Evolution: GB Virus-C

New Mexico Supercomputing Challenge

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Team #: 060

Shiprock High School

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Executive Summary

- HIV:

A virus capable of virtually destabilizing a human's or an animal's immune system through destroying CD4+ T-cells (or, "Helper T-Cells") which fight viral infections. When the "breaking-down" process occurs, it is known as an Opportunistic Infection. In addition, HIV is a widely known predecessor to the deadly AIDS disease.

- AIDS:

Acquired Immunodeficiency Syndrome (AIDS) is a disease that has claimed millions of lives over the past decade alone. At present, millions of people have been diagnosed with AIDS. Furthermore, an entire generation of South American citizens is expected to be wiped-out by AIDS.

There is no cure for this disease…

- Why there is no cure:

HIV-1 (global) and HIV-2 (primarily isolated to South America) are mutanogenic viruses- meaning that these viruses do not keep their original form. They constantly mutate in order to survive and in order to fulfill their terrible chore. Therefore, it is a daunting task to develop a vaccine for this virus; whereas, it was easier to develop a vaccine for, per-say, smallpox.

- Experimentation:

Scientists have joined in an effort to develop a vaccine for the virus and for the disease but have not prevailed possibly due to the numerous HIV mutations. In the process of testing a possible vaccine on hundreds of infected persons in February 2003, hope was nearly crushed when it was discovered that the AIDS "Vax" was not

effective enough to kill the disease. However, the virus's mutation speed was efficiently inhibited when the Vax was administered to those who were infected for a certain amount of time. Therefore, scientists have begun redefining their research and altering their experimentation on creating a vaccine.

- Team 060's Further Discoveries on GB Virus C:

GB Virus C:

Continue research for more information concerning the effect that GB V-C has on HIV and/or AIDS.

GB Virus C research notations:

A virus capable of slowing HIV-iral mutation through a co-infection.

GB Virus C (GB v-C) is a virus believed to be capable of treating surviving patients of HIV. With administering a co-infection (combining GB v-C & HIV), team 060 has hypothesized that GB v-C may slow or neutralize HIV mutation.

About GB v-C:

- Related to the hepatitis C virus, but does NOT appear to cause liver disease. The GB v-C + HIV co-infection, has shown to be a successful method of treatment for HIV surviving patients. Cultures of peripheral-blood mononuclear cells infected with both viruses determined that GB v-C co-infection alters virus replication, meaning that with the co-infection our hypothesis on GB v-C ("does it work as far as slowing HIV mutation?") has shown positive results. The virus's infection significantly slowed HIV. In a study conducted

by top New England physicians and scientists, GB v-C Co-infection Testing was administered to 218 HIV infected patients. One-hundred and forty-four of which were administered a co-infection were reporting that the method was successful. Their test results showed that over a 4 year time-period, 56.4% of co-infected patients survived. A break through? Maybe so- but still many are very optimistic on whether or not the co-infection will work for them.

Introduction

Our **hypothesis** on GB v-C is simply: “Does it work when a co-infection is administered to an individual suffering from HIV?” The answer to that is: It does slow-down the HIV mutation process significantly. However, there is no cure to date for the current mutation HIV.

The **model** to describe this is in the facts and coding itself. The research or facts we have done came from top New England physicians and scientists, who have conducted a study on GB v-C. To show this model you would input a number of facts in the model and the coding will help you figure out how the study went. We did it to check the facts that were gathered from New England, as an outcome the coding revealed a similar comparison.

Project Description

Evolution: GB Virus-C is the result of our team's research and model development…

Method

The project was initiated in order for our team to gain an understanding of viral mutation and methods that could be used to slow-down or stop it. We found that working with HIV would be the easiest way to explore our hypothesis in the time that we were allotted, and within the time we had to open to our project.

As we delved deeper into our research we found that administering a co-infection of GB Virus-C to an HIV infected person hindered HIV mutation. Then in order to gain a better understanding to how successful the method of treatment is, we developed our code for what we named *Virus City*. *Virus City* is a mathematical simulation that takes into account the number of people infected, the amount of months it takes for the virus to infect more individuals and the number of those individuals, the do-infection treatment, percentage of the infected, and the percentage of those who've been treated successfully. The city gives you the statistics on a three-way bout; Time vs. Death vs. Survival.

Implementation

In order to run our code we used the program *MS-DOS/Java* to compile and simulate a population of a certain amount of infected citizens within a fictitious city. However, I believe that if we had used the program *Starlogo*, a more vivid and shocking simulation could've been developed. In addition, we also relied upon the internet to find more information concerning GB Virus-C, and the *New England Journal of Medicine*'s article related to GB Virus-C co-infection.

We also used the programs *Microsoft Word* and *Microsoft PowerPoint* to bring you this presentation of how HIV's "death process" can be slowed.

Results/Conclusion

The results of our coding had given us what we had hoped for in the beginning, which was administering a co-infection of GB Virus-C would slow-down the mortality and infection rate of *Virus City*. The co-infections within our code were a successful method in treating HIV infected citizens. As where in the real world, it is a successful method as well.

Recommendations

Our team recommends to you that this project be kept in mind for next year's SuperComputing Challenge. Reason for this is because HIV is a very serious disease plaguing our world today and it is necessary to continue research on a way to de-evolve the virus or cease its existence completely. Finding that GB Virus-C co-infection is a successful method of treatment, both in model and in life, the knowledge should be spread, and what knowledge that has been gained *must* be elaborated on by another team.

Good Luck…

Acknowledgements

We'd like to give thanks to the people that have helped us in the process of "completing" this project. Thanks to…

1. Eric Ovaska- Java
2. James Taylor- Starlogo (although we didn't use it)
3. Levi Valdez- for lending a hand to our team in completing our code.
4. Mrs. Noble- Sponsor
5. Mrs. Hines- Sponsor
6. Mrs. Johnson- Sponsor

References

1. the Internet

2. *New England Journal of Medicine*

Appendix A – Code

CODING/MODEL: VIRUS CITY

```
import javax.swing.JOptionPane;


public class team060
{

     public static void main (String args[])
    {
         String boy, Num1;
          int virus1, vir1, vir2, vir3, vir4;

 boy = JOptionPane.showInputDialog("What's your name?");

      JOptionPane.showMessageDialog(null, "Hello " + boy);

 Num1 = JOptionPane.showInputDialog("Enter virus number");

       JOptionPane.showMessageDialog(null, "People with the virus: " + Num1);


          virus1 = Integer.parseInt(Num1);
         vir1 = (virus1 * 2)* 2;

  JOptionPane.showMessageDialog(null, "Infection rate in four months: " + vir1);

           vir2 = (vir1 * 2)* 2;

  JOptionPane.showMessageDialog(null, "Infection rate in six months: " + vir2);

          vir3 = (vir1 * 2)* 2 * 2;

  JOptionPane.showMessageDialog(null, "Infection rate in eight months: " + vir3);

          vir4 = (vir1 * 2)* 2 * 2 * 2;
  JOptionPane.showMessageDialog(null, "Infection rate in twelve months: " + vir4);

       String Num2;
         int virus2, vir5;
      Num2 = JOptionPane.showInputDialog("Enter immunity number");

      JOptionPane.showMessageDialog(null, "Immunity is: " + Num2);
```

```
        JOptionPane.showMessageDialog(null, "Number of people with the Immunity:
" + Num2);
                    virus2 = Integer.parseInt(Num2);



         JOptionPane.showInputDialog("Enter the population");
         JOptionPane.showMessageDialog(null, "The percentage is:");


         System.exit(0);

        }
}
```