

**P043** Structure of the human RECQ1 DNA helicase  
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RecQ-like helicases, which include five members in the human genome, are important in maintaining genome integrity. We present a crystal structure of a truncated form of the human RECQ1 protein with Mg-ADP, combined with a mutational study, which identify important determinants of the activity and molecular interactions of RECQ1. The structure resembles that of *E. coli* RecQ, with some important differences. All structural domains are conserved, including two RecA-like domains and the RecQ-specific Zinc-binding and winged-helix (WH) domains. However, the WH domain is positioned at a different orientation from that of the bacterial enzyme. Unlike other characterized RecQ proteins, RECQ1 appears both in solution and in the crystal as a dimer. We identify a prominent beta-hairpin of the WH domain as essential for DNA strand separation, which may be analogous to DNA strand-separation pins of other DNA helicases. This hairpin is significantly shorter in the *E. coli* enzyme and is not required for its helicase activity suggesting that there are significant differences between the modes of action of RecQ family members.