

Versatile container molecules for a multitude of uses

The Product

Cucurbiturils (Qs) are a family of rigid, chemically and thermally robust container molecules that have many of the advantages but few of the disadvantages associated with cyclodextrins. They provide a unique opportunity in veterinary and human pharmaceuticals to develop new products and design more efficient delivery systems.

The Market

Qs resemble open-ended barrels, providing a cavity with a unique chemical environment. The variety of sizes available and their hollow structure suggest a wide range of possible applications as a container for absorption or delivery of guest molecules in a number of different environments.

Qs are soluble in a wide range of solvents under a range of conditions. Their characteristics have been documented for a range of guests and environments. However Qs' binding and release characteristics are dependent on the environment and the guest molecule being encapsulated, and can be engineered by suitable modifications to the base molecule.

The Application

Utilisation of the Qs' inherent stability and extended size range allows delivery of a broader range of guests under a greater variety of adverse conditions than are currently exploited by Cyclodextrin.

The versatility of Qs provides many advantages particularly in the following applications:

- An encapsulation and delivery system for pharmaceuticals, anti-biotics, fragrances, anti-bacterials, herbicides, fungicides, and pesticides :
- Less side effects and lower frequency doses through controlled delivery and slow release
- Increased drug stability in vivo and on the shelf
- Versatile delivery in solution, suspension or in a polymer substrate
- Longer life and easily delivered fragrances or antibacterials through slow release and polymer substrate.
- An absorption system for contaminants
- Removal of wastes from either gas or liquid streams
- Reversible selective binding of gases such as NO, O₂, CO, anaesthetic gases etc.
- Storage and transport of unstable or volatile materials
- Separation technologies such as chromatography

Pharmaceutical delivery system

Qs have the opportunity to be a disruptive technology. Because of their unique characteristics, toxicity can be masked and delivery can occur where it was otherwise not possible.

Qs have been used to encapsulate and deliver a number of pharmaceutical compounds including several anti-cancer therapeutics. The encapsulated therapeutics have been characterised, and trialled in vitro on cell lines as well as in vivo with animal trials. The results have been very encouraging with regard to cytotoxicity and other desirable characteristics.

Manufacture

Qs have been synthesised using novel methods which provide a range of sizes with a high degree of purity for each size. Qs synthesised by this process, are rigid, truncated, hollow spheres, which allow complete encapsulation of some compounds.

The manufacture of a range of these compounds together with their use in a number of key application areas has been demonstrated in the laboratory. Based on our preliminary kilogram scale work, Qs can be produced in commercially viable quantities with a cost comparable to that of their direct competitors the cyclodextrins.

Qs can also be engineered to allow manipulation of physical characteristics such as solubility, binding and release of guests and the ability to bond to a substrate.

Commercial Opportunity

NewSouth Innovations is looking to work with end users in a number of key application areas to identify the compound/s most suitable for their particular application/s. NewSouth Innovations can offer worldwide exclusive rights to this patented technology for particular fields of application.

Research Materials

Research quantities (a few grams) of Q's are available in all cavity size ranges: Q5 to Q10; tailored substitutes may also be specified. For further information and to obtain a quotation, please contact:

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