BIONAND 2019 CONFERENCE SERIES

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"Carbohydrates and Sulfur Compounds: Smart Tools in the Enantioselective Synthesis of Therapeutically Relevant Molecules"

Abstract:

The importance of enantiopure compounds in different areas such as agriculture, fragrance and medicine is currently well recognized. As illustrative data, at present more than 50% of the drugs in the market are chiral compounds, and about 80% of new drugs patented are single enantiomers.1 Therefore there is a strong demand for the development of new and effective asymmetric synthesis methods. Catalysis can be considered as the most efficient method in asymmetric synthesis since it can be applied to a wider range of transformations than any other enantioselective synthesis method, and ligand design has played a central role for the development of efficient metal and organo-catalyzed processes. In this sense, sulfinyl-based ligands present indubitable advantages for their applications in asymmetric catalysis. They are air, oxygen and moisture stable, and nowadays a number of highly efficient approaches allow the rapid synthesis of both enantiomers of sulfinyl-based ligands and to easily modulate their structure.2 In this sense, our research centers on the asymmetric synthesis of enantiopure sulfinyl derivatives of synthetical and biological interest, having developed a general and enantiodivergent approach for the synthesis of enantiopure sulfinyl derivatives, using diaceton-D-glucose as the unique source of chirality.3
With these bases, in the first part of the talk I will show our approach to the design and synthesis of a number of C1 and C2 symmetric bidentate sulfinyl-based ligands, and their applications in different enantioselective organic and organometallic catalytic processes.4
In the second part, I will present our approach to the development of new lead compounds with antitumor activities, based on the NK1 receptor 5 and the Nrf2 activation factor as therapeutic targets.6

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