Polyribosomes are Molecular 3D Nanoprinters that Orchestrate the Assembly of Vault Particles

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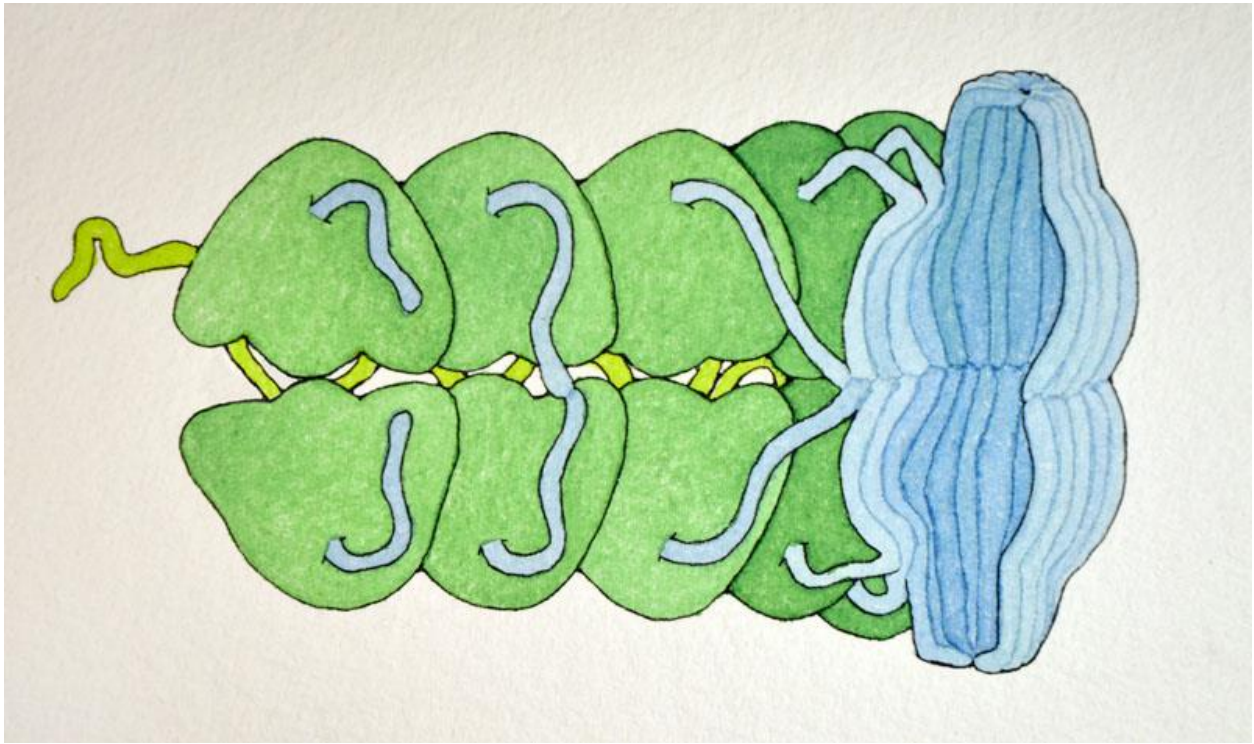

Fig. S1: Schematic illustration of vault assembly by polyribosome templating. This drawing provided by Dr. David S. Goodsell, The Scripps Research Institute, depicts a moment in vault assembly where about half of the particle has formed on the polyribosome.

Movie S1. Cryo-Electron Tomography of 6-His-MVP mutant.

To view Movie S1 see: http://vaults.arc2.ucla.edu/MovieS1.htm

Movie S2. Polyribosomes function as templates to orchestrate assembly of vault particles. In this movie, ribosomes and vault components are presented from actual cryo-EM and crystallographic models (obtained from the PDB) at relative scale to one another. For ease of modeling, the polyribosome has been presented in a planar fashion, however a pseudo-helical structure is most likely[6, 7]. The growing MVP chains (illustrated in red) are modeled as static chains, however, in nature they are likely emerging in an orientation that maximizes the distance from each other[6, 7]. Once the shoulder region of MVP emerges from the ribosome it can redirect the N-terminus toward the neighboring MVP chain.

To view Movie S2 see: http://vaults.arc2.ucla.edu/MovieS2.htm

Author Contributions J.M. designed and executed the experiments, interpreted the data, conceived and developed the idea of polyribosome templating model. J.M, S.R and L.H.R carried out all the TEM analyses. H. D.T., X.Z. and H.Z. carried out the cryo-tomography. J.M, H.Z, B.C.F., V.A.K and L.H.R refined the model and wrote the manuscript. All authors discussed the results and implications and commented on the manuscript at all stages.