Utilising chiral mono- and bis-oxazolines for the synthesis of a new class of stereodefined peptidomimetic polymers

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Poly(oxazoline)s (PAOx) (**Fig 1a**) are promising for many industrial applications, demonstrating a combination of strength and stability whilst also being less antagonistic to the immune system than PEG based systems. PAOx have a polypeptide-like structure, conferring the ability to easily tune the hydrophobicity through the amide side chain (**Fig 1b**). PAOx have been be employed in biomedical applications such as targeted drug delivery, drug formulation, tissue engineering and as tissue adhesives.[1-3] Beyond biomedical applications, their tunable properties present opportunities for use as surface modifiers, surfactants and compatibilisers, and in coatings.[4-6] Robust methodologies utilizing living cationic ring-opening polymerization (CROP) have been developed to access PAOx with a degree of structural control (**Fig 1a**).

Despite the recent drive to expand the library of PAOx, studies so far have focused on simple non-chiral 2-substituted oxazoline monomers.[7] These polymers contain no chiral information in the backbone and can only have appended functionality through the tertiary amide bond. This project will probe the polymerization of chiral oxazoline monomers (**Fig 1c**), to provide access to a new generation of highly functionalized peptidomimetic polymers with defined tacticity (**Fig 1d**). The incorporation of additional functionality into the polymer backbone, along with precise stereocontrol, presents the opportunity to direct the secondary structure adopted by the polymer. More broadly, the ability to generate PAOx with controlled tacticity will enable the relationship between polymer microstructure and macrostructure to be investigated for this emerging class of industrially important polymers.

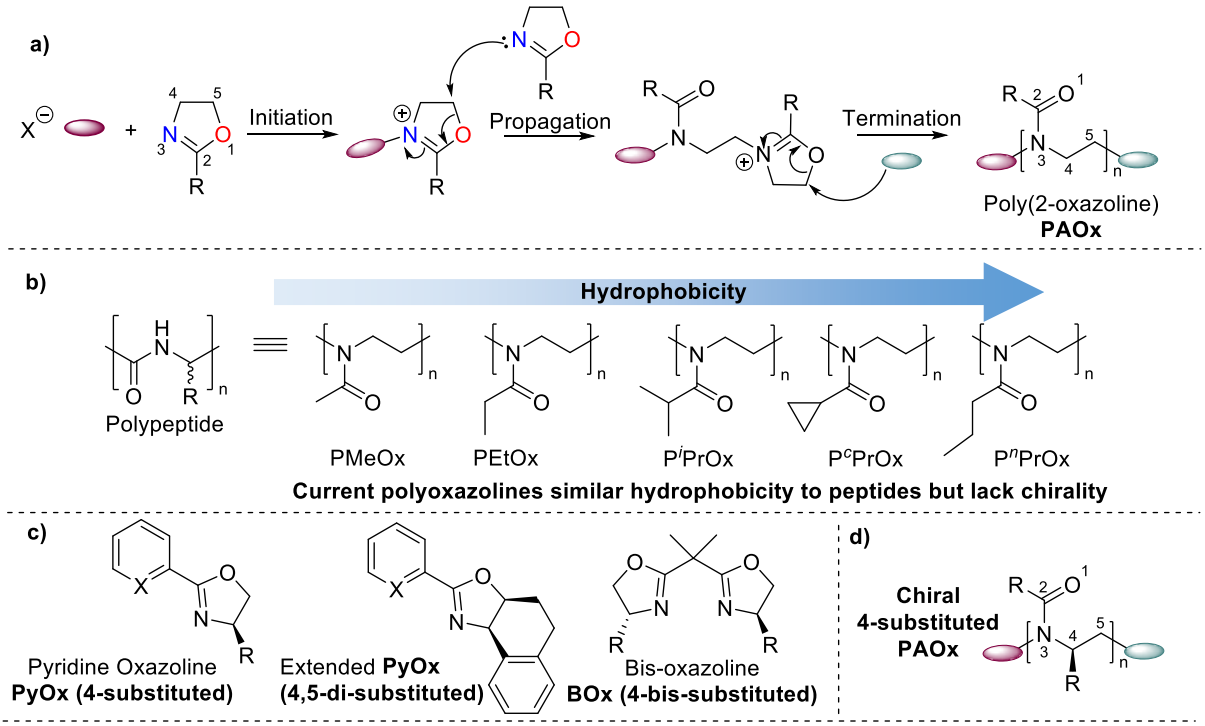

Figure 1 a) Living cationic ring-opening polymerization (CROP) for generation of polyoxazolines from 2-oxazoline monomers c) Structures of well-established chiral oxazolines used in asymmetric catalysis d) Structure of proposed chiral peptidomimetic polymer.

References

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