

**STUDIES ON INCORPORATING SMALL FLUORESCENT MOLECULES INTO PAMAM DENDRIMERS**BARBARA KLAJNERT and MARIA BRYSZEWSKA\*Department of General Biophysics, University of Łódź,  
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Dendrimers are a relatively new class of polymer, with well-defined molecular structures. They are synthesized from a polyfunctional core by adding branched monomers that react with the functional groups of the core, in turn leaving end groups that can react again. This results in a large number of reactive terminal groups that increases after each cycle or "generation".

The structure of a given dendrimers has a great impact on its applications. Using dendrimers as drug delivery systems has been of great interest. Dendrimers have two interesting properties at the molecular level. First, it has been shown that drug molecules can be attached to dendrimer end groups through covalent bonds or by electrostatic forces. Due to the large number of terminal groups, one molecule of the dendrimer is capable of carrying drugs at a high density. Another strategy to design dendrimers for drug delivery is to use them as containers which encapsulate drug molecules. This is possible because there are large empty cavities inside dendrimers. Dendrimers with a hydrophobic interior and hydrophilic surface are sometimes called unimolecular micelles since they act like micelles. That means that they are able to solubilize hydrophobic molecules in aqueous solutions.

In this study, the incorporation of tryptophan and 1-anilinonaphthalene-8-sulfonic acid (ANS) into polyamidoamine (PAMAM) dendrimers was examined. PAMAM dendrimers are based on an ethylenediamine core with branched units constructed from both methyl acrylate and ethylenediamine. We used three types of PAMAM dendrimers with different surface groups (-COOH, -NH<sub>2</sub>, -OH). As tryptophan and ANS are fluorescent molecules and their fluorescence is very sensitive to the changes in their microenvironment, it was possible to evaluate their interactions with dendrimers by spectrofluorometric methods. Dendrimer surface groups were observed to have a strong impact on the interactions between dendrimers and fluorescent molecules. It is very likely that during the first stage of incorporation, the electrostatic forces between terminal groups and charged molecules are crucial.

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