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## Human to beast: A scientific examination of the Bloodborne curse

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### Abstract

In the computer game titled Bloodborne, the people/enemies you encounter have all turned or are in the process of turning into beasts. This is due to them imbibing a type of blood that originally had healing properties but was also cursed to transform anyone into a beast if too much was consumed. This paper aims to comprehend and explain this curse in a scientific context by looking at multiple possibilities as to how the curse comes about.

**Keywords:** *Computer game; Biology; Virus; Parasite; Beasts; Bloodborne*

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### Introduction

In the world of Bloodborne, the inhabitants of the fictional town of Yarnham are afflicted by a curse that transforms them into beasts (see Figure 1) [1]. This is attributed to a cursed ancient blood that the citizens initially used for its healing properties, but over time has turned all of them into beasts. This paper attempts to analyse this from a scientific perspective to discern how the blood turns a person into a beast. Multiple ideas, such as a bloodborne virus or parasite, will be examined in an attempt to gain insight into the cause of the beast plague.



Figure 1 – An image of an enemy from the game called a Huntsman. They are people who are being slowly turned into beasts due to their infection [2].

### Virulent pathogen

One possible cause of the bloodborne curse is the presence of a virus in the blood. Viruses infect an organism's cells by either attaching themselves to specific proteins on the outer plasma membrane or entering a cell after being engulfed by an endosome (see Figure 2) [3]. The virus then injects its genetic material into the cell, which is incorporated into the cell's genetic code, and the cell starts to propagate more viruses. What is observed in Bloodborne can be compared to a type of virus called a *Lyssavirus*. A widely known kind of *lyssavirus* is the rabies virus, which can cause symptoms such as a feeling of anxiety or aggression as well as experiencing hallucinations [4]. These symptoms occur when the infection spreads to the brain, particularly the limbic system [5]. This would explain certain behaviours and ideas presented throughout the game. Another possible kind of virus is a retrovirus. Unlike other viruses, retroviruses have RNA as their genetic material [6]. When they infect a cell, the RNA code is reverse transcribed by an enzyme called reverse transcriptase into a DNA code, which is then inserted into the cell's genetic code. Retroviruses are known to cause cancer by causing mutations in specific genes, which affects the cell growth and differentiation process [6]. This could be a possible explanation for the inhuman forms the beasts take in-game as their appearance could be a result of uncontrolled cell growth. A type of retrovirus called HIV could also give some insight into the mental

deterioration the people suffer; if HIV infects glial cells around neurons, it can cause forgetfulness and changes in behaviour [7]. This can be evidenced in-game as a character, Father Gascoigne, is reminded of his humanity and his daughter when he hears the sound of her music box. Additionally, in both cases, the viruses can stay dormant for extended periods of time, which may provide an explanation for the slow progression from human to beast.

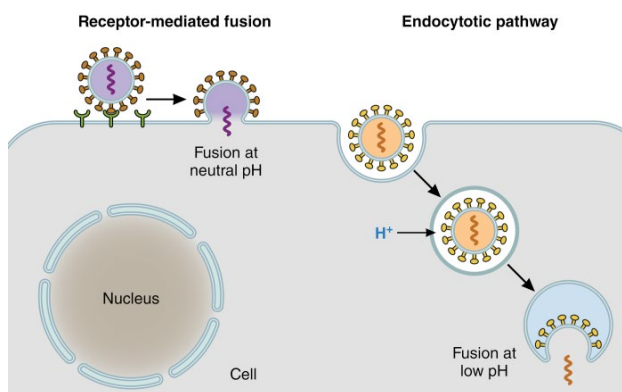


Figure 2 – A diagram displaying the process by which a virus infects a host cell either by receptor-mediated fusion or via the endocytotic pathway [3].

### Bloodborne parasite

Another possibility is that the blood contains a parasite. The most likely candidate is a protozoan parasite similar to *Toxoplasma gondii*. This parasite is commonly found in domestic cats, particularly if they hunt or are fed raw meat. *Toxoplasma gondii* is a good comparison to make, as in order to infect a cat, it can change the behaviour of an infected rodent [8]. It can cause things like a loss of fear and memory deficits, which allow the parasite to spread and reproduce as the infected rodent is more likely to be found and subsequently eaten by a cat. A second parasite worth examining is a parasitic worm or a helminth. To protect themselves from the immune system, helminths can release proteins such as proteases and glycolytic enzymes, which can modulate various immune systems [9]. It is possible that the fictional parasite could release a protein or proteins that alter the genetic code of the host in such a way that it changes their physical appearance and promotes the growth of new structures like

larger teeth and claws. Also, parasites have multiple ways of staying dormant or avoiding the immune system so that if they do promote physical changes, the rate at which they do so may be slowed in order to avoid detection.

### Abnormal protein

A third possibility is that there are prion or prion-like proteins in the blood. Prion proteins are misfolded proteins that can influence other proteins to misfold, which can lead to brain damage [10]. If the buildup of the abnormal proteins becomes significant enough, it can lead to changes in personality and memory problems. This can be compared to the behaviours seen in *Bloodborne*. However, there is no real-world prion that affects cell and tissue growth, so for the changes seen in-game to occur, the fictional protein would affect cells in a different way. Instead of a prion destroying cells, the misfolded protein could trigger mutations in structural proteins like collagen or actin, which would lead to abnormal tissue growth and the development of beast-like features.

### Conclusion

In conclusion, there are multiple possibilities for how the ancient blood could transform a person into a beast. For each suggested possibility, they have been compared to real-world examples to try and gain a better understanding of how each of them would go about causing the transformation. For example, how the *Toxoplasma gondii* parasite can change the behaviour of infected rodents to make them more likely to be eaten by a cat to allow the parasite to reproduce. In some cases, there is no real-world example to draw from to explain an aspect of the curse. Based on the information presented, a virulent pathogen in the blood is the most likely candidate, as there are more real-world examples to draw upon and make comparisons to. It would be increasingly less likely for a parasite and an abnormal protein to possess all the desired traits to turn someone into a beast, particularly for abnormal proteins, as there are no real-world examples of one affecting tissue/cell growth.

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