

50. Translation

1 unit, Heeseon An and Alban Ordureau, November 10, 2025

1) Components needed for translation;

- mRNA

- tRNA

- ribosomes

- initiation, elongation, and termination factors

2) Roles of these players in ensuring accuracy during the initiation, elongation, termination and recycling steps of the translation process

3) Quality control:

- How defective mRNAs are detected by ribosomes

- Degradation of faulty RNA and incompletely translated protein product

- recycling of the ribosome components

4) Relationship between protein levels and mRNA abundance.

Discussion Paper:

Simsek D, Tiu GC, Flynn RA, Byeon GW, Leppek K, Xu AF, Chang HY, Barna M. The Mammalian Ribo-interactome Reveals Ribosome Functional Diversity and Heterogeneity. *Cell*. 2017 Jun 1;169(6):1051-1065.e18. doi: 10.1016/j.cell.2017.05.022. PMID: 28575669; PMCID: PMC5548193.

Review Paper:

Schuller A and Green R. Roadblocks and resolutions in eukaryotic translation, *Nat Rev Mol Cell Biol* 2018 Aug;19(8):526-541. doi: 10.1038/s41580-018-0011-4.

Background paper:

Melnikov S, Ben-Shem A, Garreau de Loubresse N, et al., One core, two shells: bacterial and eukaryotic ribosomes. *Nat Struct Mol Biol*. 2012 Jun 5;19(6):560-7. doi: 10.1038/nsmb.2313