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## Explaining the Vampire Legend through Disease

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## **Cover Page Footnote**

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# Explaining the Vampire Legend through Disease

*Cydney J. Christner*

## INTRODUCTION

Vampires have continually been depicted in literary and cinematic works as pale, undead human beings that consume the blood of the living.<sup>4,7,19</sup> Evidence that vampires were a part of culture before they grew in fiction has been observed in ancient burial rituals known as apotropaic observances, which consisted of practices to prevent evil.<sup>8</sup> Excavation of a cemetery in Poland dated between the 17<sup>th</sup> and 18<sup>th</sup> centuries uncovered several abnormal burials in which apotropaic practices were used. These burials included sickles placed over the neck or abdomen of the deceased, large stones placed under the chin in a few of the cases, and coins placed with the body or under the tongue that were intended to ward off evil spirits.<sup>8</sup> What made these individuals feared by their community enough to take measures to prevent them from returning from the dead? This paper explores the plausibility that the fictitious depiction of vampires and apotropaic observances of past burials could have been fueled by individuals infected with various diseases and engaging in cult activity.

## SEPARATING THE VAMPIRE MYTH FROM PLAUSIBLE REALITY

Vampires are commonly depicted as pale, undead creatures.<sup>4,7,19</sup> A few depictions attribute unnaturally glistening skin to these undead along with the presence of blood in their sweat, as in Anne Rice's book *Interview with the Vampire*.<sup>19</sup> Rice's depiction of the vampire also features smoldering, brilliantly colored eyes.<sup>19</sup> In *I Am Legend* they are unkempt creatures with long, greasy hair and red spots staining their teeth while *Cirque du Freak* portrays them with long, thick nails that are abnormally colored.<sup>13,23</sup> The movie *Byzantium* attributes vampires with the ability to protract and retract a single fingernail at will.<sup>9</sup> Vampires are reported to give off a

putrid smell, both of body and breath. Specifically, their breath is able to knock out a human, as in *Cirque du Freak*.<sup>10,13,21,23</sup> They are able to change the shape of their face and possess superhuman strength and the ability to fly.<sup>7,10,21</sup> Mirrors and crosses are repellents of vampires, and when exposed to sunlight, a vampire will disintegrate.<sup>13,19</sup> The process of becoming a vampire is a ritual of drinking blood along with killing human beings. Through this process, the vampire's body dies and the transformation is complete.<sup>19,21,23</sup> From the blood of their victims, the vampires believe they can soak up their victims' memories.<sup>23</sup> Vampires also show a dysfunction in sexual behavior in which sexual behaviors are accompanied or completely replaced by rituals of murder and/ or drinking blood.<sup>19</sup>

### **PLAUSIBLE VAMPIRE CHARACTERISTICS**

While not all of these characteristics are plausible, a person that is considered to be a vampire displays many of the following plausible symptoms. A vampire presents a sickly pallor with skin that appears to glisten and their eyes appear to be a smoldering, brilliant color.<sup>19</sup> They have strong, thick nails that are abnormally colored; long, greasy unkempt hair, and they give off a putrid body odor.<sup>4,10,13,19,23</sup> The teeth of a vampire are stained and their breath has a terrible odor.<sup>13,21,23</sup> Vampires possess extraordinary strength, which gives the impression they can fly at times.<sup>7,10</sup> They show an aversion toward mirrors and the cross and may present a dysfunction in sexual behavior and perverse ideas pertaining to themselves, others, and certain objects that may be characteristic of mental disease and which may tie them to an organization or cult based on these believed ideas or delusions.<sup>10,13,19,21,23</sup>

### **PORPHYRIA CUTANEA TARDA**

The plausibility of a vampire having pale skin could be the result of porphyria cutanea tarda (PCT). Porphyria cutanea tarda is a disease that affects the liver.<sup>17</sup> An enzyme called

uroporphyrinogen decarboxylase (UROD), found in the liver, has decreased function in PCT, which leads to an increase in the amount of porphyrins formed in the liver.<sup>17</sup> These porphyrins are deposited in the skin and, when in contact with sunlight, cause lesions and blisters to form.<sup>17</sup> A person with this disease would likely avoid the sun at all costs to prevent blisters and lesions from forming; therefore, they would have significantly less sun exposure accounting for a pale appearance. This disease would also account for the depiction that they disintegrate in sunlight because they can lose superficial features such as their nose and ears, and even fingers,<sup>17</sup> however it is more of a slow disintegration over a long period of time rather than a sudden combustion. It is known that a vampire drinks blood in some of their rituals and PCT is linked with iron overload,<sup>17</sup> therefore through the increase of iron absorption by drinking blood a vampire could unintentionally develop PCT. Other than iron overload, PCT can be caused by several other factors including hemochromatosis protein mutation or UROD mutation (either inherited or not), lifestyle factors such as alcohol consumption and smoking, increase in estrogen, and viral infections.<sup>17</sup> Some individuals may be genetically predisposed by inheriting a deficiency of the UROD enzyme and when combined with the factors previously described may lead to the development of PCT.

### **HYPERHIDROSIS**

The depiction that vampires glisten can be attributed to hyperhidrosis. Hyperhidrosis is a condition in which the body produces excessive amounts of sweat,<sup>5</sup> which would cause the vampire to have a constant sheen of sweat that could be mistaken for glistening or sparkling skin. Hyperhidrosis is either primary or secondary. In primary hyperhidrosis, the cause of the increased sweating is unknown. In secondary cases, the cause is either an underlying medical

problem, such as diabetic hypoglycemia, or a symptom of medication use, such as birth control, Accutane, opiates, and antidepressants.<sup>5</sup>

### **CHROMHIDROSIS**

While vampires produce an abnormal amount of sweat, this sweat has been observed to contain blood at times. A condition called chromhidrosis is a disorder in which colored sweat is secreted primarily on the face and in the axillary region.<sup>22</sup> Sweat can appear brown which could be mistaken for blood. An accumulation of lipofuscin granules, yellowish brown in color, occurs in the secretory cells causing chromhidrosis, but the cause of the excessive accumulation of these granules is unknown.<sup>22</sup> Different dyes and drugs can cause this condition when ingested; normal, clear sweat can interact with dyes, fungi, and bacteria on the skin and change the color of the sweat.<sup>22</sup>

### **TRIMETHYLAMINURIA**

A putrid odor is characteristic of vampire depictions.<sup>10</sup> Trimethylaminuria may be the root of this putrid odor. Trimethylaminuria, also known as fish odor syndrome (FOS), is characterized by an odor of rotting fish produced by the sweat, urine, and breath.<sup>14</sup> In the liver, flavin monooxygenase 3 (FMO3) is an enzyme that oxidizes the compound trimethylamine (TMA) into the non-odorous compound trimethylamine-N-oxide (TMAO).<sup>14</sup> However, in FOS there is either an inadequate production or a large amount of dysfunctional FMO3, wherein TMA is not metabolized properly leading to an excessive output of the fowl smelling TMA.<sup>14</sup> This disorder is most commonly an inherited deficiency in FMO3. However, precursors such as liver and kidney disease, excessive bacterial growth, and excessive intake of certain compounds for treatments and in medications, such as the intake of choline in treating Alzheimer's disease, can lead to FOS as a secondary case.<sup>14</sup> Increased perspiration, which a vampire produces due to

hyperhidrosis, increases the intensity of the foul odor because TMA is present in sweat. Poor hygiene may promote the symptoms of FOS and vampires are commonly characterized by long, greasy hair,<sup>13</sup> an indicator of poor hygiene.

### **POSTGANGLIONIC HORNER'S SYNDROME**

Vampires are typically observed to have an odd appearance of the eyes and nails, and staining of their teeth.<sup>13,19,23</sup> The odd appearance of the eyes could be a symptom of Horner's syndrome.<sup>9</sup> This affects the size of the pupils and some facial features around the eye. Looking specifically at postganglionic Horner's syndrome, any type of lesion that blocks the neural signals going from the hypothalamus to the eye can cause Horner's syndrome.<sup>9</sup> These lesions are usually the result of some type of trauma or surgery. An underlying disease, such as cancer, may also be a contributing factor along with compression of nerves. It is possible that Horner's syndrome is a congenital disease, but rarely does this occur.<sup>9</sup> Horner's syndrome is accompanied by the symptoms of miosis, or pupil constriction, and drooping of the eyelid, also known as ptosis, on the same side of the face as the lesion. Unlike other forms of Horner's syndrome, postganglionic Horner's syndrome is not accompanied by anhidrosis, or a lack of sweating, on the affected side of the face.<sup>18</sup> A final symptom of Horner's syndrome is iris hypochromia on the affected side, which is usually associated with acquiring Horner's syndrome early in life, either congenitally or through trauma in the first few years of life.<sup>9</sup> This syndrome could cause an unusual appearance of the eyes, giving them a brilliantly colored appearance with a differentiation of iris coloration associated with hypochromia. Squinting in one eye along with a decreased pupil size in that eye, compared to the other eye, can give the vampire a sort of deranged appearance.

### **JADASSOHN LEWANDOWSKY SYNDROME**

Long, dark nails that could be the result of Jadassohn Lewandowsky syndrome often characterize vampires.<sup>16</sup> Long nails that look like claws or rams horns are characteristic of this syndrome and may be accompanied by thickened skin on the palms and soles of the feet, white patches in the mouth, follicular keratosis, and blisters.<sup>16</sup> Mutations in the genes encoding for keratin is the cause of this syndrome and these mutations can either be inherited or occur spontaneously.<sup>16</sup> These mutations cause subungual hyperkeratosis to occur, which is the overproduction of a yellowish keratin in the skin underneath the nail.<sup>16</sup> This keratin builds up underneath the nail, lifting the nail from the nail bed and causing the nail to become thickened and discolored.

### **METHAMPHETAMINE**

Stains on the teeth could be a symptom of methamphetamine use. Methamphetamine users are known to have an increased amount of dental caries compared to non-users due to a decrease in saliva production, an increase in consumption of sugary drinks, and poor oral hygiene. Direct contact with methamphetamine and the teeth was found to have an insignificant role in the formation of dental caries.<sup>2</sup> Methamphetamine increases the amount of norepinephrine in the brain, which binds to alpha-2 receptors and causes a decrease in the production of saliva.<sup>20</sup> Meth users, on average, opt for sugary drinks to relieve their dry mouth. This preference combined with poor oral hygiene leads to an increase in stains and dental caries that can appear reddish-brown. Stains and cavities may be mistaken for abnormal red spots that resemble blood.

Methamphetamine use not only affects the teeth, but also has psychological implications. Some symptoms include: agitation, violence, hallucinations, and delusions, often times paranoid delusions.<sup>6</sup> Meth can lead to psychoses similar to those exhibited by people with schizophrenia

and may even unmask schizophrenia in undiagnosed individuals.<sup>20</sup> This could be a contributing factor in which an individual believes himself or herself to be a vampire.

### **SCHIZOPHRENIA**

Schizophrenia is a complex disease. According to research, genes, the environment, and imbalances of neurotransmitters all influence the development of this disease. Delusions, either monothematic or polythematic, and hallucinations are often signs of schizophrenia.

Monothematic delusions are one or more delusional beliefs that pertain to a single theme while polythematic delusions are beliefs pertaining to several different themes.<sup>3</sup> An individual suffering from both schizophrenia and meth addiction could present with monothematic delusions based around vampirism. One example of a delusion is the belief that through drinking the blood of their victims, they can soak up their memories. A common delusion experienced by people with schizophrenia that could also be included in this vampire theme is the Cotard delusion in which an individual believes they are dead.<sup>3</sup> So, when an individual goes through the ritual to become a vampire, they may actually believe they have died due to Cotard delusion. The symptoms of agitation and violence presented by meth addiction along with this monothematic delusion could lead the individual to commit crimes, specifically murder, because they believe they are a vampire.

### **ANABOLIC STEROIDS**

It is plausible that, other than methamphetamine use, a “vampire” may also use anabolic steroids. Anabolic steroids affect regions of the brain that control anger and aggression, mainly in the hypothalamus. They alter the expression of estrogen receptors, decrease serotonin levels, and suppress 5-HT1A-R receptors while increasing activity of 5-HT2A-R receptors.<sup>1</sup> Serotonin functions in the hypothalamus by causing the release of vasopressin (AVP), which regulates

aggression; therefore, the decreased serotonin levels associated with steroid use inhibit the release of AVP leading to aggressive behaviors. Activation of dopamine receptors from steroid use also inhibits the release of AVP.<sup>1</sup> The aggressive behavior and outbursts of anger exhibited by a vampire using steroids may make one mistake their face contorting in anger for their face changing shape. Increased strength and stamina from steroid use would give a vampire exaggerated strength and the ability to jump higher or farther than normal, making one perceive them as being able to fly or possessing superhuman strength as associated with vampires.<sup>7,10,21</sup>

### **BORDERLINE PERSONALITY DISORDER**

Self-loathing can be observed in people with borderline personality disorder (BPD). Someone with this disorder may experience disgust with oneself and have a sense of irreparable badness, repulsiveness, or essentially being flawed.<sup>11</sup> This could be the reason that the characterization of vampires is that they avoid mirrors.<sup>13</sup> They may be so disgusted with themselves that they cannot and will not look at their reflection because they abhor who and what they see. Borderline personality disorder can also be expressed as a distorted sense of self. Believing oneself to be a vampire is an example of this symptom. Other symptoms of BPD include intense and uncontrollable anger, and impulsive behaviors that may be dangerous. The characteristics of BPD also explain the tendency of “vampires” to avoid crosses. Several depictions of vampires present them as being repelled by a cross. Therefore, an individual with beliefs of being a vampire and being inherently bad may avoid any cross. Not because they are actually repelled by it, but fear being repelled by it.

### **SHARED PSYCHOTIC DISORDER AND INDUCED DELUSIONAL DISORDER**

In this study of vampires, it is believed that vampires belong to cults. Cults offer an individual a place to belong,<sup>15</sup> which an individual with the aforementioned disorders and

vampiristic beliefs may be seeking. Within a cult it is possible to see shared psychotic disorder (SPD) and induced delusional disorder (IDD), in which a person with delusional beliefs transfers or shares those beliefs among two or more people who are highly impressionable.<sup>12</sup> Oftentimes in SPD and IDD, sexual delusions are also reported.<sup>12</sup> Thus, a person considered to be a vampire may not exhibit any sexual dysfunctions, but upon joining a cult in which they feel they belong, they may acquire a sexual dysfunction. A dysfunction may be murdering people or drinking blood accompanied by sexual behaviors or in place of sexual behaviors.

### CONCLUSION

Vampires are often depicted in modern culture and have been throughout recent human history, but are any of these depictions realistic? In *Interview with the Vampire*, Anne Rice describes vampires as pale, glistening humans with intensely colored eyes.<sup>19</sup> She could be describing an individual with porphyria cutanea tarda which could cause pale skin due to lack of sun exposure. The glistening skin could be attributed to hyperhidrosis, an excessive output of sweat. The 1992 movie depiction of Bram Stoker's *Dracula* portrays Dracula with long, discolored fingernails,<sup>4</sup> while Richard Matheson describes vampires with long, greasy hair in his book *I Am Legend*.<sup>13</sup> Fish odor syndrome, intensified by hyperhidrosis, could cause a vampire to give off a putrid smell and foul breath. Their long fingernails could be caused by the over production of keratin known as Jadassohn Lewandowsky syndrome. Psychological disorders, such as schizophrenia and borderline personality disorder, along with methamphetamine-induced delusions could contribute to the cult-like characteristics and beliefs vampires project. These characteristics include vampires' repulsion towards crosses and mirrors,<sup>13</sup> meanings they tie to blood<sup>23</sup> and the drinking of blood,<sup>21</sup> the transformation process of becoming a vampire, and the belief they have that they are dead.<sup>4,10,13,19,21,23</sup> Shared psychotic disorder and induced delusional

disorder could cause a vampire suffering from schizophrenia with the delusions previously mentioned to project those delusions on another individual, creating a cult.

A person possessing several of these diseases and disorders could have been sequestered from society and an apotropaic burial may have been warranted in an age where medical knowledge wasn't as expansive as it is today. With a lack of knowledge it is understandable that a society would turn to superstition to explain differences in individuals, and those superstitions likely made the individuals in question feel removed from society. It is fair to say a vampire may just be a disease-ridden human, rejected by society due to their differences.

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