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Light-activated reagents for double-dtrand DNA cleavage with built-in selectivity for hypoxic cancer tissues

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This talk will present light-activated molecular systems for "switchable" pH-gated ds DNA-cleavage. These hybrid compounds combine potent DNA-photocleavers with pH-regulated components derived from basic amino acids or peptides. The pH-gating amines undergo protonation at the pH threshold which separates cancer and normal cells. This change leads to an extraordinary increase in the efficiency of therapeutically important double-strand DNA cleavage, far exceeding that for the natural enediyne calicheamicin, the most potent of nature's anticancer agents.

Biography

Igor V. Alabugin received his Ph.D. degree from the Moscow State University at the age of 25. After a postdoctoral study at the University of Wisconsin-Madison, he joined the Department of Chemistry and Biochemistry of the Florida State University in 2000, where he is currently a Full Professor. He coauthored 93 peer-reviewed publications and several patents. He co-organized two international conferences and presented 79 keynote, plenary and invited talks at conferences, universities and companies. He is a reviewer for 45 journals and 7 funding agencies. His research combines organic chemistry with biochemistry and materials science for design of photochemical double-stranded DNA cleavage agents with built-in selectivity to cancer cells, development of pH-gated biological processes, discovery of fast and selective reagents for bioorthogonal chemistry, functionalization of nanomaterials, and construction of precisely cut and functionalized graphene ribbons.

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