Binding of $Ru(bpy)_2(eilatin)^{2+}$ to Matched and Mismatched DNA

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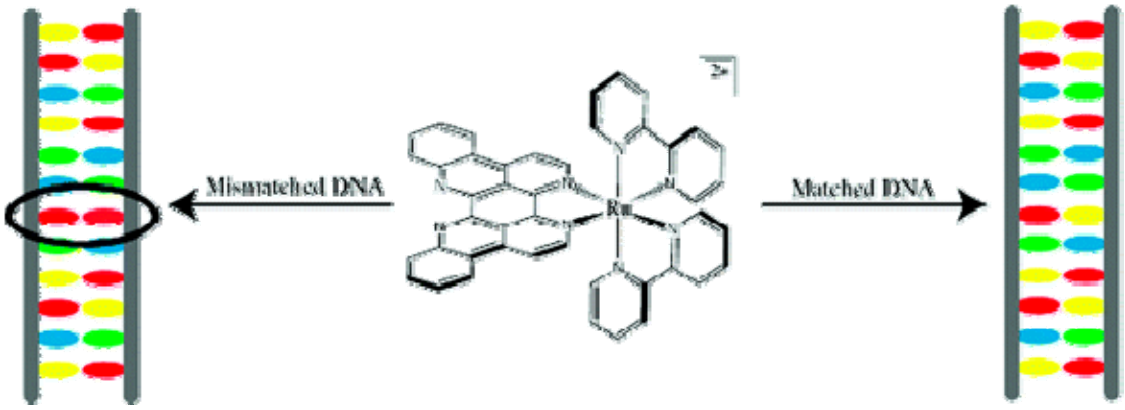

Abstract:

The DNA-binding properties of $Ru(bpy)_2(eilatin)^{2+}$ have been investigated to determine if the sterically expansive eilatin ligand confers specificity for destabilized single-base mismatches in DNA. Competitive DNA photocleavage experiments employing a sequence-neutral metallointercalator, $Rh(bpy)_2(phi)^{3+}$ (phi = 9,10-phenanthrenequinonediimine), and a mismatch-specific metalloinsertor, $Rh(bpy)_2(chrysi)^{3+}$ (chrysi = chrysene-5,6-quinonediimine), reveal that the eilatin complex binds to a CC mismatched site with an apparent binding constant of $2.2(2) \times 10^6$ M^{-1}. Nonetheless, the selectivity in binding mismatched DNA is not high: competitive titrations with $Rh(bpy)_2(phi)^{3+}$ show that the complex binds also to well-matched B-form sites. Thus, $Ru(bpy)_2(eilatin)^{2+}$, despite containing the extremely expansive eilatin ligand, displays lower selectivity for the mismatch than does $Rh(bpy)_2(chrysi)^{3+}$, a metalloinsertor containing the smaller, though still bulky, chrysene-5,6-quinonediimine ligand. In summary, the size and shape of the eilatin ligand allow stacking with both well-matched and mismatched DNA.