**ALBA Synchrotron: A Cutting-Edge Resource for Pharmaceutical Companies**

Núria Valls, ALBA Synchrotron, [nvalls@cells.es](mailto:nvalls@cells.es)

ALBA Synchrotron is a state-of-the-art facility comprising a complex of electron accelerators that produce synchrotron light, enabling high-resolution visualization of the atomic structure of matter and in-depth analysis of its properties. **ALBA offers a diverse array of applications, particularly within the pharmaceutical sector.**

The different instruments available at ALBA are crucial in advancing drug discovery, efficacy assessment, and formulation development through the following approaches:

* **Drug Discovery**: X-ray crystallography enables precise visualization of macromolecular structures, such as antibodies and protein-drug complexes, at the atomic level. This detailed structural information significantly accelerates drug design and optimization, surpassing the capabilities of traditional methods. On top of that, the **Cryo-Electron Microscopy (Cryo-EM) located at ALBA** allow the study of biological molecules at near-atomic resolution without complementing the information obtained by crystallography. This technique is ideal for studying complex protein-drug interactions and the structural biology of challenging targets, providing critical insights for drug discovery.
* **Drug Efficacy**: Soft X-ray cryo-tomography provides a novel, complementary approach for studying the cellular architecture at medium resolution (50-60 nm). This technique offers very relevant information into the effects of drug compounds on cellular structures, aiding in the evaluation of their efficacy.
* **Drug Development**: synchrotron X-ray powder diffraction is a key tool for characterizing active pharmaceutical ingredient (API) formulations and providing information of crystallinity, polymorphism, with low detection limits and high peak resolution.
* **Nanoparticle Characterization**: Small-Angle X-ray Scattering (SAXS) is used to analyze the size, shape, and internal structure of nanoparticles, including drug delivery carriers. This technique is valuable for characterizing liposomes, polymeric nanoparticles, and other nanomaterials, providing essential data for optimizing drug delivery systems.

ALBA is dedicated to scientific excellence and industrial innovation, supporting the advancement of drug research and development, and ultimately contributing to societal well-being and progress.

For industrial collaboration opportunities, contact: [industrialoffice@cells.es](mailto:industrialoffice@cells.es)

<https://www.cells.es/en/industry>