Review of: "Structural Basis for Dimerization and Activation of UvrD-family Helicases"

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Potential competing interests: No potential competing interests to declare.

Authors newly determined homodimeric structures of UvrD with and without DNA by cryoEM. The DNA binding mode with the UvrD dimer was completely different from that with the UvrD monomer. Especially, the GIG motif of the 2B subdomain was located on the dimer interface, whereas it is located nearby DNA in the monomer complex. Authors hypothesized that DNA is first bound on the UvrD monomer, then the 2B subdomain changed its conformation to form a homodimer. During the conformational change of the 2B subdomain, double-stranded DNA was partially unwound. To reveal whether the hypothesis is applicable to the non-disulfide bonded UvrD family such as EcUvrD, they measured the helicase activity of the mutated EcUvrD in which a cysteine residue is introduced to the dimer interface of the 2B subdomains. The helicase activity was increased when the mutated EcUvrD formed a homodimer, indicating that the hypothesis is applicable to not only the disulfide bonded UvrD family but also the non-disulfide bonded UvrD family.

The results and discussion are excellent, and I just have a simple comment shown below.

1. Do you have any biochemical evidence to reveal the model shown in Figure 4? Crosslinking to fix the compact or DNR bound conformation of the MtUvrD1 dimer may be useful to support the model.