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Host: Dr. Maurizio Prato

Heterochiral Peptide Assembly: Entry to Wonderland through the Mirror

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Nature's choice for homochirality has stimulated our research, as we challenge it with heterochirality. The scientific journey in this direction starts from the design of tripeptides to define self-assembly rules within chemical systems of biological relevance. We use one or two D-amino acids in D,L-tripeptides and study small libraries with variations in stereochemistry or amino acid sequence.¹ We established how chirality affects spatial conformation for assembly from the molecular, nano-, micro- and through to the macro-scale, to link the macroscopic properties back to structural details of the building blocks.² As Alice steps beyond the mirror and enters Wonderland,³ we can get inspired by D-amino acids and use them in D,L-peptides to achieve functional superstructures. We monitored molecular conformation and its evolution as a continuum to macroscopic hydrogels.² We have now identified a more diverse library of self-assembling tripeptides with different functional groups.

Applications range from (antimicrobial) biomaterials⁴ to supramolecular catalysis,⁵ with function that can be switched on/off with assembly/disassembly.

REFERENCES

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