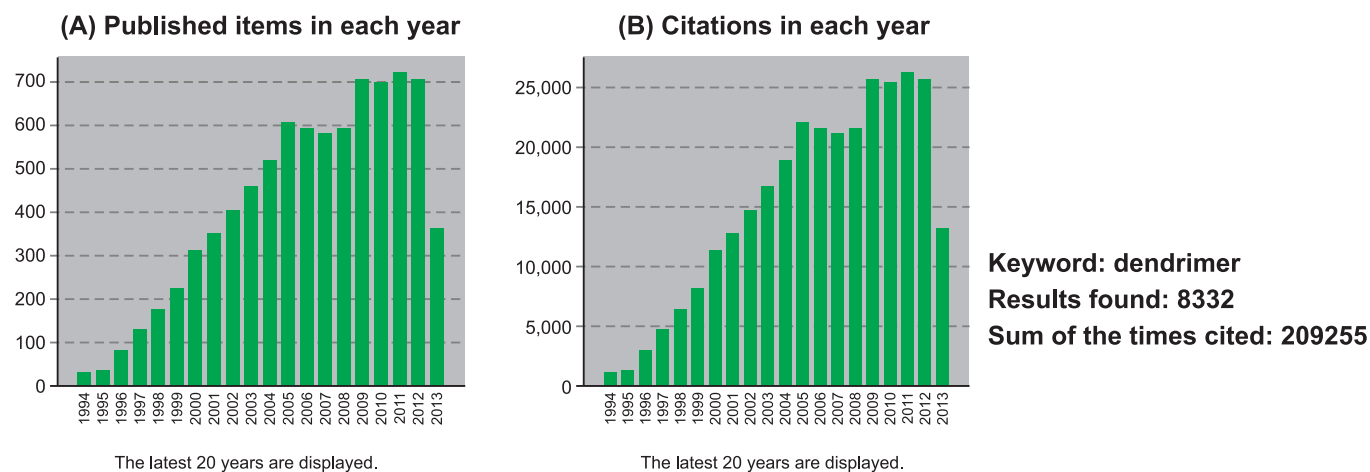


## Dendrimers: from the art of building precise molecules to the dissemination through the world

The word dendrimer comes from the Greek (*dendron* = tree) and represents new molecular systems, which become more branched at each successive connection. These compounds are designed by a central core, repeated branches from the core, (which characterize the generations), and surface groups. The synthesis is performed step by step, obtaining structures perfectly controlled, precise and symmetric. Moreover, dendrimers are extremely branched, monodisperse, possess nanoscopic size and large number of peripheral functionality.

The first dendrimer families, with higher generation and well-defined structures, were reported by Tomalia (Tomalia *et al.*, 1985) and Newkome (Newkome *et al.*, 1985). Nowadays, these compounds have been attracting great interest from academic community and industrial segment, showing numerous applications in nanotechnology fields. In the pharmaceutical sector, it has been highlighted the use of these nano-composites as drug carriers, allowing the improvement of prototype features, such as pharmacokinetic and pharmacodynamics properties.

The growing interest in dendrimers can be seen at Figure 1. It is important to emphasize that, in 20 years, approximately 8.332 works were published in the area, showing widely different applications. Only in 2012, around 700 papers were presented. As observed for publications, the citations related to this subject have increased significantly in the last two decades (Figure 1-B), achieving almost 25.000 in 2012.



**FIGURE 1** - The growing interest in dendrimers evaluated by: (A) publications per year, (B) citations per year. (Source: <http://apps.webofknowledge.com>).

In order to disseminate the knowledge related to dendrimer, to expand the studies that have been carried out in the area, as well as to strengthen the communication between the researchers, since 1999 are being conducted international events regarding to this scope, known as **International Dendrimer Symposium (IDS)**. This Conference is held each two years and concentrates the most important academics and leaders of the area. Several cities around the world were the hosts of the event: Frankfurt (Germany - 1999), Tokyo (Japan - 2001), Berlin (Germany - 2003), Mount Pleasant (MI, USA - 2005), Toulouse (France - 2007), Stockholm (Sweden - 2009), Washington (USA - 2011) and Madrid (Spain - 2013).

In Brazil, this area of research is still new. Data from National Council for Scientific and Technological Development (from Portuguese *Conselho Nacional de Desenvolvimento Científico e Tecnológico* - CNPq), a federal public agency, which support research in Brazil, show that few Brazilian research groups have been working on dendrimers. Hence, considering this reality, and in order to expand and stimulate the exchange of ideas in our country, in October 2011, was held at the Faculty of Pharmaceutical Sciences, University of São Paulo, **Dendrimer Symposium: Significance in the Context of Nanotechnology**. The Symposium had as General Coordinator Professor Elizabeth Igne Ferreira, who is carrying out research in this field since 2005. This interesting event was a landmark in the history of dendrimers in Brazil, since brought together the principal investigators in the area, including those who introduced this chemistry through the world: Dr. Donald Tomalia and Dr. George Newkome. Interesting issues were discussed in the modules of synthesis and characterization, molecular modeling, biological assays, drug release studies and new applications. Considering that, it is important to emphasize the relevant role of the *Brazilian Journal of Pharmaceutical Sciences* in organizing a special Number concerning dendrimers, gathering some interesting lectures presented at the Symposium.

I would like to thank very much the authors for their willingness to contribute to this special issue. I am quite sure that this special issue will bring numerous benefits to the scientific community, including the dissemination of valuable knowledge, creation of new ideas, and it will contribute to solve several enigmas of science, especially in the pharmaceutical field.

**Jeanine Giarolla Vargas**

Editor of special issue - Dendrimers

## REFERENCES

NEWKOME, G.R.; YAO, Z.Q.; BAKER, G.R.; GUPTA, V.K. Micelles. Part 1. Cascade molecules. A new approach to micelles. *J. Org. Chem.*, v.50, p.2003-2004, 1985.

TOMALIA, D.A.; BAKER, H.; DEWALD, J.; HALL, M.; KALLOS, G.; MARTIN, S.; ROECK, J.; RYDER, J.; SMITH, P. A new class of polymers: starburst dendritic macromolecules. *Polymer J.*, v.17, p.117-132, 1985.

ISI Web of Science. Available at: <http://apps.webofknowledge.com>. Access: July, 23th 2013.