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Most living organisms have their genes encoded in the sequence of DNA. The sequence of DNA of an organism is referred to as the genome. Genes and other features of the genome are precisely regulated, which is critical for most processes occurring in every cell. Eukaryotic organisms, which include animals, plants and fungi, have their cells divided into compartments. While most genes are present in the nucleus, some other subcellular organelles have their own genomes. These genomes can be traced back to bacterial cells incorporated into eukaryotic cells in the process of endosymbiosis. While much is known about the processes controlling nuclear genes, organellar genomes remain more mysterious. This is especially true for plastids, which are the organelles responsible for photosynthesis in plants and give them the green color.

The goal of this project is to advance our understanding of how plastid genomes are regulated. It is focused on two proteins. One has been proposed to cut a specific class of RNA. We will determine what types of RNAs are cut by this protein. We will also determine, which regions of the genome give rise to RNAs, which are cut by this protein. The second protein this project is focused on has also been proposed to bind RNA but its function is mostly unknown. We will determine its structure, which will allow us to establish its biological function. Overall, this project will advance our understanding of how genes encoded in plastid genomes are controlled.