Identifying trace amounts of molecules

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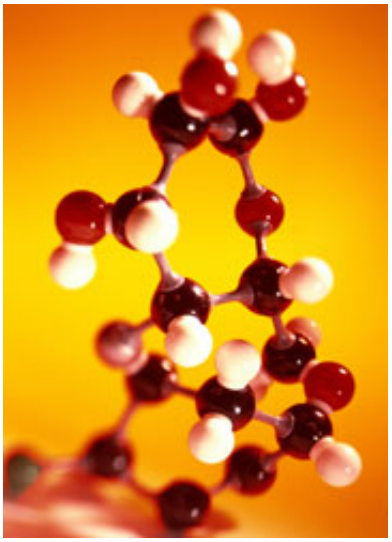

European researchers advanced the frontiers of chemical separation technology. The increased specificity and selectivity regarding identification of biologically relevant molecules should have important impact on biomedicine and environmental science in particular.

Imagine a piece of play dough into which an unusual and complicated shape is pressed. Removing the 'key' leaves the matching 'lock' imprinted on it. This is the basic idea behind an exciting new process called molecular imprinting.

A polymer is 'imprinted' with a molecule or piece of a molecule creating

a molecularly imprinted polymer (MIP). The MIP has cavities or imprints that now give it selectivity and specificity for the original molecule used to make the imprint or perhaps the entire family of molecules.

MIPs are already being used in a variety of applications. Recognition of veterinary antibiotics in food samples and separation and analysis of sample components in clinical laboratories are only a few.

Despite their potential, optimisation of MIPs can be complicated due to numerous different binding sites with varying affinities for different molecules. In addition, creating MIPs from large molecules such as proteins has proven difficult.

European researchers seeking novel synthesis routes for cost-effective MIP production initiated the 'Nanoimprinting technologies for selective recognition and separation' (Nanoimprint) project.

Investigators focused on synthesis of molecularly imprinted nano- and microparticles via three different techniques using peptides, the building blocks of proteins, as template molecules. Various different biologically important peptide templates were used.

Scientists also evaluated potential for encapsulation of MIPs in hydrogels and production of MIP coatings on rigid beads, both of which could be important in biomedicine.

Nanoimprint advanced current knowledge regarding optimisation of imprinting of large molecules such as peptides and proteins on polymer substrates. Extension of the selective recognition and separation properties of MIPs to larger and biologically important molecules could have wide-reaching impact on biotechnology, biomedicine and environmental science.

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