

Università degli studi di Parma

Dottorato di Ricerca in Scienze Chimiche

XXII ciclo  
Triennio 2007-2009

**Synthetic ligands in bioorganic chemistry:  
guanidinium-mediated  
ion transport and gene delivery and  
development of a  $\beta$ -sheet propensity scale**

**Tutors:**

Dr. Francesco Sansone

Prof. Rocco Ungaro

**Dottoranda:**

Valentina Bagnacani

## **Abstract**

The work reported in this Ph. D. thesis concerns the synthesis and properties of ligands designed for bioorganic applications. In particular, i) new non-viral vectors for gene delivery and ion transporters based on calix[n]arene functionalized with guanidinium groups or arginine units, and ii) an experimental  $\beta$ -sheet propensity scale for  $\alpha$ -amino acid residues, via Backbone Thioester Exchange (BTE) have been developed.

Keywords:

Non-viral vector, cell transfection, cationic lipid, guanidinium, arginine, calix[n]arene, cation transport, halide transport, hairpin,  $\beta$ -sheet propensity scale, backbone thioester exchange (BTE).

## **Abstract**

Il lavoro riportato in questa tesi di dottorato riguarda la sintesi e lo studio delle proprietà di leganti progettati per applicazioni in chimica bioorganica. In particolare si sono sviluppati i) nuovi vettori non virali per il trasporto di materiale genetico e trasportatori di ioni basati su calixareni funzionalizzati con gruppi guanidinio o con unità di arginina, e ii) una scala sperimentale di propensione del foglietto  $\beta$  per residui  $\alpha$ -amminoacidici, tramite scambio di scheletro tioestereo (BTE).

Parole Chiave:

Vettore non virale, transfezione cellulare, lipide cationico, guanidinio, arginina, calix[n]arene, trasporto cationico, trasporto di alogenuro, forcina, scala di propensione del foglietto  $\beta$ , scambio di scheletro tioestereo (BTE).

*Research is what you are doing when  
you don't know what you are doing*

*Werner Von Braun*

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