Enhancing learning in the molecular aspects of Biologics through active learning and problem-based approaches

LB-E-02-1

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The rapid advancement in biotechnological drugs necessitates innovative educational approaches to equip future professionals with the requisite personal skills and knowledge. This presentation describes an innovative course designed to teach the molecular aspects of biologics in an interactive framework, using real-world case studies to introduce and reinforce methodological concepts. The topics were chosen in such a way as to give students an idea of which pharma protein structural modification strategies can be exploited to improve the PK/PD profile. The AURORA LOUIS Competence Framework [1] was utilized to identify and design key skills. A cornerstone of this course is the application of 3D structural analysis techniques on biologic drugs and their derivatives, giving students hands-on experience in understanding drug interactions at a molecular level. Employing challenge-based and problem-based learning (PBL) strategies, the course encourages students to work collaboratively in groups, critically engage with complex problems, and present their findings in a classroom setting. This approach not only fosters a deeper understanding of biologics but also enhances students' analytical and presentation skills, equipping them with essential tools for success in the biotechnological sector. The course aims to bridge theoretical knowledge and practical application, making it a vital model for teaching advanced aspects of biologics. The structure of the course is designed as a journey where the difficulty of the challenges gradually increases. Tutorials on how to carry out the analysis are provided to the students, at first very detailed and then progressively less and less, so as to ensure a progressive independence of the students.