Efficacy and risks: the other side of One Health drugs

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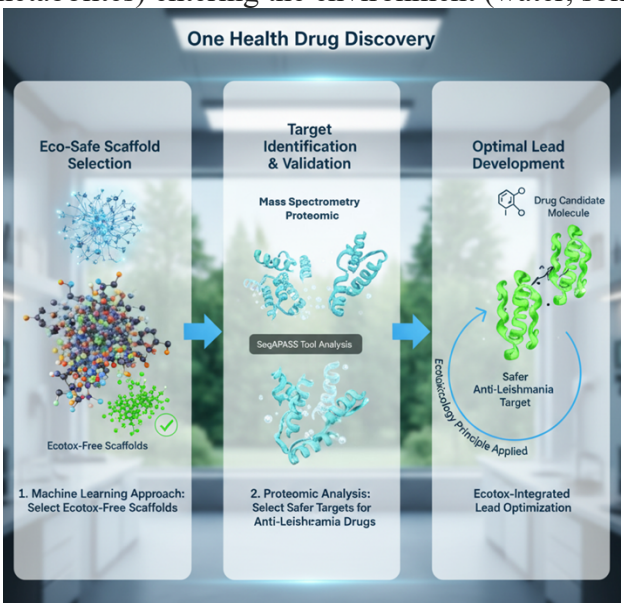
From the design of safer human and veterinary drugs to the monitoring and remediation of environmental contaminants, chemistry is uniquely positioned to contribute transformative tools and knowledge. Existing drugs for human and animal parasitic infectious diseases (especially vector-borne parasitic diseases) are often scarce, have limited efficacy, and can have toxicity issues. The misuse and overuse of antimicrobials in both human and veterinary medicine drive antimicrobial drug resistance (AMR), a major global health threat [1,2]. One Health mandates coordinated efforts to promote responsible use and preserve the efficacy of critically important antimicrobials for human use. Chemistry is of paramount importance as the use, and disposal of pharmaceuticals result in their residues (Active Pharmaceutical Ingredients and metabolites) entering the environment (water, soil, biota) and contaminating it.



The goal for these therapeutics is to focus on the chemistry, improve their structural diversity in a controlled manned and plan a development under the ecotoxicology framework where chemistry is hardly determinant to rive to a safer outcome. Prevention approaches are necessary. Our work in a collaborative network of scientists from different chemical and environmental science disciplines show how tailored greener approaches may provide safer structural templates that can be developed to drugs. Safer scaffolds today may correspond to safer drugs tomorrow. This presentation showcases our recent work aimed at transforming drug discovery by integrating ecotoxicological principles early in the process. We introduce novel approaches, including cleaner scaffold selection where a machine learning-driven approach generates environmentally friendlier starting compounds for drug development [3]. A second topic shows how ecotox-clean target identification can be achieved by Mass Spectrometry proteomic selection of targeted proteins in *Leishmania infantum* treated by new compounds. In this effort the SeqAPASS tool to confirm unique and ecotoxicologically free protein target(s) was adopted. Despite the experimental transaltion to effective demonstration of the efficacy of the tool promoted is ongoing, a step forward has been performed and new principles consolidated.

REFERENCES

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