PROVA ESTRATTA

BANDO TD3/2023 – PROFILO D

Traccia 1

Di seguito un estratto della descrizione dello "*Structural Biology Laboratory*" di Elettra Sincrotrone Scpa presente sul sito web www.elettra.eu.
Su questa base indicate in maniera sintetica ed efficace, motivando le scelte effettuate:

- **le possibili applicazioni industriali di interesse di strumentazione e know-how del Laboratorio;**
- **il target industriale prioritario (per ricerca c/terzi o collaborativa);**
- **fonti e modalità di individuazione dei soggetti rientranti nel target**

"We apply molecular and structural biology tools to study the basic genetic processes within the cell and to characterise some of the proteins involved. Structural biology is an interdisciplinary research area, requiring expertise from both the life sciences and the physical sciences. We use protein crystallography to determine the atomic structure of these proteins, as well as biochemical and biophysical approaches to understand how they work. Crystallographic studies are complemented by the concomitant use of electron microscopy to visualise the architecture of large complexes and/or small-angle X-ray scattering (SAXS) to obtain additional structural information.

Our research focuses on DNA replication, genome stability and cell signaling. These are crucial events in the cell cycle, underpinning cellular processes with important consequences such as cell proliferation and genome stability. Failure to control these processes causes chromosome instability, which can lead to the development of cellular abnormalities, genetic diseases and the onset of cancer".

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Traccia 2

Di seguito un estratto della descrizione della "Cryo Electron Microscopy – CryoEM" Facility di CERIC-ERIC presente sul sito www.ceric-eric.eu
Su questa base indicate in maniera sintetica ed efficace, motivando le scelte effettuate:

- **le possibili applicazioni industriali di interesse di strumentazione e know-how del Laboratorio;**
- **il target industriale prioritario (per ricerca c/terzi o collaborativa);**
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State-of-art cryo transmission electron microscope FEI Titan Krios 3Gi enables researchers to look at the macromolecules almost in their natural environment. Frozen hydrated specimens of e.g. proteins make high resolution structural analysis possible. Acquiring SPA datasets gives opportunity to get molecule structure with resolution of about 2Å, which means very good insight in macromolecules internals. The use of direct electron detectors pushes scientific work output even further. Very fast data acquisition, with frame-rate up to 75 fps, drift correction and image averaging is now possible during the measurement itself. [...] Well known disadvantage of vitrificated samples imaging i.e. low contrast, can also be overcame with the use of direct electron detectors and when combined with usage of phase plate, macromolecular structures can be reconstructed reproducibly with very high, unreachable until now, resolutions and quality.

[...]. Krios system is equipped with autoloader able to hold and handle twelve samples. Additionally, the use of dedicated software for data acquisition, either for SPA or angle tomography, allows full automation of collection process.

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Traccia 3

Di seguito un estratto della descrizione del "*Genomics and Epigenomics Laboratory (LAGE)* di Area Science Park presente sul sito https://en.areasciencepark.it/
Su questa base indicate in maniera sintetica ed efficace, motivando le scelte effettuate:

- **le possibili applicazioni industriali di interesse di strumentazione e know-how del Laboratorio;**
- **il target industriale prioritario (per ricerca c/terzi o collaborativa);**
- **fonti e modalità di individuazione dei soggetti rientranti nel target**

*The Genomics and Epigenomics Laboratory (LAGE) works on **analysing DNA and RNA sequences and genotyping (microarrays)**. The sequencing instrumentation includes:*

***NOVASEQ 6000**: a flexible, ultra-high throughput DNA sequencing system capable of sequencing up to 48 human genomes at a 30-fold depth in a single instrument run. The instrument offers multiple flow cell formats, various read length configurations and the ability to analyse one or two flow cells at the same time to obtain data output ranging from approximately 160 Gb to 6 Tb and up to 20 billion reads per run, providing flexibility across a wide range of study applications and sizes.*

***MISEQDX**: a massive parallel sequencing platform to be used both in certified IVD (In Vitro Diagnostic) and RUO (Research Use Only) analysis. Illumina's MiSeqDX System connects Illumina's sequencing by synthesis (SBS) technology with a workflow that enables researchers to obtain analysed data from DNA samples in as little as eight hours (8h), producing up to 15 gigabases of data in a single instrument run, 25 million reads with a length of 2×300 bp each and base call accuracy parameters greater than 99.9%. MiSeq incorporates cluster generation, sequencing and data analysis functions on a single instrument with full automation and flexibility to process limited numbers of samples.*

***PromethION 24:** offers direct, real-time DNA and RNA sequencing technology capable of long readings of single molecules. The PromethION 24 system is designed to run 24 flow cells, allowing for on-demand sequencing, using any flow cell at any time. The running of single experiments can be started and stopped as required or multiple flow cells can be deployed onto single experiments for greater speed or throughput. Each flow cell allows up to 3,000 nanopores to be sequenced simultaneously, with a yield of > 4.8 Tb.*