

**Figure S1.** **Performance of NeRV-3D with different conversion factors on low-resolution data**. (A) The comparison of PCC, SCC, RMSE between the Euclidean distance calculated from constructed structure and distance converted from the simulated Hi-C contact matrix. (B) The comparison of PCC, SCC, RMSE between the Euclidean distance calculated from constructed structure and simulated structure. (C) The comparison of the ground truth simulated structure and reconstructed structures calculated by NeRV-3D with different α value. The simulated dataset used in figure a, b, c is the simulated Helix structure.



**Figure S2**. **Performance of NeRV-3D-DC with different conversion factors and division bins on 5 kb resolution data of chromosome 20 in IMR90**. (A) 3D visualization of chromosome structures reconstructed by NeRV-3D-DC when setting α value ranging from 0.1 to 0.8, division bins 100 and 400. (B, D)The comparison of PCC, SCC, RMSE between the Euclidean distance calculated from constructed structure and distance converted from the Hi-C contact matrix. (C, D) The comparison of similarity between FISH and reconstructed structures using RMSE metric.



**Figure S3**. **Performance of NeRV-3D-DC with different conversion factors and division bins on 5 kb resolution data of chromosome 22 in IMR90**. (A) 3D visualization of chromosome structures reconstructed by NeRV-3D-DC when setting α value ranging from 0.1 to 0.8, division bins 100 and 400. (B, D)The comparison of PCC, SCC, RMSE between the Euclidean distance calculated from constructed structure and distance converted from the Hi-C contact matrix. (C, D) The comparison of similarity between FISH and reconstructed structures using RMSE metric.