CRISPR is one of the most significant advancements in the field of biology in recent years. CRISPR is a protein that can take a guide RNA and target regions in the cell’s DNA. The protein can ‘Find’ and ‘Cut’ similar to the ‘ctrl-f’ and ‘ctrl-x’ shortcuts if the cell’s DNA was a word document. CRISPR can allow us to change a cell’s DNA with a high degree of precision.

Recently, scientists have found that many cells are capable of resisting the ‘Cut’ function of this protein, either through innate immunity or killing themselves. However, the ‘Find’ function of the protein is still effective and is used by scientists in novel ways. One of these methods is called CRISPR activation (CRISPRa). CRISPRa uses CRISPR to increase the rate of specific DNA transcription, leading to greater protein expression. This method has numerous advantages over CRISPR such as being safer, reversible and more suitable for more complex screening techniques.

My research focuses on developing CRISPRa tools by modifying the CRISPR protein. Specifically, I attach various other proteins to the CRISPR protein which are able to attract RNA polymerase, an enzyme used for transcription. One such protein that attracts RNA polymerase is RpoD, a sigma factor which helps increase transcription during periods of fast growth in E.Coli.

Through the use of CRISPRa, it is possible to increase the output from a single gene selectively. This increased output can lead to more effective synthesis of various medicines created in bacteria.

Themes:
Check (highlight) the most applicable theme according to the abstract.

| Innovation and Technology | Health and Wellness | Culture and Society | Sustainability and Conservation |

Comments: Amend symbols to represent apostrophes. Robust primer of CRISPR and its applications. Consider minor edits for flow and for greater polish. All the best at MURC!