

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: X-ray crystal structure of NanR in complex with Neu5Ac and Zn²⁺ and closeup of the effector binding site.

Accompaniment to Fig. 4b-c.

File Name: Supplementary Movie 2

Description: Cryo-EM structure of the NanR-dimer1/DNA hetero-complex and closeup on the protein-DNA interface.

Accompaniment to Fig. 5.

File Name: Supplementary Movie 3

Description: Morph model to illustrate the conformational change between the DNA-free (X-ray crystal structure) and the DNA-bound (cryo-EM structure) states.

Accompaniment to Fig. 6.

File Name: Supplementary Movie 4

Description: Cryo-EM structure of the NanR-dimer3/DNA hetero-complex and closeup of each dimer assembled across the (GGTATA)₃-repeat operator DNA.

Accompaniment to Fig. 7.