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From Δlog k_w^{IAM} to multidimensional biomimetic chromatography: a journey to shed light on the absorption potential of therapeutics. What will the future bring?

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Biomimetic chromatography encompasses a range of analytical approaches aimed at mimicking the asset of biological membranes including – but not limited to – micellar liquid chromatography (MLC), immobilized artificial membranes (IAM) and immobilized liposome chromatography.

By combining chromatographic retention factors on the IAM phase with *n*-octanol/water partitioning data, it is possible to account for the excess of the polar/electrostatic forces involved in the biological membrane/drug interaction, giving Δlog k_w^{IAM} (1). In several studies, Δlog k_w^{IAM} was found to be inversely related to data of drug passage through complex biological barrier, such as the blood-brain barrier and the gut mucosa (2).

Further research efforts were directed at simulating the complexity of biological membranes by introducing novel selectivities in the separation mechanism. This was effected by either investigating the biomimicking potential of other stationary phases such as IAM sphingomyelin (3) and arginine (4) or by exploiting comprehensive two dimensional liquid chromatography (5) to combine IAM retention with interaction with the human serum albumin. The latter platform afforded to study the human intestinal absorption of some model therapeutics.

The lecture will end up with a view on the future of this field, with pressing demands from industries for higher throughput, miniaturized and easily automatable biomimetic platforms.

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