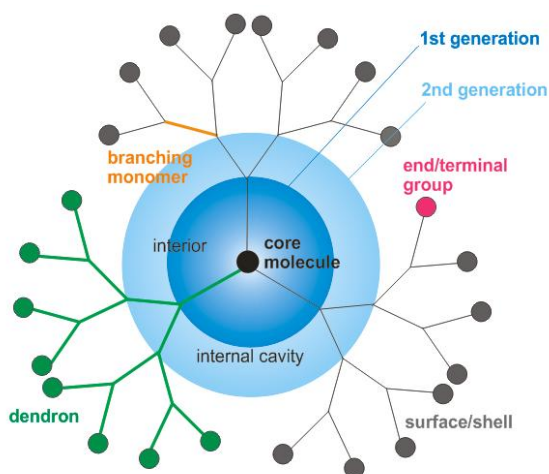


Breast cancer is the most frequently occurring cancer in women. It has been confirmed that approximately 30% of patients have overexpression of human epidermal growth factor 2 (HER2) on the surface of tumor cells. Trastuzumab – a recombinant, humanized monoclonal antibody – is directed against this receptor. Its use in traditional chemotherapy (with anthracyclines or taxanes) causes an increase of therapy efficiency. However, the systemic toxicity of the anticancer drugs is still a serious problem. Therefore new solutions are sought, especially in the field of selective drug transport to tumor cells.



Dendrimers are composed of a core and branches. They are the best-known group of nanoparticles. A lot of publications have shown that they can be used as carriers of various types of molecules, including anticancer drugs. The branched structure provides effective protection against premature release of the drug into the circulatory system. It gives a chance to reduce the dose while maintaining a therapeutic effect, and to reduce the toxicity of the drug for normal cells.

Furthermore, the surface of dendrimers can be modified by a monoclonal antibody to achieve a targeted therapy. For that reason synthesis of conjugates of trastuzumab, dendrimers, and anticancer drugs is so crucial. The preliminary results indicate that PAMAM dendrimer conjugated with anticancer anthracyclines and taxanes synthesized by the author of the project in the laboratory of cooperating branch of Polish Academy of Sciences (CBMiM PAN) have a higher effectiveness against tumor cells compared to the free drugs. We expect that due a combination of monoclonal antibody (Trastuzumab), PAMAM-anticancer drug conjugates would has the ability to act selectively on breast cancer overexpressing HER2. The subject of the project belongs to one of the most promising and fast developing branches of knowledge – on the edge of chemistry, nanotechnology and medicine. The idea of using dendrimers as carriers of therapeutic agents and monoclonal antibody in HER2 overexpressing breast cancer is new and positive results will enable a real progress in medicine and an improvement in the quality of life.