Current Topics in Biophysics, 2007, 30 (suppl. B) 43

SINGLE STRANDED DNA-BASED FLUORESCENT INDICATOR FOR pH MONITORING

A. MASTERNAK, A. GŁUSZYŃSKA, B. JUSKOWIAK

Adam Mickiewicz University, Poznań, Poland

The existence of the multistranded helical architecture of nucleic acids is deeply connected with the nature of interactions between nucleobases – Watson-Crick or Hoogsteen base-pairing. The association of complimentary strands by means of hydrogen bonds is exploited in oligonucleotides hybridization probes for detection purpose and structural investigations of DNA. Obviously, the applications of such probes are dependent on the selected sequence of oligonucleotides as well as on luminescent properties of fluorophores. Most oligonucleotide fluorescence probes is based on the formation of double helix DNA, however, the exploiting of the possibility of forming diffrent tetriary structures by nucleic acids, like triplexes, G-quadruplexes and I-motifs may help to design more sophisticated biosensors than traditional hybridization probes (Miyoshi, Inoue & Sugimoto, 2006, *Angew. Chem. Int. Ed*., 45, 7716; Navani & Li, 2006, *Curr. Opinion Chem. Biol*., 10, 272).

In this report we present synthesis and preliminary results of fluorescence measurements with oligonucleotides labelled with pyrene at the 3' and 5' ends. For this purpose, we have chosen C-rich sequences due to their feasibility to self-associate at acidic or even neutral pH into the I-motif (Gueron & Leroy, 2000, *Curr. Opinion Struct. Biol*., 10, 326; Kumar *et al*., 2005, *Biochemistry* 2005, 44, 16426). As a consequence of the structural conversion into I-motif at low pH conditions, we expect to observe pyrene excimer fluorescence. Particularly, we predict that changes in C-rich oligomer conformation allow pyrene moieties to arrange face-to-face and exhibit excimer emission as it was observed in case of a dual-pyrene-labelled G-rich oligonucleotide, which formed G-quadruplex in the presence of K^+ ion (Nagatoishi *et al*., 2005, *Angew. Chem. Int. Ed*., 44, 5067).