TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Dipartimento di Scienze e Tecnologie Chimiche

AVVISO DI SEMINARIO

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"Bringing the Science of Proteins into the Realm of Organic Chemistry"

5 Ottobre, ore 15

Aula Seminari del Dipartimento di Scienze e Tecnologie Chimiche

Proponenti: Prof. Lorenzo Stella, Prof. Mariano Venanzi

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Bringing the Science of Proteins into the Realm of Organic Chemistry

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Total chemical synthesis of proteins was one of the 'Grand Challenges' of 20th century synthetic organic chemistry, from the time of Emil Fischer. A general solution to this challenge was provided by the chemical ligation principle: *chemoselective covalent condensation of unprotected peptides enabled by formation of a non-native moiety at the ligation site* [1]. The most effective chemistry – 'native chemical ligation' [2] – is based on this principle and has enabled the robust total synthesis of a wide variety of protein molecules [3]. Application of synthetic organic chemistry to protein molecules enables novel protein science that can only be done by chemistry [4]. Examples include: total synthesis of mirror image proteins composed entirely of unnatural D-amino acids (and achiral glycine) [5,6]; design and synthesis of protein molecules with novel chemical features not found in Nature [7,8]; and, racemic & *quasi*-racemic crystallography enabled by total chemical synthesis for the determination of novel protein structures by X-ray diffraction [5,7; 9,10].

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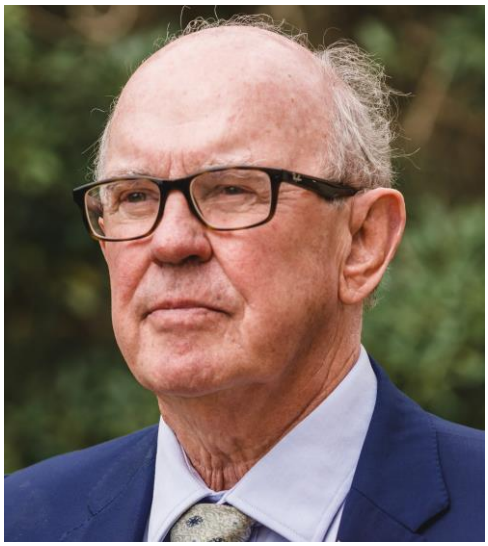
[9] Racemic protein crystallography. Yeates,T.O.; Kent,S.B.H. *Ann. Review Biophysics***2012**,*41*,41.
[10] A functional role for Rv1738 in *Mycobacterium tuberculosis* persistence suggested by racemic protein crystallography. Bunker, R.D.; Mandal, K.; Bashiri, G.; Chaston, J.J.; Pentelute, B.L.; Lott, J.S.; Kent*, S.B.H.; Baker*, E.N. *Proc Natl Acad Sci USA* **2015**, *112*, 4310.



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