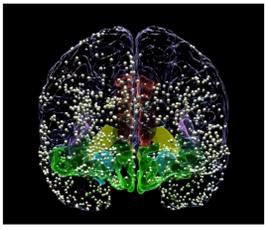Fall 11-15-2021

Micro-RNA, a Solution for Understanding Depression

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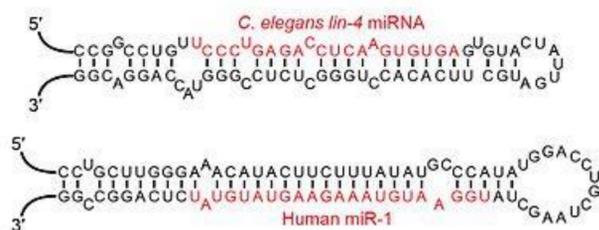# Micro-RNA, a Solution for Understanding Depression

Marshall White

Course: BIOL 488 Senior Capstone in Biology   Instructor: Dr. Mark Fink

Background

- Major depressive disorder is a mood disorder that affects one's feelings particularly individuals notice feelings of sadness and reluctant to perform daily human activities. This disorder leads to a variation of physical and emotional trouble. MDD is a hereditary disorder and geneticists are researching how certain genes can either trigger or protect this disorder.
- Micro-RNA is a single stranded noncoding RNA molecule. Their function include RNA silencing and regulates the process of coping DNA into RNA for gene expression. Some micro-RNAs have been linked with resilience or development to MDD.
- Gene therapy is an experimental technique which uses genes to prevent different medical conditions. Although this sounds good on paper the unknown risk in this method has resulted in continue research.

Aim of Research

- To determine how knowledge of MDD causing micro-RNA could attribute to the development of different medicines, therapies, and early prevention plans.

Hypothesis:

- If there is a full understanding of micro-RNAs that directly impact MDD, gene therapy could be implemented in certain individuals to treat their problem without the use of drugs.

Methods

Research different scientific papers on micro-RNA and its affect on depression
↓
Obtained information on how micro-RNA in different individuals causes this disorder
↓
Determine how this could be used for future research within depression therapies

Acknowledgments

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Conclusion

- Several micro-RNA interactions have been seen altered in animals and individual patients with depression.
- Due to the ability for a Micro-RNA to control the regulation and signaling for hundreds of target mRNA the ability for one person to produce could result in the over production or underproduction resulting in
- One being miR-30e having a positive correlation for depression and onset of the disorder. Another micro-RNA miR96 is found within the 5-HT1B receptor and its role is serotonergic signaling. Lastly miR-182 it targets an individual's circadian rhythm that can increase their vulnerability to depression. All three of these micro-RNA's can be attributed to the increased risk of depression.
- Mutations can be found within microRNA resulting in impaired regulatory function between individuals. This can make it hard for scientist to specifically pinpoint the reason to why certain micro-RNAs within depressed individuals is the cause to begin with.
- Therefore, many different studies need to be done to determine many differential expressions that patients with major depressive disorder.

Discussion

- The limited number of studies done on individuals with major depressive disorder makes it hard to identify more micro-RNAs that have a direct correlation.
- With this information these specific micro-RNAs can be used along with gene therapy and prevent someone that is genetically predisposed to this disorder.
- Animals are known to experience stress and depression just like humans therefore experiments can be done on them with gene therapy before human experimentation to determine short and long-term effects of this therapy.
- Lastly are people going to be accepting of this technology once its able to be used for human treatment. Due to the procedure done by replacing a mutated gene with one that is going to prevent it from developing. Many individuals who don't fully understand the science behind this treatment could be hesitant on trusting these new scientific techniques.

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