[Intracellular Bacterial Pathogen Vaccine Development Through the Use of Genomics]

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[Abstract]

Pathogenesis among bacterial species has allowed researchers to study various treatment options when dealing with diseases in humans caused by pathogenic microorganisms. The use of both antibiotics and vaccines are often used as treatment and preventative measures for infectious diseases. The current treatments for Lyme disease vary, but now there is a potential antibiotic method being proposed to help deal with post-treatment Lyme disease syndrome.

Introduction

As humans, we encounter different types of microorganisms daily. Some of the strains have the potential to be pathogenic or cause disease if a person were to be infected by a particular microbe. Lyme disease is an example of a disease transmitted from a vector to a host. A person can contract Lyme disease after being bitten by a tick. Borrelia burgdorferi is the pathogen responsible for Lyme disease, which can often lead to persistent symptoms in people who have already tried the treatment for the infection (Kullberg et al, 2020). The post-treatment of this disease is still being debated by researchers, in the hopes of one day having a more effective cure for the potential nerve damage that can arise in a person diagnosed with this disease. A study conducted by Zhang and associates aims to determine the efficiency of using antibiotics, such as ceftriaxone, in post- treatment of Lyme disease syndrome (Zhang et al, 2022). Before this study, the use of neurotropic drugs was often prescribed to patients to help with memory processes previously affected by the symptoms of this disease. However, the medications given only offered temporary relief. In regards to the research conducted by Zhang and collaborators, it was hypothesized that if the previous neurotropic drugs gave temporary relief then the use of antibiotics could be a more permanent solution for the treatment of post-treatment Lyme disease syndrome. This hypothesis has its drawbacks as certain criteria have to be met to be considered an effective regimen of post-treatment Lyme disease syndrome as the 2 | ©MRCMB 2012. All Rights Reserved. Microreviews in Cell and Molecular Biology Volume: 1. Issue: 1 (2012) 1-3 etiology, or cause of this condition is still unknown (Zhang et al, 2022).

Recent Progress

Progress within the study conducted by Zhang and collaborators relied on the use of Meta-analyses to prevent any bias when conducting the study. A literature search was conducted to gather a basis of prior studies using antibiotics as a treatment method for this syndrome. The search was conducted online through various research journals resulting in a total of 721 articles that were used all following the required guidelines to eliminate any prejudice before the beginning of the experiment (Zhang et al, 2022). The study itself had both included and excluded criteria when finding literature to use for the Meta-analyses. The included criteria for the study used articles containing randomized control trials, as well as any research containing people who had previously been diagnosed with post-treatment Lyme disease syndrome that had symptoms lasting longer than six months after their first diagnosis with Lyme disease (Zhang et al, 2022). Articles with measurable data were taken into account for the use of the Meta-analyses as well. Zhang and their fellow researchers did focus on adults aged 18 and older to have

more of a broad range in regards to the participants in all of the prior studies, as well as the final inclusive criteria being studies that contained a control group as well as a placebo group to determine the effectiveness of antibiotics given to participants in the control group (Zhang et al, 2022). Exclusion criteria for research done by Zhang and associates eliminated any studies without a control group, duplicate studies, and research that was not part of an original publication, such as reviews (Zhang et al, 2022). The use of the network meta-analysis allowed the researchers to then eliminate any articles that did not follow their set of guidelines. After removing articles that did not meet the necessary criteria a total of four articles were used for the full Meta-analyses for Zhang to test their hypothesis of using antibiotics to combat symptoms of post-treatment Lyme disease. Among the four articles that remained, there were 485 patients in total who were all over the age of 18, and all were from the same country (Zhang et al, 2022). A software system STATA 17.0 was used to compare sample sizes used in the four studies used in this experiment to compare the results of patients given the placebo and patients who were given antibiotics such as doxycycline, ceftriaxone, and uni (Zhang et al, 2022). The functional status scale (FSS) was also compared by the rate appearing at the beginning of the trials in the four different studies versus the rate at the end of the trials. A lower number in the results for the FSS helps the researchers know a patient is improving after being given antibiotics to alleviate their prolonged symptoms (Zhang et al, 2022). Once the Meta-analyses were constructed with the results of the studies through the use of the STATA 17.0 system, Zhang and others were able to determine the difference in the means or averages of patients given ceftriaxone, doxycycline, or the placebo (Zhang et al, 2022). Control groups who were given ceftriaxone in comparison to the other antibiotics and the placebo as well had a much lower RSS, which led the researchers to be able to determine those patients were improving based on the data collected (Zhang et al, 2022).

Discussion

The use of clinical antibiotics during post-treatment Lyme disease has had both positive and negative outcomes after a patient's exposure. People can have an improvement in their quality of life after taking the medication however, ingesting the antibiotics can begin causing them to live with various side effects. Zhang and collaborators discussed the rules and requirements within the study for subsequent research to be conducted (Zhang et al, 2022). In the study performed by Zhang, no side effects in participants as a result of the antibiotics throughout the study were reported in the publication. The antibiotic 2 | ©MRCMB 2012. All Rights Reserved. Microreviews in Cell and Molecular Biology Volume: 1. Issue: 1 (2012) 1-3 known as Ceftriaxone when given to participants struggling with post-treatment Lyme disease syndrome was discussed as having the lowest RSS when compared to the other antibiotics (Zhang et al, 2022). The difference in RSS data collected among participants of the four studies was not significant, but it did allow researchers to determine a difference in the effectiveness of the antibiotics for people with this diagnosis. Overall, the antibiotics were able to give patients relief from some symptoms brought on by their disease. However, the data collected as well as the results can differ from a person to person basis on which antibiotic treatment option may be best. Based on the data given in the article by Zhang and others, ceftriaxone had the best efficacy and lowest RSS among their studies. Zhang and fellow researchers wanted to be able to determine whether or not antibiotics would be effective in eliminating symptoms of post-treatment Lyme disease, because of this further studies relying on more therapeutic drugs can be conducted to compare results to determine if antibiotics as a treatment work just as well.

References

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