BACKGROUND

Benzopyrylium dyes belong to the flavonoid branch of polyphenolic compounds. Due to their positive charge, they are expected to interact strongly with DNA and RNA.

Molecular recognition of DNA and RNA is an important area of current research, due to the relevance of such recognition events in medicinal, biochemical, and biological processes. [1] While several studies on the interaction of flavonoids with DNA are known, the interaction with RNA is poorly studied. We have expertise in the synthesis of fluorescent benzopyrylium dyes and on spectroscopic study of interaction between biological molecules and fluorescent dyes.

OBJECTIVES

- Characterize the thermodynamics and kinetics of binding of benzopyrylium dyes and several types of DNA and RNA
- Characterize the emission of the benzopyrylium dyes – NA adducts by steady-state and time-resolved fluorescence spectroscopy and check their use as sensors for NA recognition
MSc in Biochemistry  
Dissertation Project – 2nd Cycle

PROJECT DESCRIPTION

There are several benzopyrylium dyes available at our lab. If the student, however, is keen on organic synthesis, new flavylium salts adequate for intercation with nucleic acids can be designed, synthesized and structurally characterized (NMR, EA, MS), Task 1.

The intercalation of the dyes into nucleic acids will be studied by UV-Vis spectrophotometry, spectrofluorimetry and ITC and the data analysed to obtain association constants and kinetic parameters, Task 2.

The adducts that form will then be characterized by time-resolved spectrofluorimetry and eventually by Circular Dichroism to infer binding geometries, Task 2.

In a second stage, the benzopyrylium dyes will be left to equilibrate to their corresponding chalcones and Light will be used to photoinduce the intercalation, Task 3.


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