acquisition

Full scan MS^3

pragolab

Stellar

Nový hybridní hmotnostní spektrometr poskytující cílené experimenty nové generace

Stellar – patří do skupiny nízko rozlišujících hmotnostních spektrometrů

- Hybridní hmotnostní spektrometr s konstrukčními prvky kvadrupólového hmotnostního analyzátoru a technologií lineární iontové pasti
- Poskytuje vysokou citlivost při extrémní rychlosti měření
- Možnost měření:
  - full scan produktových iontů pro každý prekurzor (PRM)
  - MS^n
- HCD nebo CID fragmentace
- Inteligentního sběru dat (Adaptive RT)

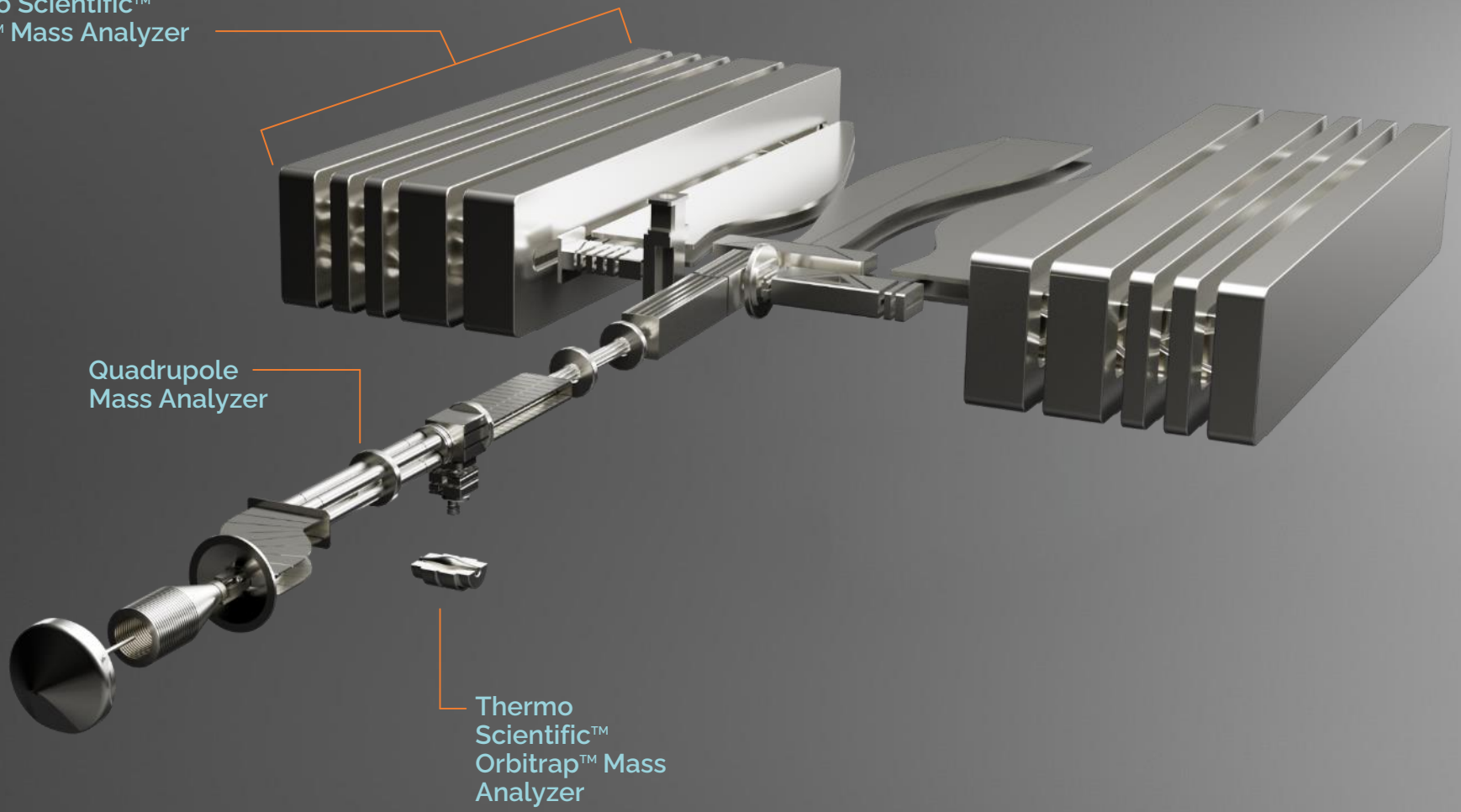
pragolab

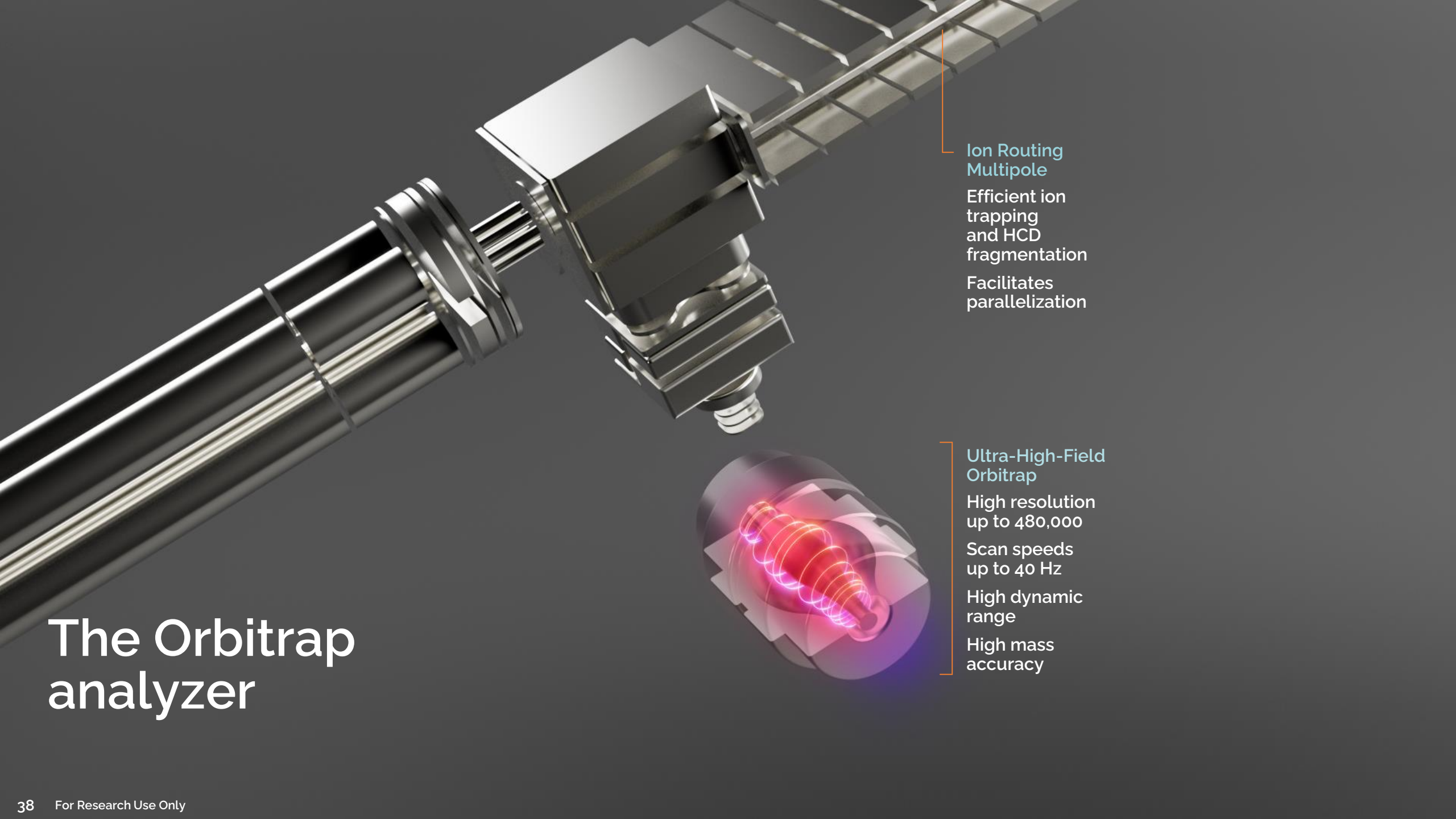
Introducing the

Thermo Scientific™ Orbitrap™ Astral™

MASS SPECTROMETER

The Orbitrap Astral MS





The Orbitrap analyzer

Ion Routing Multipole

Efficient ion trapping and HCD fragmentation

Facilitates parallelization

Ultra-High-Field Orbitrap

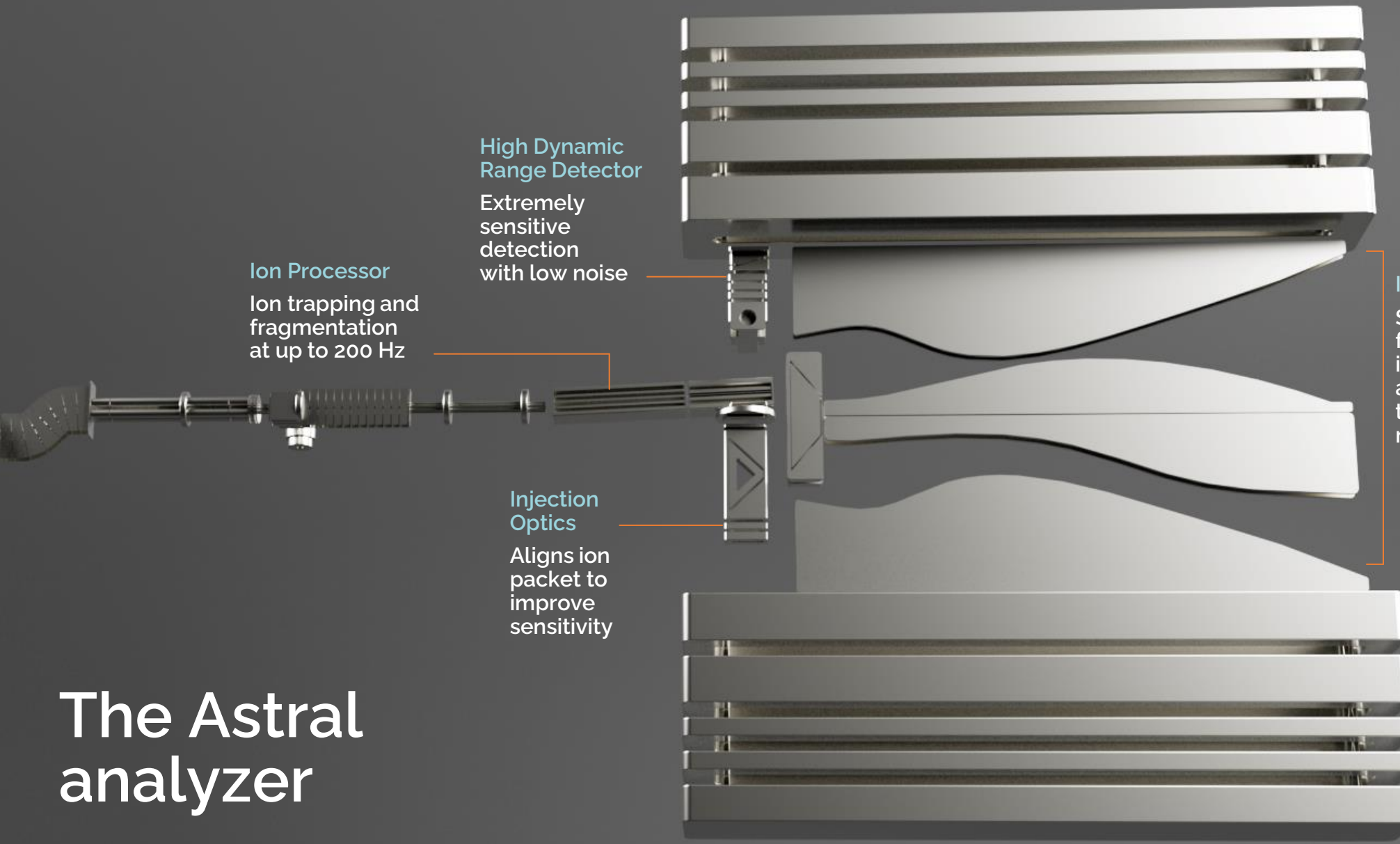
High resolution up to 480,000

Scan speeds up to 40 Hz

High dynamic range

High mass accuracy

The Astral analyzer



High Dynamic Range Detector

Extremely sensitive detection with low noise

Ion Processor

Ion trapping and fragmentation at up to 200 Hz

Injection Optics

Aligns ion packet to improve sensitivity

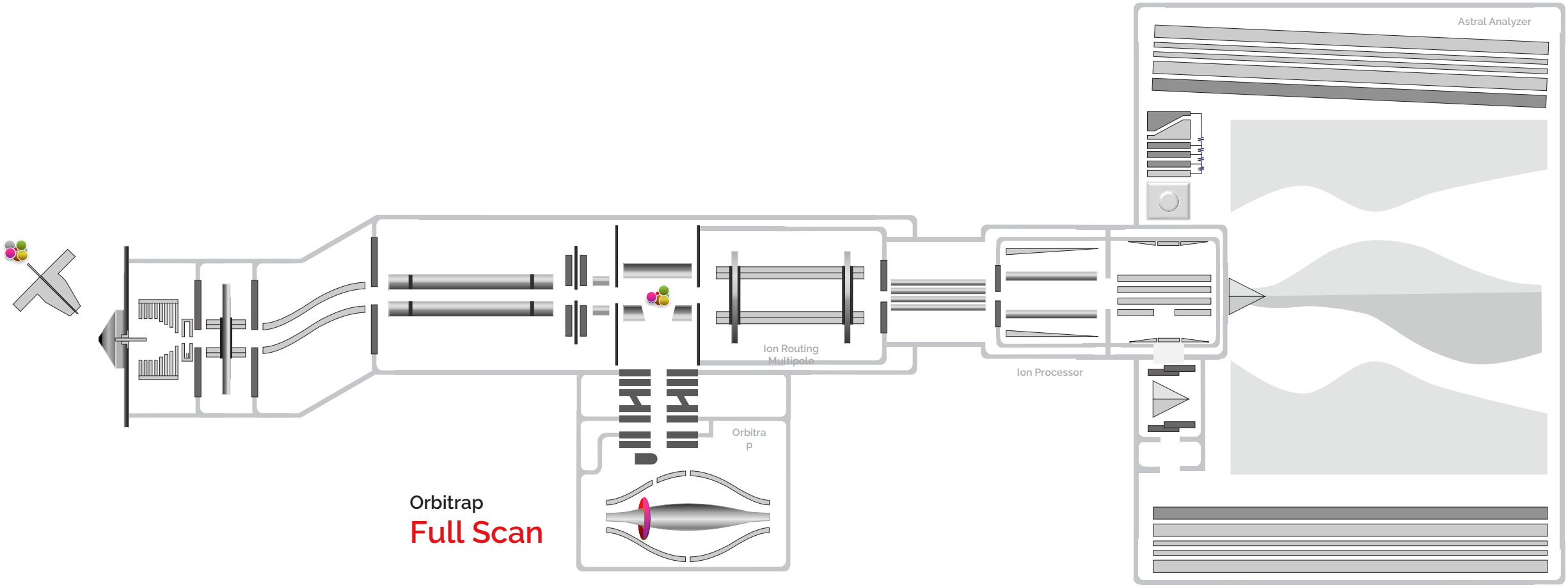
Ion Foil

Shapes and focuses ions onto asymmetric track with minimal loss

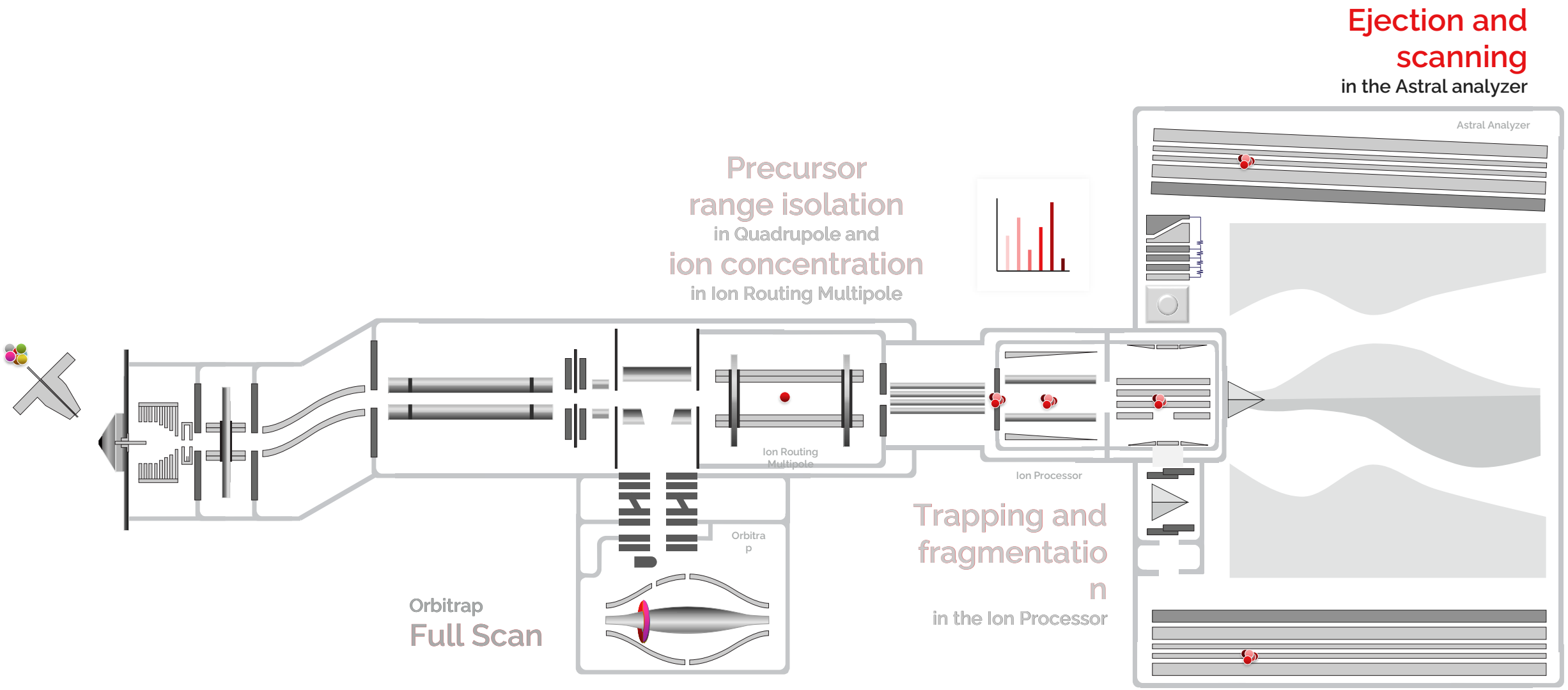
Asymmetric Ion Mirrors

Elongated ion track for up to 80,000 resolution

Orbitrap Astral mass spectrometer HR-DIA scan



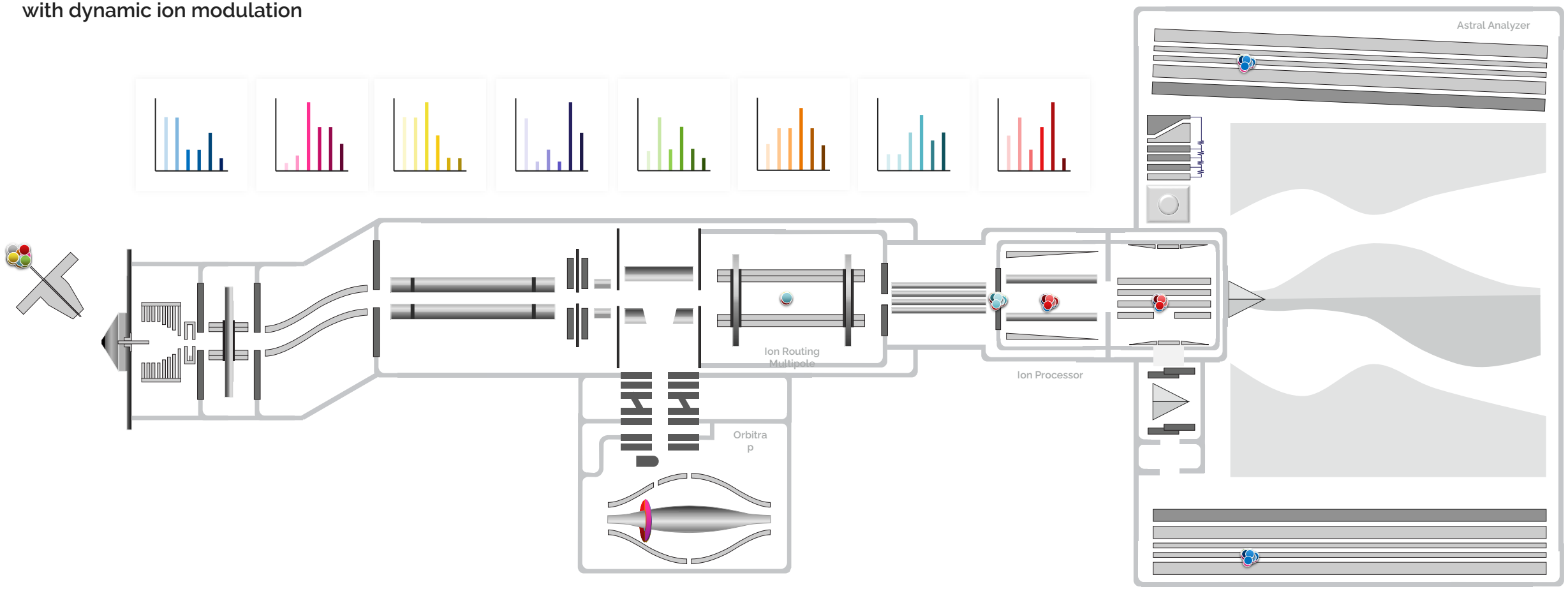
Orbitrap Astral mass spectrometer HR-DIA scan



Orbitrap Astral mass spectrometer HR-DIA scan

5 ion packets

simultaneously processed in parallel
with dynamic ion modulation



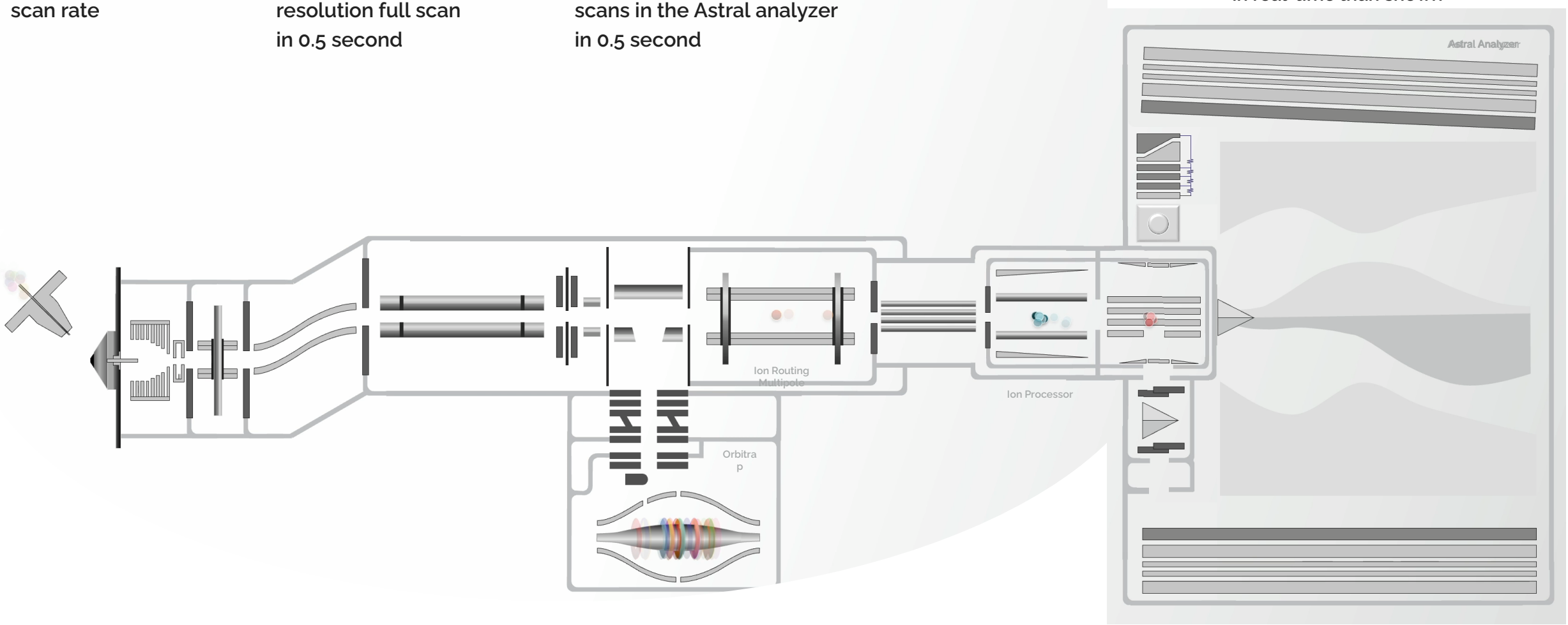
Orbitrap Astral mass spectrometer HR-DIA scan

200 Hz
scan rate

240K
resolution full scan
in 0.5 second

100 MS²
scans in the Astral analyzer
in 0.5 second

56x faster
in real-time than shown




Děkuji za pozornost