TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Dipartimento di Scienze e Tecnologie Chimiche

# AVVISO DI SEMINARIO

## *Prof. Dolunay SAKAR DASDAN*

*Nell'ambito del programma di mobilità Erasmus+ per docenti, Dolunay SAKAR DASDAN, Prof Associato presso la Yildiz Technical University, Istanbul, Turchia terrà 4 seminari sull'argomento:*

## ***"Polymer drug delivery systems".***

*nei giorni:*

*8, 9,11 e 12 Luglio in Aula Seminari alle ore 15:00*

*Proponente; Prof. Gaio Paradossi*

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*ABSTRACT:*

# POLYMER-DRUG DELIVERY SYSTEMS

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Recently, promosing advances in medicine and biotechnology have stimulated the field of drug discovery and have led to the development of many new powerful and targeted drug candidates. However, many drug candidates fail during preclinical evaluation due to poor efficacy, limited bioavailability, and other challenges associated with effective drug delivery. Small molecule drugs can suffer from low solubility, poor stability, short circulation time, and non-specific toxicity limiting their therapeutic efficacy. Inspite of the growing importance of polymer-drug delivery methodologies, the materials and methods of drug delivery are not widely available to those outside the polymer synthesis field. The objective of effective drug delivery is improving the pharmacokinetics and pharmacodynamics of each therapeutic to enable drug delivery to the right place, at the right time and in the right amount. Drug delivery systems apply three main strategies to enable improved drug efficacy: Controlled Release, Targeted Delivery and Solubility Enhancement [1].

In the light of this information, biodegradable and nonbiodegradable polymers are used as drug carriers. Non-biodegradable polymers have been used as drug carriers and are expected to retain their structural integrity at least until the completion of the release of drug. Polymer Chemist Helmut Ringsdorf suggested a model for the polymer-drug conjugate. First biological studies have been carried out with a relatively simple copolymer of maleic anhydride–divinyl ether possessing antiviral, antibacterial and antifungal activities. Maleic anhydride (MA) copolymers have often been used as reactive macromolecules displaying various biological activities, such as direct antitumor effectors. The antitumor activity of these copolymers has been demonstrated to be dependent upon the amount of hydrogen bonding between carboxyl groups and the nature of their distribution on side chains.MA-containing copolymers, also known as polyanhydrides, the highly reactive anhydride ring on the MA portion can be bound by the ring-opening reaction to amino or hydroxyl groups of nucleophilic reagents resulting in either ester/carboxylic acid or amide/carboxylic acid structures. When the drug conjugate is being released, the carrier copolymer might display its own biological activity, in an increasing fashion, via the carbonyl groups that are freed. Physicochemical properties such as particle size, surface charge and zeta potential of polymer-drug delivery systems are important parameters by the means of their interactions with plasma proteins. [2-5]

MA-containing copolymers conjugated some drugs were synthesized, characterized and physicochemical properties determined as a function of pH in water and time in simulated body fluids and also results discussed. [6-8].

**References**

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[8] Sakar Dasdan D, Dizdar A, Karakus G A.Dizdar, Bulgarian Chemical Communications, Volume 49, Special I (pp. 43–49) (2017).