

Scientific Analysis of Tru Blood

In the pursuit of understanding between human and vampire, I have devoted all of my spare waking hours to completing a preliminary analysis of the four proprietary formulas in the “TruBlood” product line. Using the resources available to me through my laboratory position, I feel I am getting close to understanding the biological needs of the Vampire. I am apprehensive about the possibility that my investigations will be misinterpreted by individuals or institutions as being of ill intent. I want to assure everyone that my research is intended for the betterment of all. I regret that I must take steps to protect my employment status and personal well being by posting this information anonymously via open forum, and so will be unable to communicate directly fellow researchers. In looking for alternatives to academic publication, I quickly realized that Bloodcopy could be a more direct route to the intended audience of this material. It is my hope that this summary will spark discussion, or at least that the diverse readership of Bloodcopy will find this topic of immediate relevance. Thank you for your audience...

First off, I'd like to say that these four specimens are unlike any synthetic blood product that I have yet seen here in the US. To illustrate this fact, I will present some background on synthetic blood.

Blood replacements that are intended for use in humans tend to be either clear saltwater infusions intended to prevent shock immediately following blood loss or more sophisticated preparations intended to mimic blood's oxygen carrying capacity for longer term support. These oxygen carrying versions can be more properly called synthetic blood and I have been curious if “TruBlood” would be a derivative of one of these. If conventional wisdom is to be given any credence, vampires tend to feed from arteries rather than veins suggesting that oxygenated blood is preferable, so this might be an important component of their nutrition.

Of the oxygen carrying kinds of synthetic blood, I immediately ruled out perfluorocarbon based substances (PFCs) based on the fact that they tend to be milky white and do not contain cells of any kind. Perfluorocarbon by itself is a colorless fluid that was developed during the Manhattan project -capable of carrying oxygen so efficiently that it has been investigated as a substitute to gas breathing for deep sea divers and is currently approved as a blood replacement in Mexico with clinical trials results pending around the world. Perhaps the fact that PFCs are simply breathed out through the lungs when no longer useful in the blood stream could mean that they wouldn't provide any lasting nutrient to the vampire's super efficient biology. Maybe the flu-like symptoms that go along with PFC exhalation would be particularly painful to

vampires. I can't properly speculate, as I don't actually know if they “breathe” (in the sense that we do) at all.

The other form of synthetic blood technology is focused around hemoglobin- the oxygen carrying molecule at the center of each natural red blood cell. It is from Hemoglobin's Iron core that blood (and all hemoglobin based synthetic blood) receives its characteristic red color. The hemoglobin in these synthetics can be gotten from a variety of sources including expired human blood, cow blood, human placentas, and from bacteria that are genetically modified to produce hemoglobin (**figure a**). In humans, bare hemoglobin breaks down rapidly in to a substance that is extremely toxic, so hemoglobin must be married to other substances before it can be safely used in human systems. Hemoglobin based oxygen carriers (HBOCs) therefore contain hemoglobin joined with substances varying from other hemoglobin molecules to plastics with varying degrees of tolerability in human systems. Hemoglobin that has been bound for safety is still tiny compared to normal red blood cells, allowing it to seep in to unusual places -and there is also evidence that this minimal amount of binding has been insufficient to prevent toxicity in some cases. The effects of this in patients

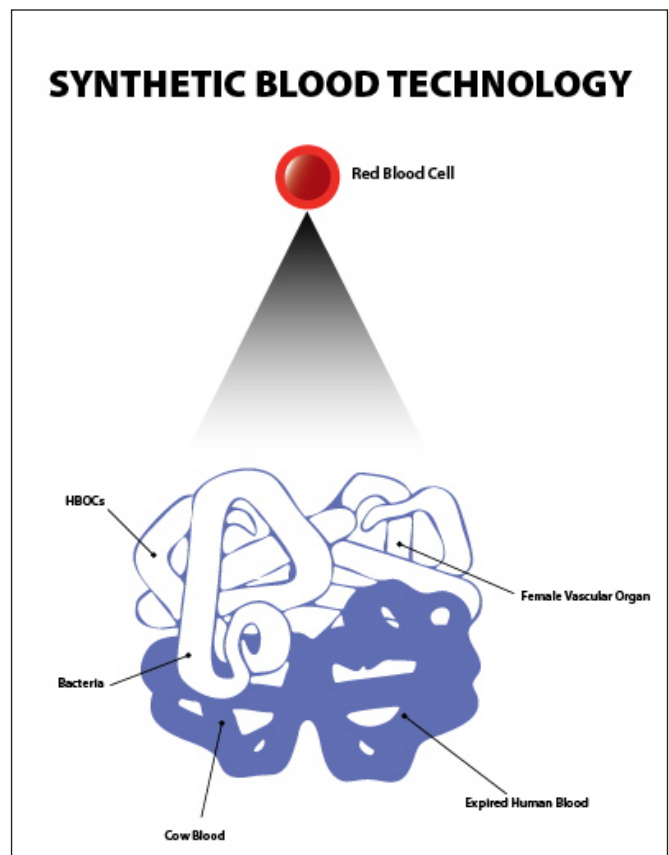


figure a

using HBOCs can be seen in flushing of the skin, redness in the eyes, and abdominal cramping where toxicity is present. Nevertheless HBOCs are being used in South Africa at this moment and development of new varieties of HBOCs is ongoing. These HBOCs are being developed for long shelf life, ease of transport (some may be stored dried or as a paste), and to have no blood type specificity so that they can be administered to any person in need.

A more recent development in the world of synthetic blood is the advent of the artificial red blood cell. It is a hemoglobin molecule surrounded by fluid and enzymes that is wrapped in a synthetic membrane made of materials similar to those surrounding natural red blood cells. This design may solve the problems associated with hemoglobin toxicity and allow the synthetic to take on some additional roles of red blood cells. This had been my favored candidate for "Tru Blood" because it seemed likely to be the closest synthetic to real red blood cells. I suspect that Vampires co-evolved with humans and therefore must have pretty human specific dietary needs - in the spirit of exploring these needs I now detail my preliminary analysis.

While microscopic examination of "Tru Blood" revealed a cell mixture that appeared to contain red blood cells, I was wrong in thinking they might be artificial red blood cells like those described in the current body of scientific literature.

Agglutination tests for blood type revealed that the "Tru Blood" marketing campaign was not just being colorful about the flavors they offer. The samples examined were clearly Type A, Type B, Type AB, and Type O -the set of blood types shared only between humans and other primates. Blood types are determined by the proteins found on the surface of a person's red blood cells and no artificial membrane created in known labs would intentionally introduce this kind of specificity. Synthetic blood is meant to be usable by all blood types, and is therefore manufactured to have no blood type of its own- making "Tru Blood" an anomaly in this field. I would love to see some documentation from the Japanese scientists on the techniques behind these formulations; moreover I'd like to know how they made contact with the sort of backers that could accommodate this kind of progress without preliminary publications in the academic journals.

The inclusion of blood types in these formulations took me by surprise. It is unlikely that vampires may require one blood type over the others. The proteins that determine blood type are similar enough that their nutritional content would only be minutely different. Given the historical prevalence of certain blood types in particular geographical areas, I would say that unless vampires have always traveled widely - there is not an actual need for a "rounded diet" of blood types either. The choice to include blood types may have been a pragmatic one based on which of the available synthetic options was capable of filling vampiric needs, or the choice may have been a purely aesthetic one. Without further information, I can only guess.

Moving on from the red blood cells... when most people think of blood, they tend to simplify it to a mix of nutrient carrying water and oxygen carrying red blood cells when it is in fact one of the most complicated multipurpose tools in the human body. Besides red blood cells, there are the white blood cells that provide immune services, there are platelets that aid in clotting, and even the plasma itself is more than just water. Plasma transports a body's vitamins, minerals, enzymes, aminos, cholesterol, glucose, hormones, serum

proteins, and metabolic waste products. My original theory was that vampires simply needed all of these chemical components of blood to survive (maybe with the addition of the oxygen carrying ability of red blood cells), and that they didn't actually need any of the functionality of living blood. I am not so sure this is the thinking behind the "Tru Blood" formulation. I am beginning to suspect that Vampires have some systems that are functional (like circulation), some that are not needed (like the digestive system), and others that require direct supplementation from human blood (like the nervous system)... but I am getting ahead of myself.

True to the advertising, varied cell types were detectable once I had completed my staining protocol. All of the normally occurring formed elements were present excluding platelets. In addition, there were a few white blood cells that I couldn't easily identify leading me to think that these cells may be the product of incomplete blood formation from a lab grown tissue culture process. In experiments performed with laboratory tissue cultures, directed blood cell formation is frequently unable to produce the large cells called Megakaryocytes that break apart to form platelets. It may be that vampire healing mechanisms are so different from ours that clotting agents aren't required, allowing some easier to produce cell type that would fulfill the same nutritional niche to be substituted in place of the platelets. I am still stunned that the Japanese laboratory has made the experimental science of laboratory blood cell production in to a dependable factor of their product production. That they won't share their techniques with the scientific community at large is frustrating, but perhaps understandable when you estimate the amount of research and development funding that must have gone in to the creation of this product.

When I was able to get some time alone with a local Mass spectrometer, the readings provided a profile of the plasma which appeared to have the usual chemicals in the usual amounts for human blood with a slight decrease in normal waste products like urea and creatinine. Although there is beauty in this balance of chemicals, it is the aspect of this product that could be most easily simulated in a biochemistry laboratory. What has my interest is the decreased level of normal waste products. Very little is known of Vampire metabolism. In humans, blood continuously carries metabolic waste byproducts to be cleared through the kidneys, lungs, and to a small extent the skin, so it is to be expected that they would be ingested during a traditional vampire feeding. Vampires do not seem to have functioning kidneys, so they must be able to use metabolic byproducts in their systems somehow, as the lungs and skin can only clear a minimal quantity of these byproducts.

I intend to spend some time cross checking the other animal kingdoms for incidences of other creatures with high metabolic efficiency, to get some models that might explain Vampire cellular activity. In the meantime, I would like to throw out a couple of stabs in the dark. Could the stories about Vampire's integument becoming tougher and less permeable with advanced age be evidence that the substances that they can't actively use are instead added

to a surface protection layer? Could there be an anesthetic fluid that Vampires inject (like other blood drinking creatures) before biting? Could unusable substances be eliminated through this fluid? If this is an important part of their elimination processes, it will be interesting to see if drinking from a bottle rather than vascular tissue (which might be necessary to carry injected vampire waste products away from the feeding site) will cause any problems in the vampire population. Perhaps human metabolic waste was reduced in the final product to try and balance for bottle drinking.

The last analysis I was able to perform was a test for hormone levels. Most hormones can be synthesized in the lab by employing the use of genetically modified bacteria. In examining the hormonal contents of my samples, I was surprised to note that blood type was not the only variation between the different formulas of “Tru Blood”, but hormone levels were also selectively varied. I re-ran the tests with samples from other “Tru Blood” manufacturing batches and the hormone level results were consistent in their variations across batches. Although each had the quantities of human hormones one would expect to be find in a healthy blood sample, all of them also revealed elevated levels of hormones that seemed to mimic the hormonal state of circulating blood during an actual human-vampire encounter including:

Endorphins - Which trigger pleasure and anesthesia in response to pain.

Adrenaline - Involved in fight or flight responses in response to stress.

Cortisol - increases metabolism and lowers immune response in response to stress.

Vassopressin - Increases blood pressure in response to blood loss.

The main additional elevated hormones specific to each formula were as follows (**figure b**):

“Type A” - increased levels of: Melatonin and Arganine -Associated with regulation of sleep/ wake cycles and suppression of reproduction.

“Type B” - increased levels of: Estrogen and Testosterone – Associated with sexual development and behavior.

“Type AB” - increased levels of: Oxytocin -a uterine hormone that has been implicated in promoting trust and intrapersonal bonding. Plus additionally elevated Endorphin levels.

“Type O” - increased levels of: Oxytocin in addition to further increase in Adrenaline.

It seems as though careful thought has been given to the quantities of each of the hormones present to illicit experiences matching the beverage qualities listed on the “Tru Blood” advertising site. These carefully blended hormones may be a response to the fact that most vampires

report an ability to subsist on animal blood, but that they feel it is lacking a needed component. Perhaps Vampires cannot make hormones, but still have receptors that require human hormonal interaction. I do not have enough understanding of Vampire physiology to be sure that these variations would have any effect on how the beverage is experienced by actual Vampires. Is there anyone out there that can lend a firsthand account to my discussion?

My final thoughts on these analyses are these... it appears that none of the contents of these samples comes directly from human or animal subjects and the formulas limit themselves

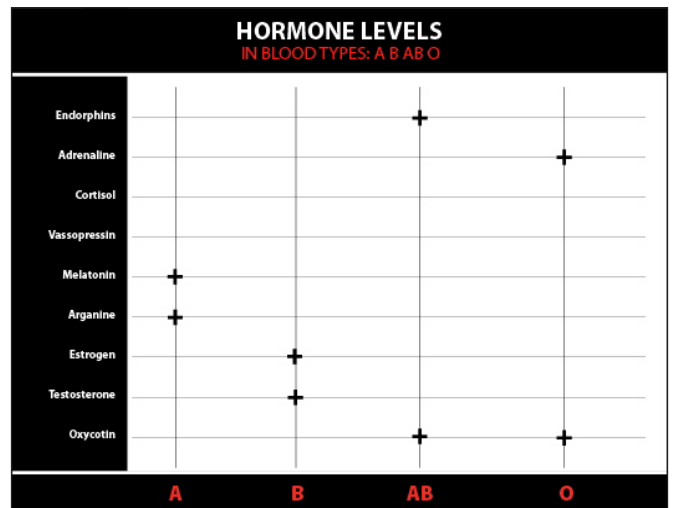


figure b

to using building blocks that can be seen as naturally occurring blood chemicals. Although these substances have been deemed safe for Vampire consumption, I am hesitant to make any claims about the safety of this preparation for use in human transfusions/ consumption. Having even one cell type that you do not recognize in a biological sample is enough to call it unsafe until further testing is performed. That being said, the components of “Tru Blood” appear to be carefully measured trace nutrients, secreted substances from genetically modified bacteria, and cells derived from tissue cultures. Many additional tests can be run which will hopefully reveal more detail of the functionality of this cocktail. If my theories are correct, my mind boggles at the massive laboratory/factory that must be required for the production of this line of beverages. The surface area required to maintain productive tissue and cell cultures alone would need to be so massive in scale as to require it to be an automated facility in order to maximize use of space. I must admit, I would love to see that in action, but for now I seek the information about Vampire physiology that these Japanese researchers must have had access to while developing so nuanced a formulation. I desire a shared understanding among the scientific community, and between vampires and humans. I hope that my work will open channels for those who share the same sentiment.

Sincerely,
an Anonymous Researcher