

PEPTIDE AND OLIGONUCLEOTIDES APTAMERS AS NEW LIGANDS FOR ANALYTICAL CHEMISTRY

Marco Mascini^{1*}

¹ Dipartimento di Chimica, Università di Firenze, Sesto Fiorentino, Italy

*Corresponding author - E-mail: Marco.mascini@unifi.it , Phone: +39 0554573283

So far, several bio-analytical methods have used nucleic acid probes to detect specific sequences in RNA or DNA targets through hybridisation. More recently, specific nucleic acids, aptamers, selected from random sequence pools, have been shown to bind non-nucleic acid targets, such as small molecules or proteins. The development of in vitro selection and amplification techniques has allowed the identification of specific aptamers, which bind to the target molecules with high affinity. Many small organic molecules with molecular weights from 100 to 10000 Da have been shown to be good targets for selection. Moreover, aptamers can be selected against difficult target haptens, such as toxins or prions. The selected aptamers can bind to their targets with high affinity and even discriminate between closely related targets. Aptamers can thus be considered as a valid alternative to antibodies or other bio-mimetic receptors, for the development of biosensors and other analytical methods. The production of aptamers is commonly performed by the SELEX (Systematic Evolution of Ligands by Exponential Enrichment) process, which, starting from large libraries of oligonucleotides, allows the isolation of large amounts of functional nucleic acids by an iterative process of in vitro selection and subsequent amplification through polymerase chain reaction. Aptamers are suitable for applications based on molecular recognition as analytical, diagnostic and therapeutic tools. In this review, the main analytical methods which have been developed using aptamers, will be discussed together with an overview on the aptamer selection process. Recently Aptamers from peptides libraries have been realized with similar techniques in order to obtain structures with much varied receptors points and higher analytical capabilities. Some experimental results will be reported and discussed.

Keywords: Aptamers, biosensors