

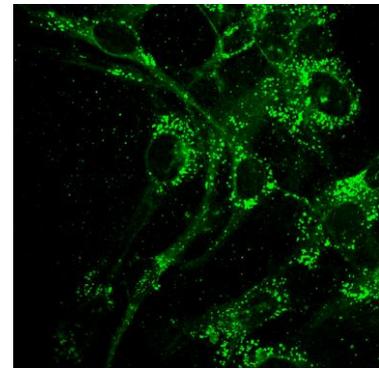
## Anticarcinogenic polymer nanoparticles with high selectivity

The Spanish National Research Council (CSIC) in collaboration with Biomedical Research Networking Center in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN) has developed polymer nanoparticles with dual activity: antiangiogenic and anticarcinogenic. These particles are based on a family of amphiphilic copolymers that are able to form polymer micelles at nanometric scale. These copolymers have intrinsic biological activity, as well as they can also serve as effective vehicles for other antitumoral agents since they have a hydrophobic core capable to encapsulate them.

*An industrial partner for a license agreement is sought*

### Dual activity: antitumoral and antiangiogenic

Currently, most cancer treatments available in market exhibit high toxicity since they have low selectivity, i.e., they affect both carcinogenic and healthy cells. Recently, a group of researchers of CSIC and CIBER-BBN has developed nanoparticles based on amphiphilic copolymers. These copolymers comprise a derivative monomers from alpha-tocopherol and highly hydrophilic monomers. They are able to form micelles at micro and nanometric scale where the core of these micelles has hydrophilic character and the shell has hydrophobic character. The nanoparticles formed selectively induce the death of carcinogenic cells (proapoptotic activity) while they inhibit the growth of new blood vessels (antiangiogenic activity).



Viability tests confirmed the low toxicity of this system as well as its dual activity and high selectivity.

Viability tests confirmed that these nanoparticles are endocytosed by cells.

### Main applications and advantages

- **Simple process of synthesis:** copolymers are obtained by conventional radical polymerization and therefore they can be produced at industrial scale.
- **Tailored properties:** particle properties can be modulated by varying copolymer composition and/or concentration.
- **Intrinsic biological activity:** due to covalent bonding of alpha-tocopherol.
- **An effective delivery system:** these copolymers serve as effective vehicles for other antitumoral agents that can be toxic and hydrophobic.
- **Low toxicity and high selectivity:** These compounds significantly decrease the cellular viability of carcinogenic cells without affecting the healthy ones.

### Patent Status

PCT ("International") application filed. Priority established by a Spanish patent application.

### For further information, please contact

Patricia Thomas V, Ph.D.  
Material Science Area  
Deputy Vice-Presidency for Knowledge Transfer  
Spanish National Research Council (CSIC)  
Tel.: + 34 – 91 561 34 41  
Fax: + 34 – 91 564 48 53  
E-mail: [patricia.thomas@ictp.csic.es](mailto:patricia.thomas@ictp.csic.es)