Empowering Scientific Progress and Nanotechnology in Kosovo through Motivation and Collaboration

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The collaborative efforts between the Department of Pharmacy at the University of Pristina and the Departments of Pharmacy at the Universities of Aldo Moro - Bari; Itali and Graz - Austria aim to advance nanotechnology and develop innovative therapeutic solutions. The research focuses on two key projects: enhancing the bioavailability of berberine and creating nanobiotics based on natural compounds to combat antibiotic resistance.

In partnership with the University of Aldo Moro in Bari, microfluidic techniques have been applied to encapsulate berberine, a compound with promising potential in treating hypercholesterolemia. Despite its therapeutic value, berberine's poor solubility and bioavailability limit its effectiveness. Encapsulation in liposomes is being explored as a strategy to overcome these challenges, with advanced nanotechnology approaches offering new possibilities in drug formulation.

Meanwhile, in collaboration with the University of Graz, the project addresses the pressing issue of antibiotic resistance by investigating natural compounds with strong antimicrobial properties—such as tropolone, carvacrol, thymol, beta-thujaplicin, and chlorothymol. Despite their potential, these compounds face challenges like low solubility and volatility. To overcome these limitations, lipid-based nanocarriers are being developed using high-pressure homogenization, enhancing solubility, stability, and bioavailability. Early findings show improved antimicrobial activity, especially against antibiotic-resistant strains, underscoring the potential of nanobiotics as alternative treatments.

These initiatives highlight the vital role of international collaboration in advancing nanotechnology to adress health challenges. Through collaborative scientific research, Kosovo is emerging as a valuable contributor to global scientific advancements.

Keywords: antihyperlipidemia, antimicrobial, berberine, thymol, chlorothymol, carvacrol, tropolone, betha-thujaplicin, microfluidic techniques.

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