

Interplay between viral transcription and host translation



Gabriel Demo, PhD.

Demo lab

Central European Institute of Technology (CEITEC), Masaryk University



National Institute
of Virology and Bacteriology

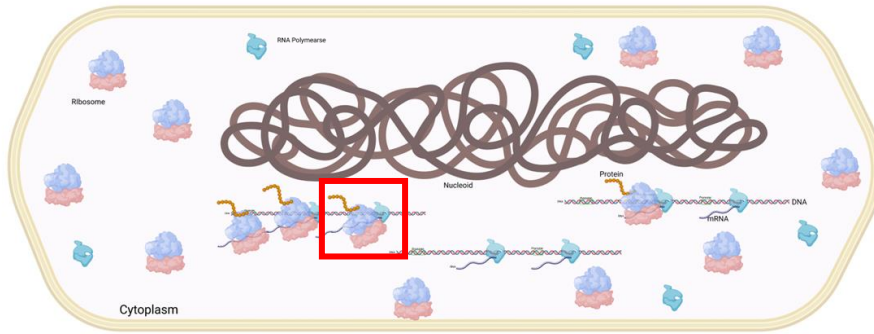


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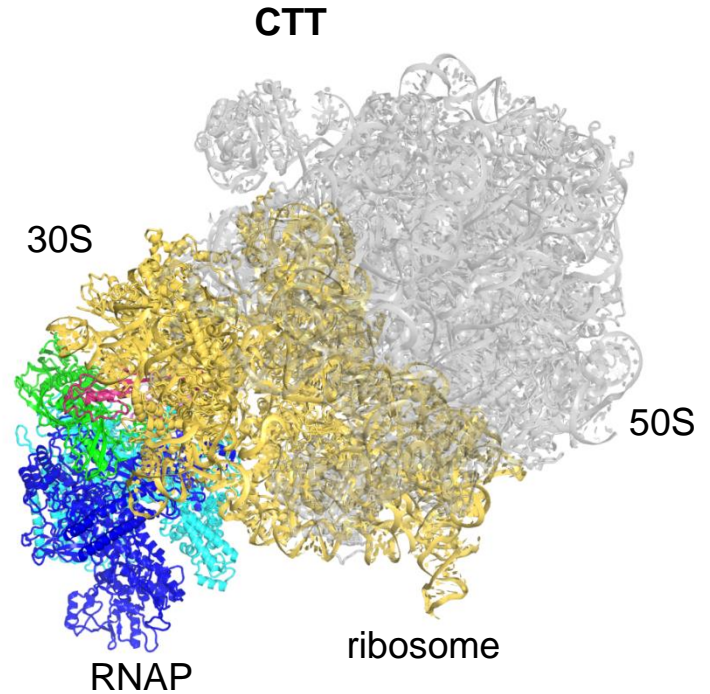


CZECH
RECOVERY
PLAN

Bacterial Transcription-Translation Coupling (CTT)

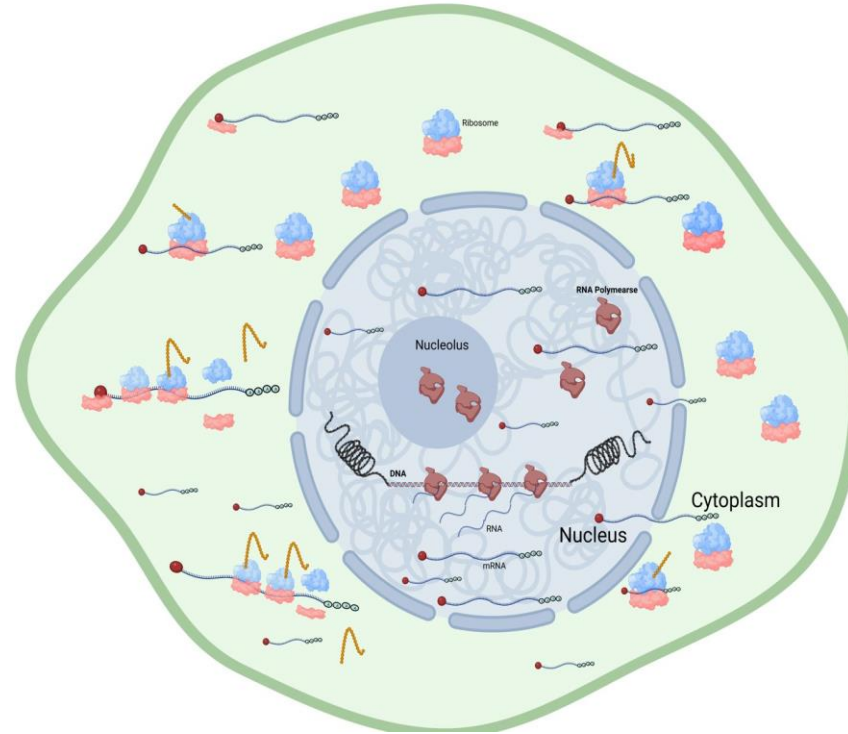


bacterial cell



Kohler R., *et al.* (2017). *Science*.
Demo G., *et al.* (2017). *eLife*.
Webster MW., *et al.* (2020). *Science*.
Wang C., *et al.* (2020). *Science*.

Coupled transcription-translation in eukaryotes?

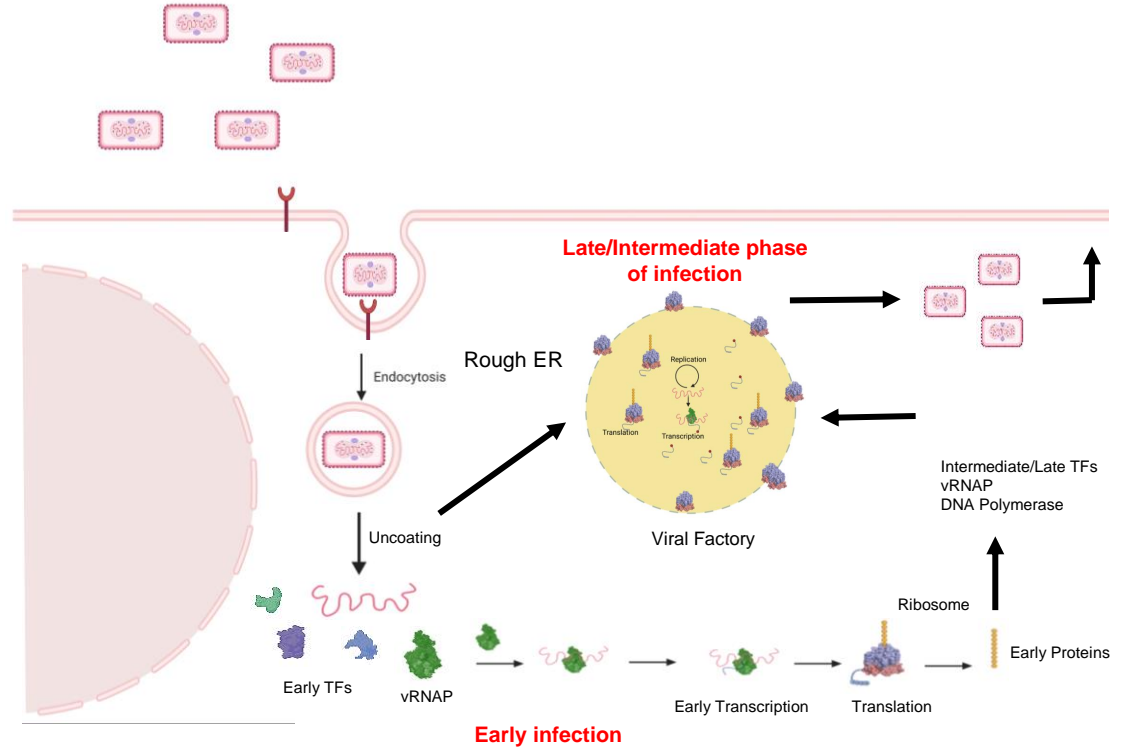


eukaryotic cell

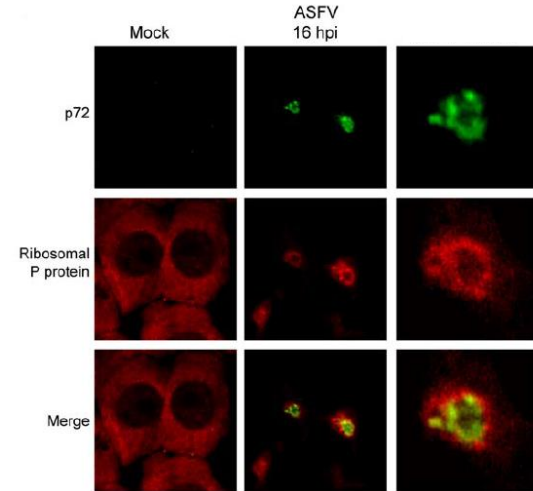
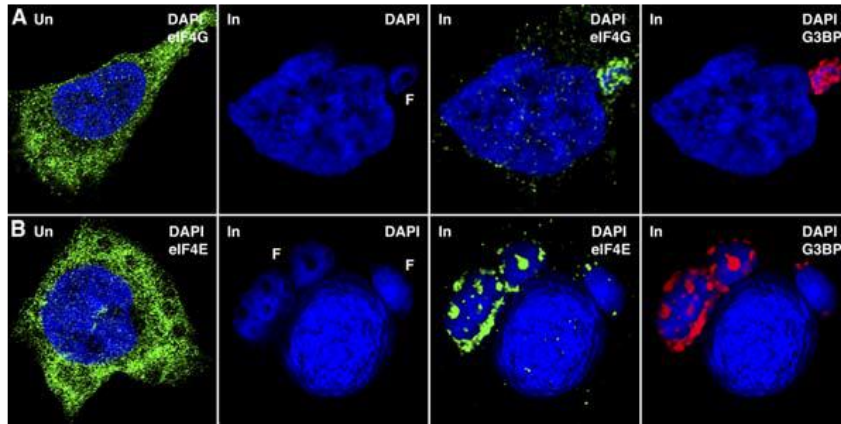
Viral infection



poxviruses



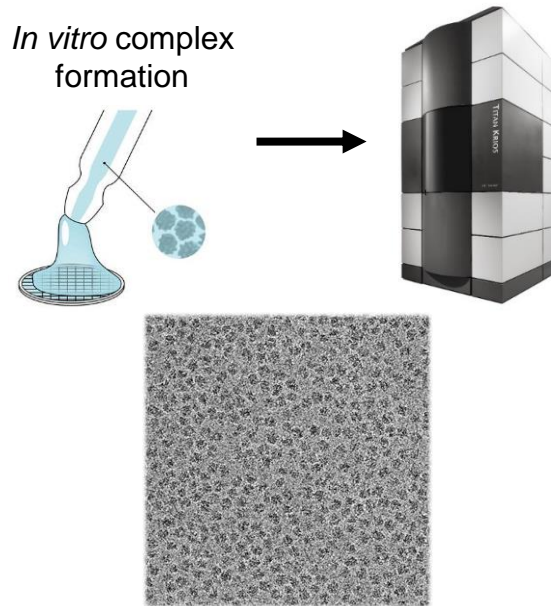
Co-localization of host translation machinery in viral factories



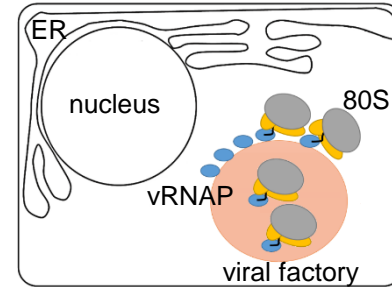
Katsafanas, G.C. *et al.* (2007). *Cell Host & Microbe*
Castello, A. *et al.* (2009). *PLoS Pathogens*

Structural biology approach

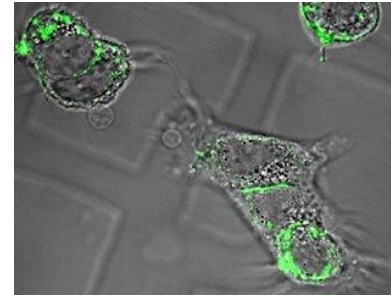
Single particle cryo-EM



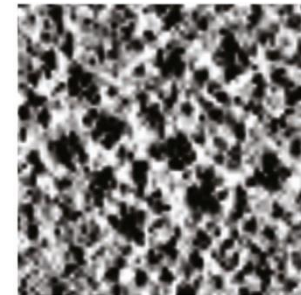
cryo-ET



Virus-infected mammalian cell

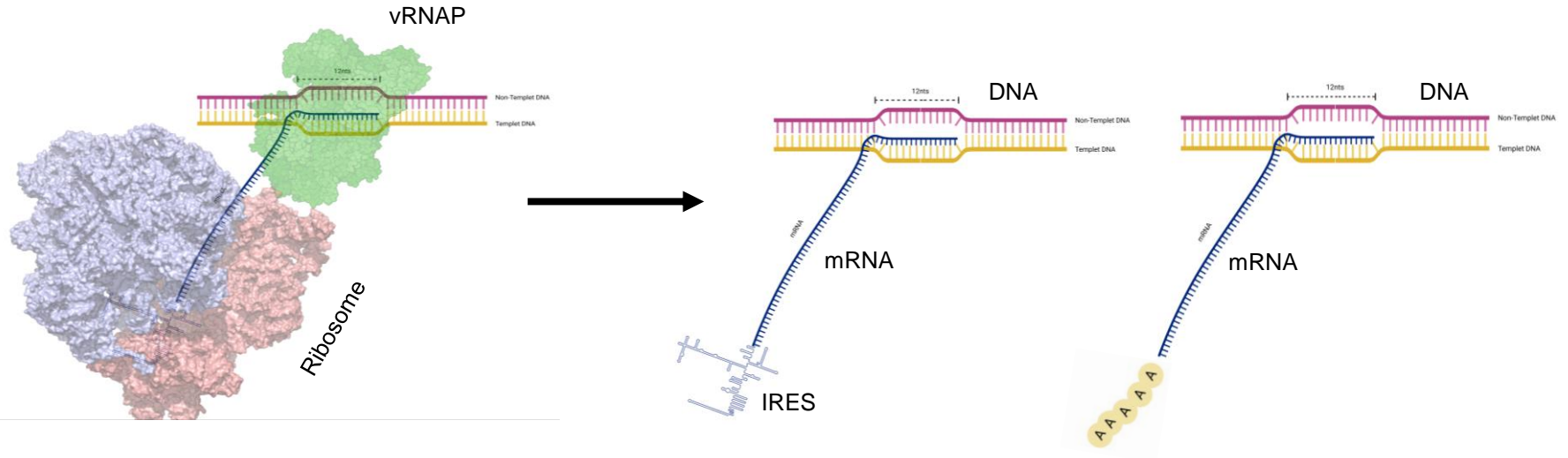


CLEM microscopy

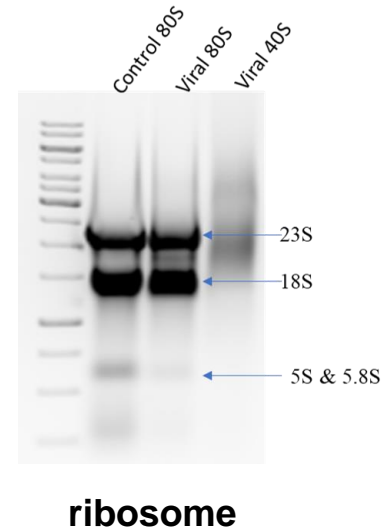
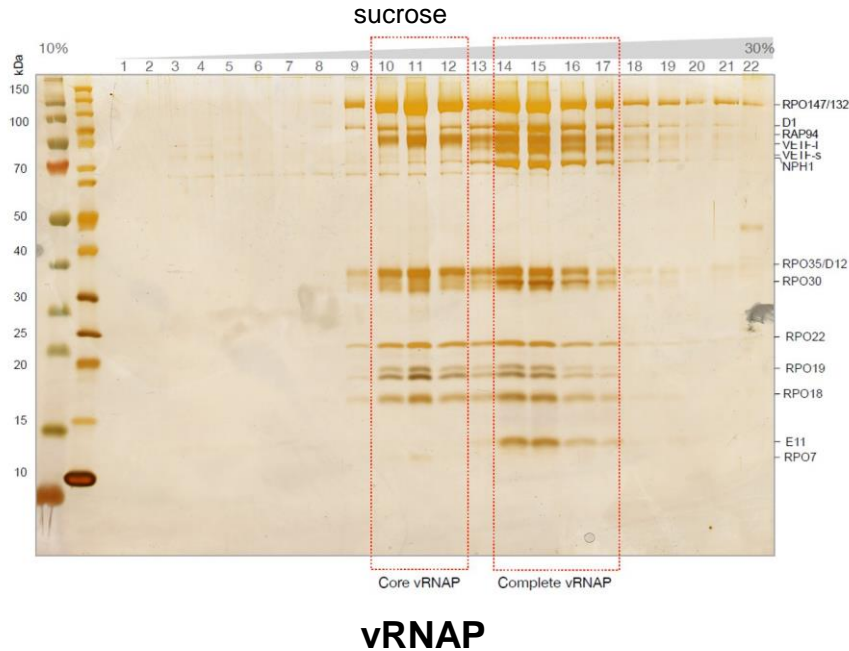
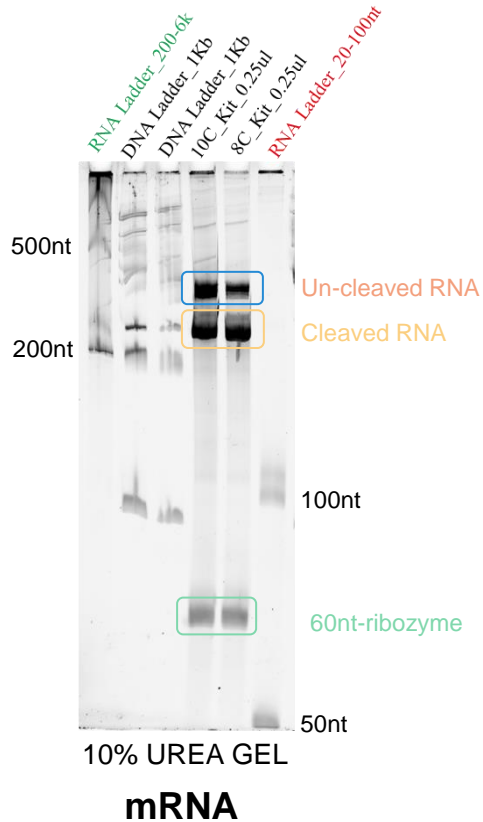


Tilt series tomogram

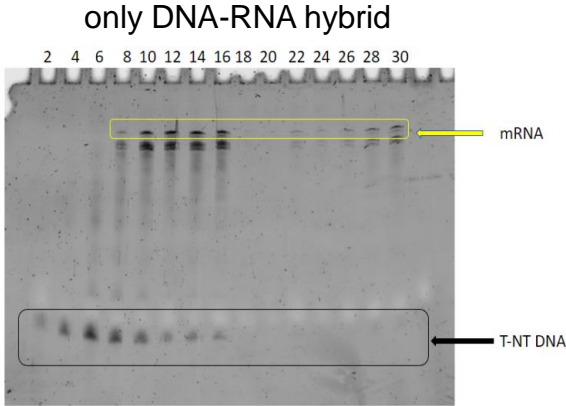
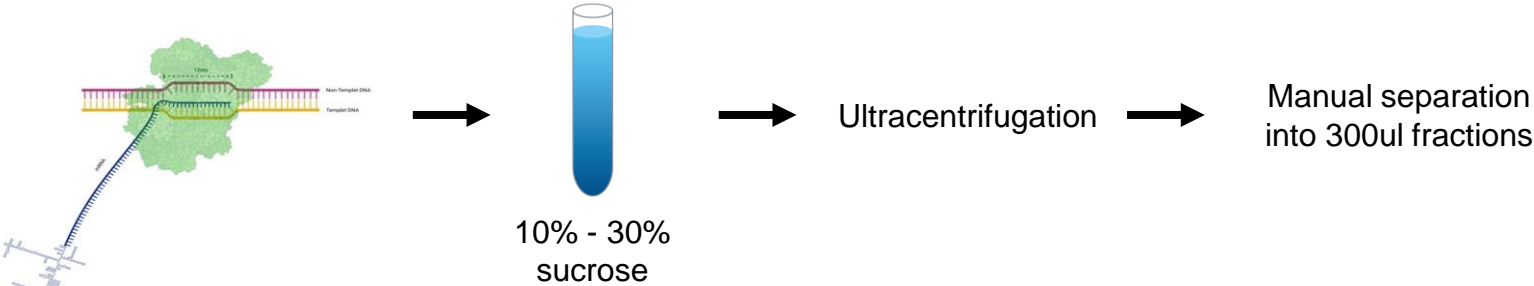
In vitro reconstitution of CTT with vRNAP and ribosomes



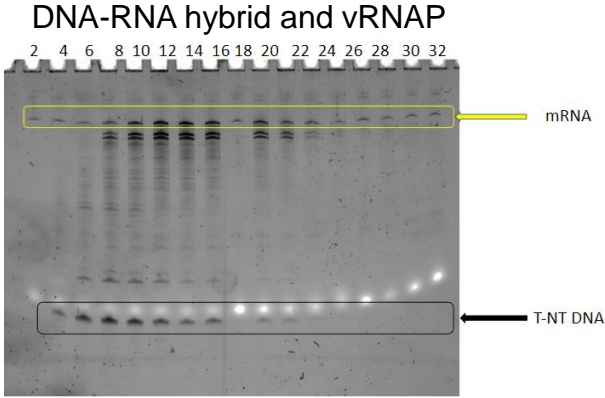
In vitro reconstitution of CTT with vRNAP and ribosomes



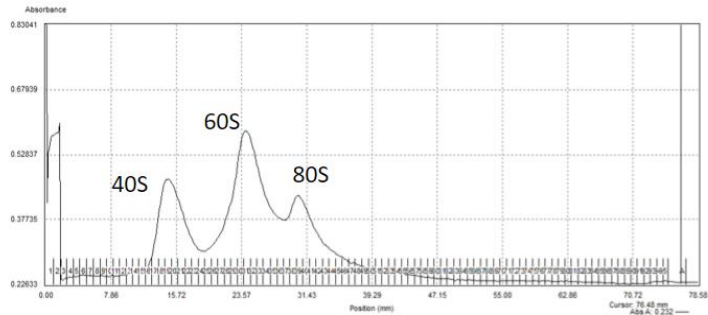
Binding of vRNAP to the scaffold DNA and RNA



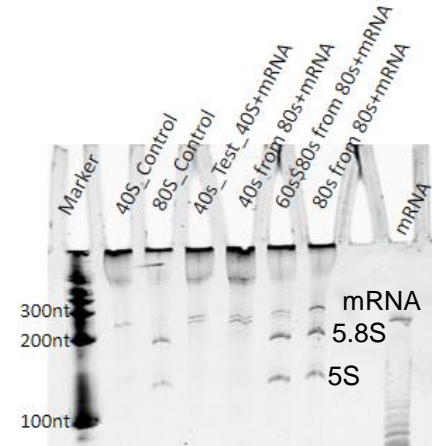
10% Urea-PAGE



Binding of the ribosome to the mRNA

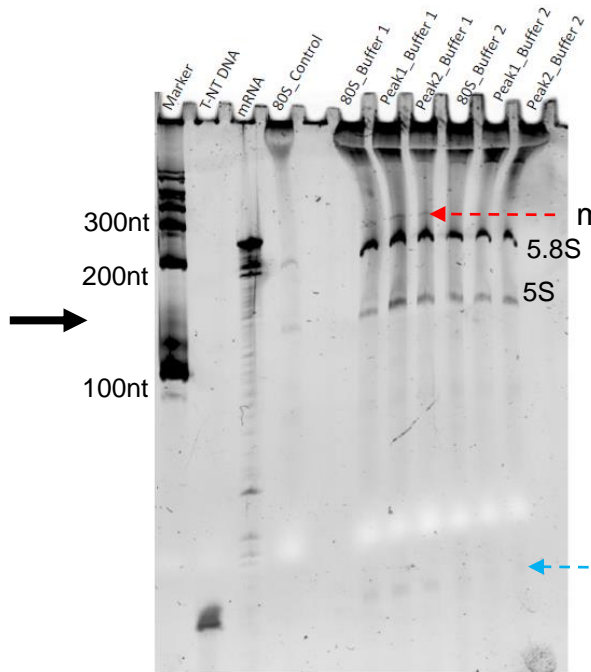
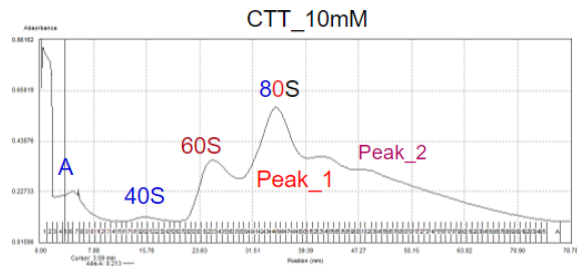


sucrose gradient profile for human ribosomes

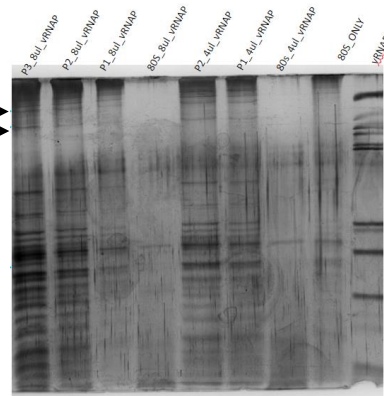


10% UREA RNA gel

In vitro reconstitution of CTT with vRNAP and ribosomes

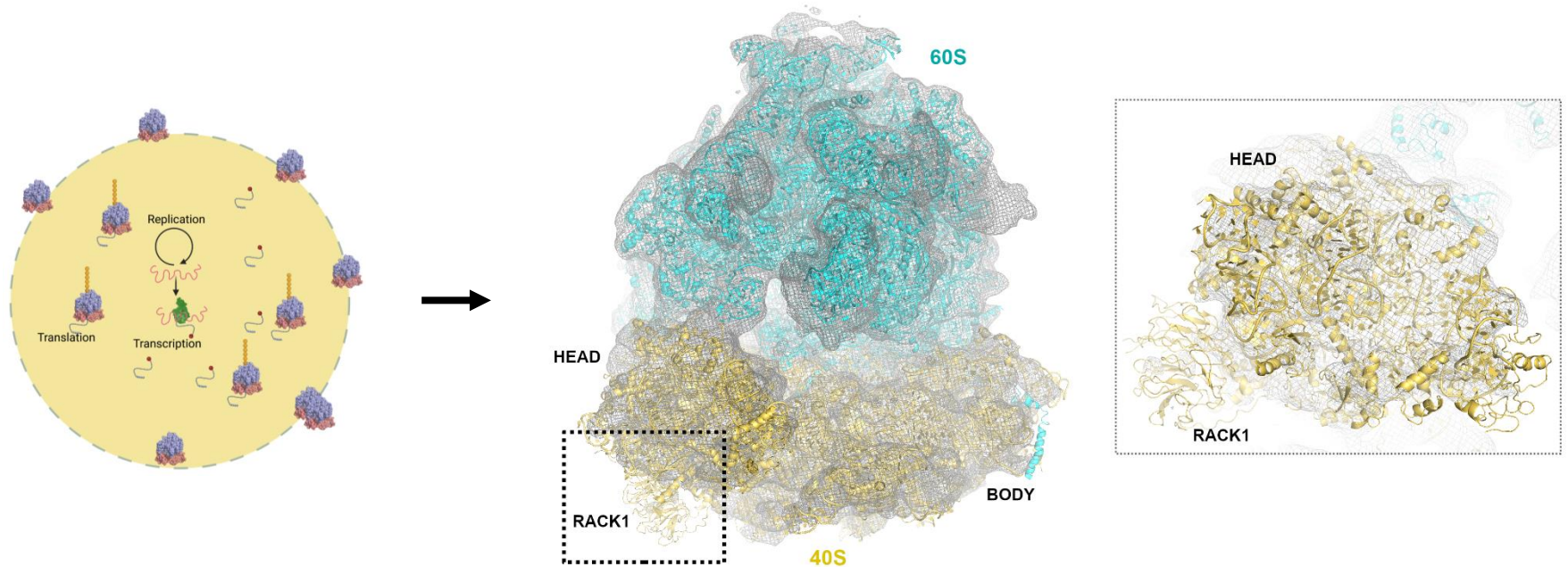


10% UREA RNA gel

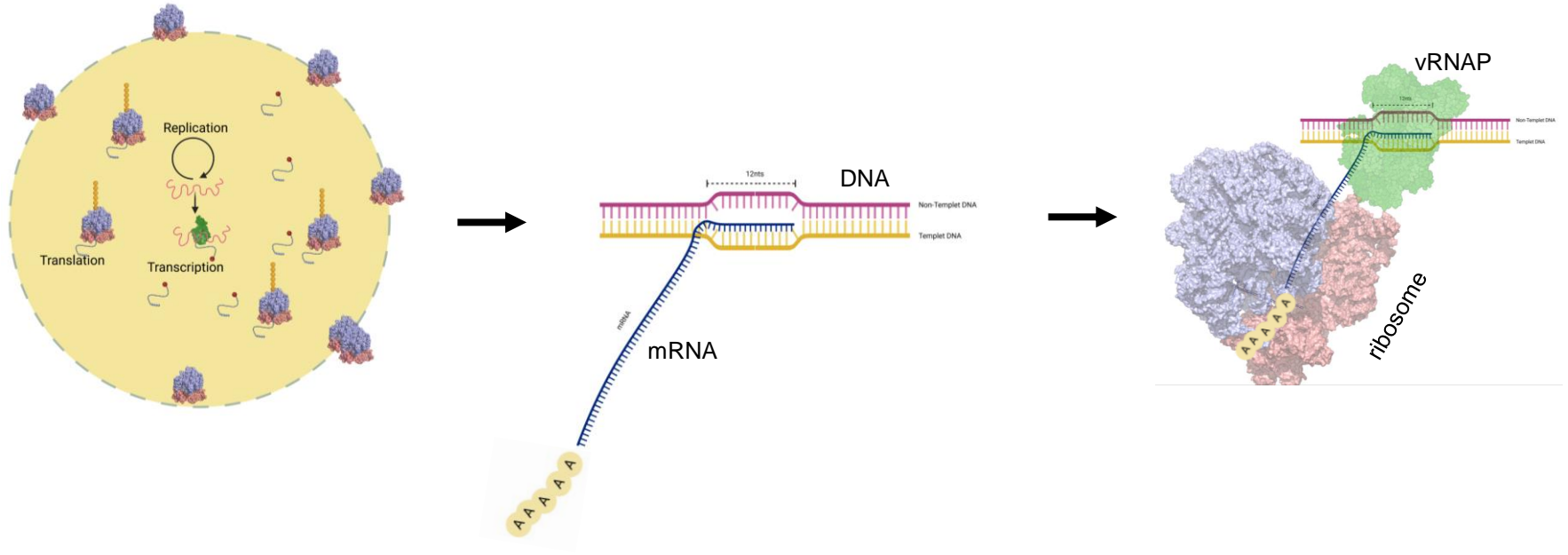


SDS PAGE gel

Ribosome modifications upon VACV late stage infection



In vitro reconstitution of CTT – future plans



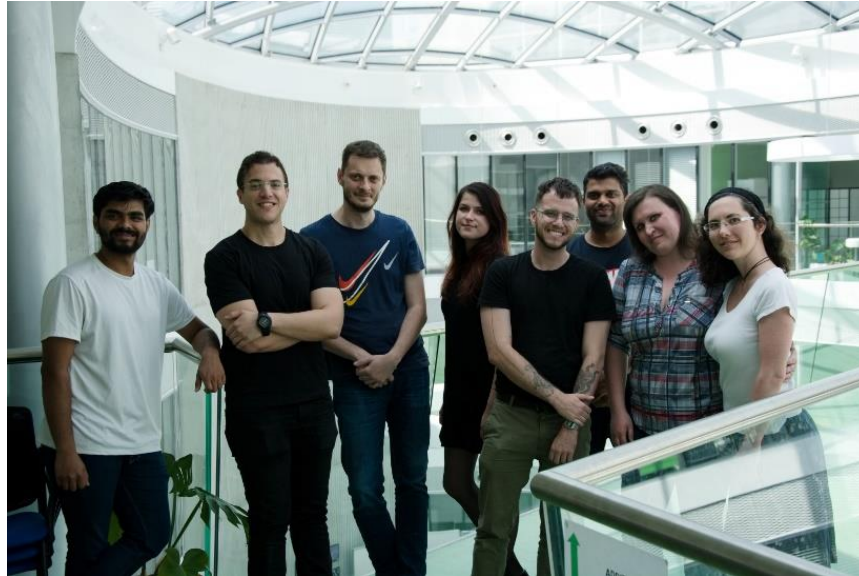
Acknowledgement

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Demo lab

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Thank you!

Gabriel Demo

gabriel.demo@ceitec.muni.cz

Institute of Organic Chemistry
and Biochemistry of the CAS

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