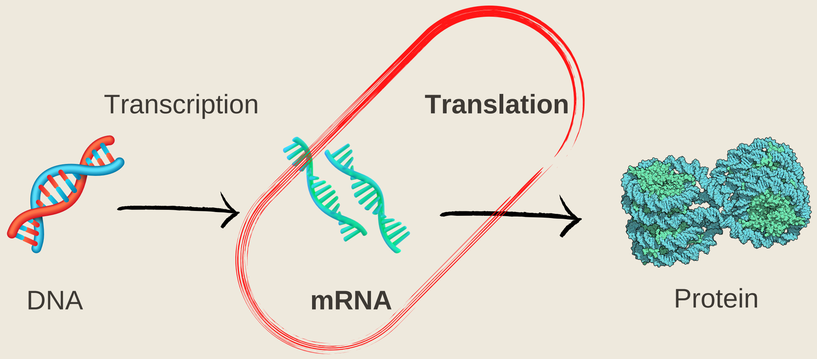
New insights into an ancient molecular tool

Erica Sterling, Deviyani Rao, **Olivia Rissland**
Biochemistry and Molecular Biology Department CU Anschutz Medical Campus

What is RNA and translation?



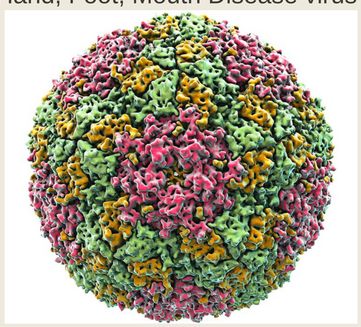
- Genes from DNA gets transcribed into mRNA
- mRNA gets translated into protein

What are 2A Peptides?

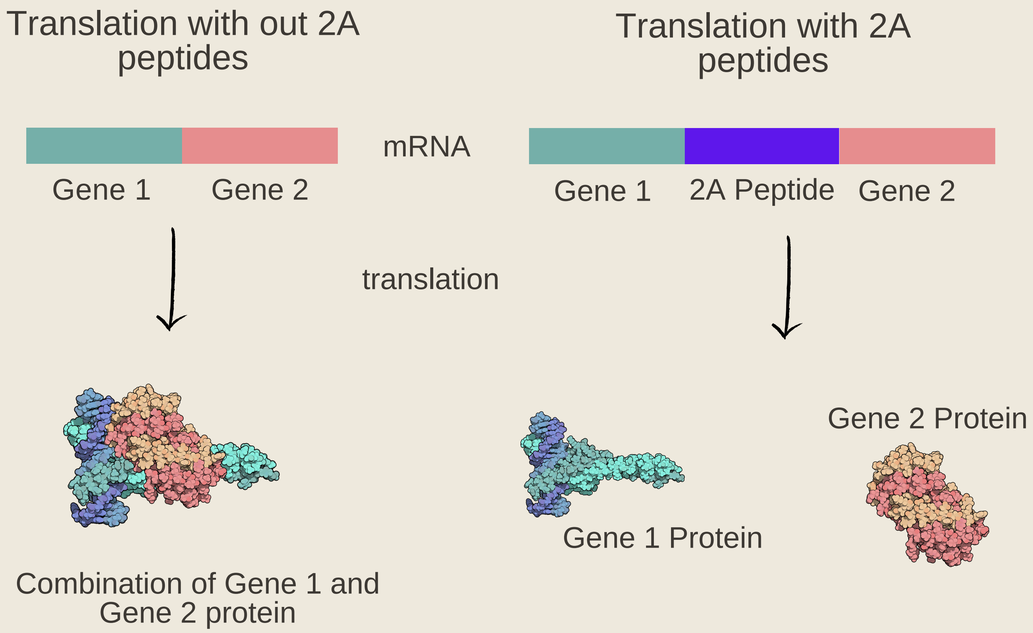
- Ancient molecular tool first discovered in viruses, such as the causative agent of hand, foot, mouth disease
  - some organisms other than viruses have 2A peptides
- Short sequence of mRNA
- Researchers and the biotechnology industry have used 2A peptides for decades

Hand, Foot, Mouth Disease

Hand, Foot, Mouth Disease virus



What do 2A peptides do?



In translation without 2A peptides, one protein is produced per mRNA transcript.

We end up with two separate and fully functional proteins.

How do 2A peptides work?

- We know 2A peptides result in 2 independent proteins
- We don't know how they achieve this

Research Goal:
understand how 2a peptides work

Sources

- Hand Foot Mouth Disease: What You Need To Know - Béaba USA (beabausa.com)
- Focus on Health: Hand foot and mouth disease (duncanjefferson.blogspot.com)
- https://www.canva.com

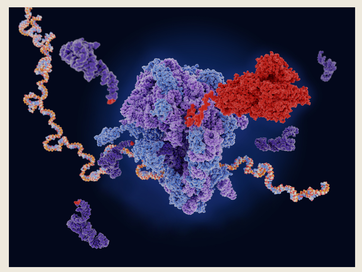
How am I doing this?

- Surprisingly, 2A peptides don't work well in *Giardia*
- We are using *Giardia* for this reason to study how 2A peptides work.

Why is this important?

Understanding how translation works could contribute to gene theraputics

Understanding how translation in *Giardia* works could lead to better treatment of *Giardia* infections.



Understanding how 2a peptides work will impact the broader field of RNA and translation.