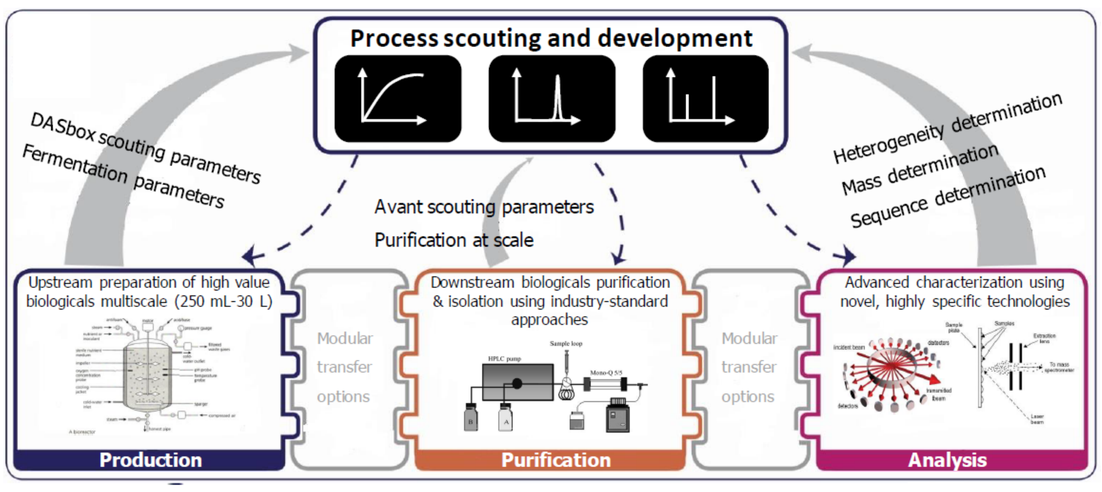
Bernal Biolabs
Biologicals Process Infrastructure Testbed

Overview

Bernal Biolabs enable three key areas i) production, ii) purification and iii) analysis of biologicals.

- Biolabs provide a fit-for-purpose research facility to bridge the current technology gap between industrial scale manufacturing and academic R&D for biological applications.
- Reduce the risk associated with testing of new bioprocess development and processing approaches for biopharmaceutical partners.
- Allow rapid and seamless knowledge transfer from academia to industry and vice versa.
- Through co-operation research activities at Bernal, augment high-end skills for users in key areas where there are currently skills deficits.



Technical Details

Upstream Bioprocessing

Figure 1. Left: Bioreactor system for bacterial process optimization.
Right: 30L Biobench mammalian unit

Microbial: Eppendorf DasBox 8 x 250 ml parallel automated bioreactor units for DOE and process optimization, up to 30 L scale up with Applikon bioreactors.

Mammalian: adherent & suspension culture, up to 30 L scale up with Applikon bioreactors, xCelligence platform for RT cell adherence and proliferation studies.

Downstream Bioprocessing

- ÄKTA Avant with Axichrome for protein purification chromatography
- ÄKTA Pure coupled with Malvern OMNISEC Reveal with UV, RI, viscosity, low and right angle light scattering detection to investigate protein aggregation
- ÄKTA Start x 3 for protein purification chromatography

Figure 2. Left to right: ÄKTA Pure, ÄKTA Start and ÄKTA Avant purification systems.

Characterisation

- Bruker UltrafleXtreme MALDI TOF MS/MS – mass spec for intact molecular mass, post-translational modifications and top down sequencing.
- Agilent 1269 Infinity LC/QTOF MS -Separation and quantification of large molecular mass molecules and biologics.
- Protein Simple Maurice – Isoelectric focusing and gel electrophoresis
- Biacore X100 – surface plasma resonance to measure ligand-protein binding affinities
- Chirascan CD – circular dichroism spectroscopy for protein/peptide secondary structure or conformation

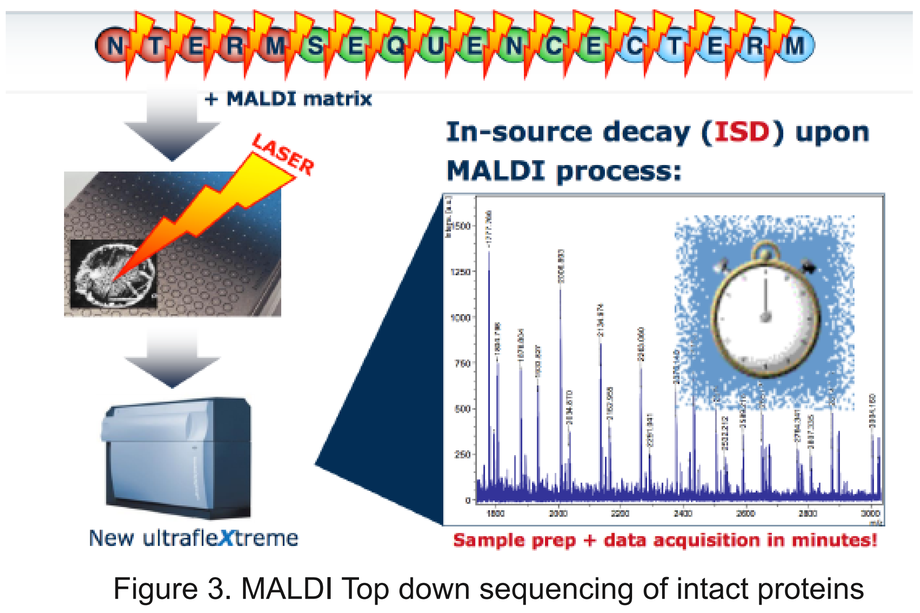


Figure 3. MALDI Top down sequencing of intact proteins

Potential Projects:

- Design and scale up of molecules produced by cell fermentation processes
- Purification and Isolation of molecules from cell supernatant
- Characterization of biological molecules (low and high molecular weight) by size, charge, structure and chemical composition

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