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The Section for Chemical Research (SCR) of the NSCS has decided to publish this year again in CHIMIA a collection of short papers corresponding to the most remarkable oral contributions or posters presented at the Fall Meeting of the NSCS held in previous year. The main purpose of this action is to enable the authors of the selected contributions to develop, their presentation so as the whole readership of CHIMIA has a chance to be aware of. The choice of these contributions is made by the committee of the SCR, which takes the full responsability for the part of subjectivity inherent in such a selection. For a fair representation of the various fields of chemistry, the Committee of the SCR has decided to select one contribution from each of the disciplines, namely, organic, inorganic, physical, and computational chemistry.

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Extending the Proline Effect: ΨPro for Tailoring *cis-trans* Isomerisation[a])

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Abstract. Pseudo-Prolines (ΨPro) consist of (4*S*)-oxazolidine- and (4*R*)-thiazolidine-carboxylic acids derived from amino acids Ser, Thr and Cys. They represent new branched proline analogues in which variation of the substituents (R^1, R^2, R^3) results in different physicochemical and conformational properties. We summarise here the relevant chemical and structural aspects of such super-prolines intended to constrain and control the peptide backbone in β-turn motifs or to alter the imide *cis-trans* ratio.

Introduction

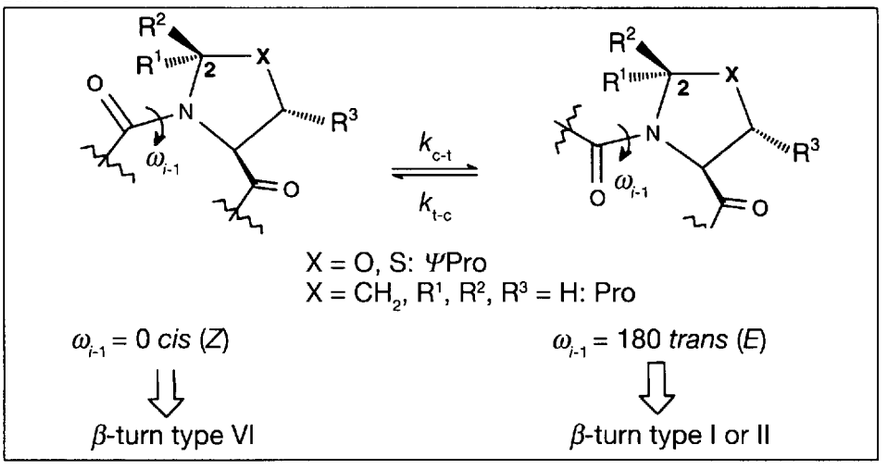
The proline residues play a critical role in peptide and protein structures and are usually encountered in loop or β-turn type I or type II (ω_i = 180°) or at the (*i*+2)-position of turn type VI (ω_{i+1} = 0°) [1][2] (*Scheme*; X = CH_2, R^1 = R^2 = R^3 = H). In this context, the prevalence of proline residues in biological processes such as protein folding and protein recognition [3a–d] has led to the development of numerous mimetics and substituted proline analogues intended to constrain and control the peptide backbone in reverse turn motifs or to alter the imide *cis-trans* ratio [4a–d].

Due to their structural similarities with proline and their easy synthetic availability, ΨPro (*Scheme*; X = O, S) represent potential surrogates to constrain the backbone or to tailor the *cis*-to-*trans* ratio in peptides, thus offering an important tool for studying the relationship between isomer geometry and peptide bioactivity.

Synthesis and Chemical Stabilities

ΨPro are generally incorporated into peptide backbones as dipeptide building blocks [5]. Oxazolidine ring formation is usually performed by reacting ketals directly on *N*-protected dipeptides containing Ser or Thr at the C-termini [6]. In contrast, thiazolidines can be obtained from cysteine and aldehydes or ketones and then incorporated within dipeptide units. The convenient preparation of these building blocks allows the introduction of various substituents at the 2-position which results in different physicochemical properties. For instance, the ring-chemical stability toward acids depends largely on the nature of the 2-position substituents, and, thus, ΨPro have been introduced as alter-

Scheme



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[a]) These results were presented as an oral presentation at the Autumn Meeting of the New Swiss Chemical Society (NSCS) in Lausanne, Switzerland, on October 15, 1997.