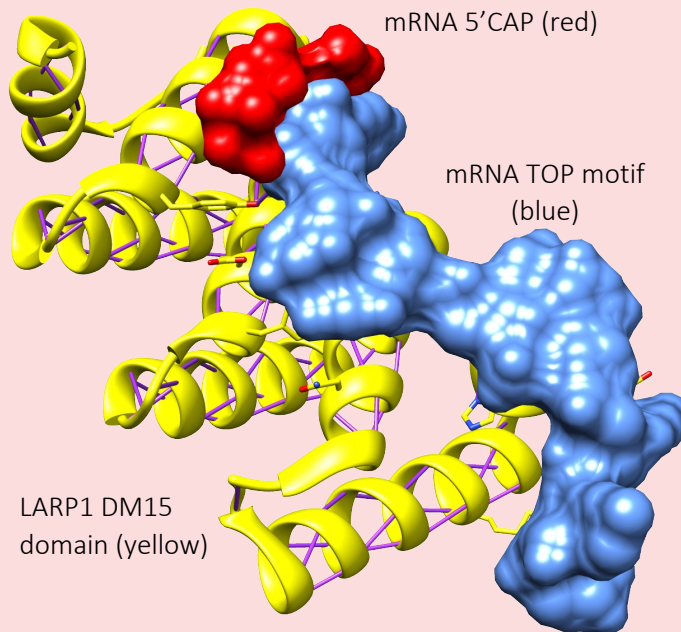


# RNA BINDING PROTEIN

5V7C



## STRUCTURE<sup>1,2</sup>

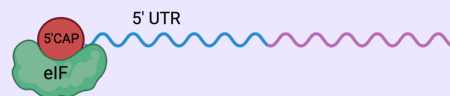
- LARP protein contains two RNA binding domains:
  - a 90 amino acid **La module** found in all LARP proteins
  - a C-terminal **DM15 domain** that is unique to LARP1
- La module binds to 3' of **polyA tail** of mRNAs
- positively charged amino acids on DM15 helices interact with the **5' UTR** of TOP mRNAs through ionic interactions and hydrogen bonds with the phosphate backbone of the mRNA

## LARP1

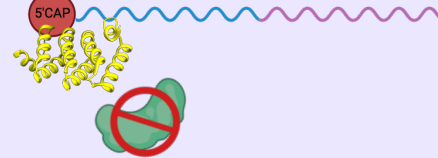
La-Related Protein 1

- represses translation of mRNAs that encode ribosomal proteins and translation factors
- stabilizes mRNAs

Initiation factor (eIF) binding leads to ribosome assembly and translation of mRNA



Binding of LARP1 prevents eIF from binding and translation cannot occur



## FUNCTION<sup>1,2</sup>

- under nutrient poor conditions, LARP1 prevents **translation** by binding to the **5'CAP** and the specific 5' UTR of TOP mRNAs that code for ribosomal proteins
- binding of the DM15 domain prevents the binding of translation initiation factors
- when nutrients are restored, the DM15 domain is phosphorylated and can no longer bind to RNA, and translation occurs.
- binding of the LARP1 to the polyA tail of mRNAs is thought to stabilize the mRNAs

## LARP1 in cancer<sup>2</sup>

- high levels of LARP1 have been found in some cancers, including ovarian, colorectal, cervical, and non-small cell lung cancer.
- in cancer cells, LARP1 has the opposite effect, stimulating translation instead of repressing it.
- why LARP1 has different effects in cancer cells is unknown, but it is thought that conditions in cancer cells prevent DM15 binding perhaps through phosphorylation.