Targeting and imaging DNA with metal complexes

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With the increasing evidence that non-canonical DNA structures (such as three- and four-stranded helical DNA structures) have important biological functions, there is increasing interest in developing small molecules that can interact selectively with a given DNA topology. Due to their flexible structural and functional properties, there has been significant interest in designing and developing metal complexes with high affinity and selectivity for guanine-quadruplex DNA (G4 DNA).[1,2] These quadruple helical structures have been proposed to have important biological functions in transcription, telomere maintenance and replication, and therefore have been identified as attractive anticancer drug targets.[3] Over the past few years, our group has developed several families of metal complexes with high affinity and selectivity for quadruplexes.[4-7] One of the aims of our recent work in this area has been to demonstrate that G4 DNA binders can target such structures in live cells[8,9] as well as to develop systems that can 'trigger' the activity of a G4 binder via external stimuli such as light, redox changes or enzymes.[6,7] This lecture will cover some of our latest results in these two areas.

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