

Preparation of optimized biomolecules for multiple selected research projects

We optimized synthetic strategies and analytical / preparative purification conditions to prepare a variety of biomolecules. These were subsequently used in multiple research studies. A few examples will be described in detail as outlined below.

First, short linear and longer cyclized peptides were prepared with a sequence which is expected to bind with Magnesium and subsequently trap CO₂ as an example of application in environmental chemistry.

Second, we designed, synthesized and characterized several chimera conjugates constituted by Peptide Nucleic Acids (PNA) antisense sequences covalently connected to cell penetrating peptides and functionalized either with fluorescent labeling or with bifunctional chelating agents able to bind radiometals. These conjugates were then used for imaging or therapeutic applications in cancer research.

Finally we are currently optimizing native chemical ligation techniques for preparation of longer polypeptides (65 to 130 amino acids) for a variety of potential applications in biochemistry and immunology. The use of an in-house optimized preparative purification system obtained by connecting a preparative HPLC system to a Mass spec ion trap has proved instrumental for the isolation of these products from a complex reaction mixture which otherwise might have been untreatable