



BLUE SKIN

An ANOMALIES Study

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Blue Skin

Throughout history, there have been stories of people with blue skin. In Hinduism, the supreme god Krishna and the goddess of time and change, Kali, are portrayed as having blue skin, symbolic of their great enlightenment. In Egyptian art, the god Amon was often portrayed with blue skin to symbolize both his invisibility, and his connection with the creation of the world. In more recent times, blue colored skin has been common in science fiction and fantasy stories... perhaps because of how fantastic the idea sounds to the average person. But it isn't a fantasy; there really have been, and are, people with blue skin.

There are, scientifically speaking, only three known causes for such an unusual skin color to exist in humans, namely: coloring the skin with dyes, lacking enough oxygen in the bloodstream, or to be poisoned by a particular precious metal.

The Indigo People

Indigo has been a stock trade item for centuries, being the most concentrated and only effective blue dye available until the recent development of artificial dyes. Due to its value and the difficulty of extraction from its various plant and animal sources, the production of indigo has traditionally been a process run by groups of people who live together and support themselves by this important process.

It is these groups that have been — in legend at least — presented as having blue skin, the color being derived from their almost constant contact both with the production of indigo dye, as well as the wearing of clothes colored with it. In fact, the legends also claim that these people are so impregnated with this dye that their babies are born with blue skin, due to the dye being transferred from the mother to the child.

I have run across this legend twice, in reference to two different groups. The first, and earliest, reference is in *"Ripley's New Believe It or Not!"* [1950 Simon & Schuster], a collection of unusual facts gathered by the staff of the Believe It or Not cartoons and published shortly after Robert Ripley's [1890-1949] death. In this book is a brief mention (*just a few paragraphs*) of the "Blue Arabs," said to be the Garui tribe living in Saba, in the Arabian kingdom of Yemen. According to the book, Saba was a center for the production of indigo dye and the Garui dyed their clothes, putting them on before the dye had dried. They were also said to smear their skin directly with indigo dye, as a protection against sickness... and that they had been doing this for hundreds of years, thus leading to a permanent blue hue to their hair and skin, one which transferred itself to their children when they were born.

No modern town called Saba exists in Yemen, but one did thousands of years ago; now more commonly called Sheba, this kingdom was an oasis culture due to a massive dam that created fertile lands. It was famed for the export of many things, including blue cloth which *might* indicate that indigo dyes were produced there. Unfortunately for the legend, I've been unable to find even a single mention of the Garui, historically or otherwise: so, in short, they likely never existed.

While researching the possible existence of the Garui of Yemen, however, I did run across a mention of another group of people that have been accused of having indigo blue

skin and pre-dyed babies: the Tuareg of the Sahara Desert, in Africa. This claim was asserted by a respondent identified only as "S. Thompson" to a short article about blue-skinned people on the *Straight Dope* website, insisting that they had read the above facts about the Tuareg somewhere... but they don't mention where.

The Tuareg are a Muslim nomadic group that inhabits the Sahara Desert of Africa. They have existed as a group for at least 2000 years, and once operated trade routes across the Sahara using camels as their main means of transportation. Since the late nineteenth century, the Tuareg has been involved in a number of conflicts relating to the perceived invasion of the Sahara by foreign groups that don't recognize the Tuareg as the controllers or owners of the lands they have inhabited for centuries. Traditionally, Tuareg men wear veils at all times; this may have started as a simple and practical protection against blowing desert sands. Due to this fact, the Tuareg have also been called "the people of the veil." Tuareg women don't wear veils, distinguishing them from women in other Muslim societies who typically do.

Any modern claim of the Tuareg having fully blue skin is untrue; but it is based on some known facts. Books published between 1890 and 1930 documented that one group among the Tuareg, usually identified as the "Northern Tuareg," have used an indigo powder to color clothing, instead of the more common fluid variety of the dye. Most often, this indigo has been used to color the veils of the wealthier men of the group. An indigo powder is used because it does not require moisture to color the clothing, a useful bonus in a desert society; but it is not as permanent as the fluid forms of the dye, and can come off of the clothes onto skin easily. The temporary skin stains caused by it were a form of prestige, as they proved the wealth of the bearer. In addition, some of the Tuareg men purposely rubbed the indigo powder onto their faces, hands, and arms as both a sunblock and as a preventative for itches and irritations of the skin.

This powder color was in no way permanent, and could be easily washed off with water; but due to the scarcity of water, and the dry weather of the desert preventing sweat buildup (*and therefore preventing body odor*), the Tuareg were in the habit of not washing often. This, of course, prolonged the time the blue powder would stay on their skin. Modernly, I have no direct evidence that any Tuareg men are having problems with the dye in their clothing or that any are purposely coloring themselves... instead, there are a dozen books that state that such things have happened, relying, no doubt, on what has been written previously.

So only one group of the Tuareg had blue skin; and it was only the wealthier men, and only part of their bodies, and in no way permanent. Tuareg women sometimes used indigo as a makeup for lips, or on their hands, but they far more often used (*and still use*) ochre to paint their faces yellow. So the Tuareg are not blue; but this is only half of the legend.

Like Mother, Like Child?

The second half of the legend claims it is possible for a mother to have a blue baby due to indigo dye in her body being transferred to her unborn child. I can find absolutely no claims for such an event actually happening; and there are some very compelling reasons for why it wouldn't.

When indigo is used as a skin dye (*even in fluid forms*), it only penetrates the first few layers of skin; this leaves a brilliant blue stain, but it only lasts a few days. This is because the indigo molecule is too large to penetrate far into the skin. In comparison, henna – which is popularly used for staining the skin with red-brown “temporary tattoos” – has a smaller molecular size and so penetrates much deeper into the skin, leaving a stain that can last for weeks... but even henna only stains the skin. In order for any dye to reach a developing child, it would have to enter the mother’s bloodstream to be transported to her womb.

Even if the indigo dye is eaten (*assuming it’s made from a nonpoisonous variety of the plant*), the dye is broken down into component elements by the digestive system so that the dye is no longer a dye when it reaches the bloodstream. All an overdose of eating indigo is likely to cause is gastrointestinal distress... but not blue blood or skin. Still, it should be noted that a variant of indigo known as “indigo carmine” is used as a medicinal dye to make blood vessels and other internal body structures easier to see, and is applied by doctors by directly injecting it into the body. In the unlikely event that the doctor miscalculates and injects too much, the patient’s skin can temporarily turn blue due to the overabundance of blue dye in their blood; but it still wouldn’t turn a developing baby blue. This is because of how a developing fetus interacts with its mother’s blood supply.

As a fetus grows it develops its own blood supply, independent of the mother; so, among other things, a developing child can have a different blood type than its mother. There is no direct sharing of blood in the normal development of a baby. Nutrition and oxygen are passed as molecules from the mother’s blood to the baby’s blood through the filter of the placenta, which prevents blood cells themselves from crossing. As you’ll recall, the molecules of indigo are too big to even penetrate skin very deeply... and so are too large to be passed through the placenta to the baby.¹

So, in the end, there is no evidence that a group of people stained permanently by indigo have ever had indigo blue babies... but I am left with two questions regarding the myth. First, did the myth start with “*Ripley’s New Believe It or Not!*” in 1950, or was there an earlier source for the story? Given that the name for a single member of the Tuareg is a Targui, which has a great resemblance to the name Ripley’s associated with this myth – Garui – it seems possible that the Ripley’s folks made up the myth based on what they had already heard about the Tuareg, but set their fictitious people into the distant past so no one could directly confirm or deny their story. Until an earlier version of the story turns up, the blame seems to rest solely with the Believe It or Not company of 1950.

Secondly, I’ve only run into the myth twice... but those two sources were fifty-seven years apart, and attributed the story to two different populations. So how did the story survive and change? In short, why can’t I find more books or sources with the story anytime within that fifty-seven year period? These are the things that keep me up at night... but you’ll probably sleep just fine. On to our next group of blue skinned people.

Blue Bloods

Another cause of blue skin hues can be a lack of oxygen in the blood, tinting the blood so that the flesh it circulates in has a blue hue. This is just as unhealthy as it sounds... but first,

a small digression from topic.

The phrase “Blue Blood” is used to designate a person of royal heritage in many European countries. A popularly repeated theory is that this phrase describes a condition caused by a rare genetic defect that is carried by the royal families of Europe, due to their habit of only ever marrying other members of European royal families. This small breeding pool is said to have led to a tendency for the disease called “hemophilia” to be inherited by royals, and it is believed by some that this condition is the origin of the phrase “Blue Blood”.



There actually is a genetic propensity for hemophilia in some members of the European royal families, spread by the “Granmama of Europe,” Queen Victoria [1819-1901]. She earned this name because she had a large number of her children and grandchildren marry into royal houses all across Europe... but this also spread her genetic propensity for hemophilia, which most often appears in males with the gene. The gene seems to have developed in the queen as a fluke mutation.

However, the hemophilia explanation for the phrase “Blue Blood” has a major flaw: hemophilia doesn’t turn blood blue, nor give a bluish tinge to the skin. It simply means the body is missing some of the agents in the blood that help it to clot when vessels are broken, so sufferers bleed longer before clotting takes place. Depending on the type of hemophilia, the victim’s blood may clot so slowly as to be equivalent to not clotting at all. Queen Victoria’s son Leopold died in 1884 after a fall that would have given a normal person a mere bump on the head; but because of his hemophilia, he was dead within a few hours due to a massive brain hemorrhage.

The actual origin of the term “Blue Blood” for royalty comes from the Spanish phrase

“Sangre Azul” (*literally “blue blood”*), used to describe the fact that when the Spanish were conquering lands held by the Moors, the Spanish nobility displayed the fact that they had white, untanned skin, through which blue veins were easily seen, as proof that they were not related to the darker skinned Moors.

A further myth that needs to be dispelled is the idea that blood can actually be colored blue to start with... it can't. Blood has a limited range of color from a bright red to a dark maroon, mostly depending on the levels of oxygen being carried by the hemoglobin in the red blood cells. Because the red blood cells are the predominant type of cell in the blood, well beyond the white blood cells that fight bacteria and the platelets that help close wounds, the overall color of blood is red.

Veins appear to be blue for two reasons. First, of course, they are carrying the de-oxygenated blood, colored the darker maroon, back to the heart to be cycled through the lungs. Secondly, due to the properties of the skin itself, the light reflecting back from the veins within the flesh has the red range of the light spectrum absorbed, leaving only a blue wavelength... making the veins look blue.

Arteries run deep within the body to carry the oxygenated (*and redder*) blood throughout, while the veins cycle the de-oxygenated blood (*more maroon*) back to the heart near the surface of the body; this makes the veins more visible. Since the flesh of the body cancels out red color wavelengths of light passing through it, flesh color is usually determined by the melanin in the skin which is the most visible coloring agent, with some visibility of the bluer veins near the surface.

If de-oxygenated blood cells (*with the maroon color*) start to flow in the arteries as well as in the veins, the blue color from light reflecting off the maroon blood cells in the arteries becomes visible, giving the skin an overall bluish tint. This doesn't require a great amount of the de-oxygenated blood, simply because the color of the oxygenated blood doesn't effect skin tone at all... the light that would display the red color of the oxygenated blood cells is absorbed by the flesh of the body, so only the maroon blood, however much or little there may be, is visible through the skin.

Luckily, de-oxygenated blood doesn't normally circulate through the arteries; the job of the arteries, after all, is largely to get oxygen to all the parts of the human body, so the less oxygen it carries, the greater the danger to health. But this situation does happen from time to time – the condition is called *cyanosis*, and there are a variety of causes – and unlike the indigo dye myth above, this condition actually causes blue babies to be born.

Blue Baby Syndrome

Babies are sometimes born with blue skin; at other times, a child born with a normal skin tone can become blue within the first few months of birth. Each of these conditions are caused by different problems, but are both called “Blue Baby Syndrome.”

To be born blue requires a flaw that allows de-oxygenated blood to mix with oxygenated blood. Many known conditions can cause this effect, and they are collectively known as “cyanotic heart defects”. The most common cyanotic heart defect – representing

from 55% to 70% of them – is called “Tetralogy of Fallot,” named for Étienne-Louis Arthur Fallot [1850-1911], who described the condition in 1888. The condition is a grouping of four defects of the newborn’s heart, most notably for our purposes being a hole between the two ventricles of the heart where blood gathers, oxygenated on one side and de-oxygenated on the other, to be pumped further into the circulatory system. This hole allows de-oxygenated blood to bypass the usual trip through the newborn’s lungs, instead entering the arterial system directly... and since these de-oxygenated cells are maroon, the child’s skin takes on a blue hue as more and more de-oxygenated blood continues to be circulated. Babies born with this defect only rarely live more than three days without surgical intervention, since more and more of their blood becomes de-oxygenated. If the hole in the heart can be closed, or if a new route to the lungs can be created, the child will have a fighting chance at survival; and, as the blood is forced to circulate through the lungs again, the blood cells will quickly become oxygenated and the child will gain a normal skin color.

Another way for de-oxygenated blood to circulate through arteries is for the blood cells themselves to be altered so they are incapable of carrying oxygen. Blood cells altered in this way still fully circulate through the body but don’t pick up oxygen when circulated through the lungs, so they always have a maroon color which tints the skin blue. Just such a condition happens when the iron in normal red blood cells becomes oxidized.

The iron element in a red blood cell is what attracts oxygen in the lungs; when oxidized, however, the iron element holds an additional iron ion in the spot that normally attracts oxygen, and the red blood cell remains in a permanently de-oxygenated state. This altered blood cell is called methemoglobin and the condition of having them in your body is called Methemoglobinemia. In severe cases it can be fatal; but only a small amount of de-oxygenated blood is needed to make skin look blue, so in minor cases the blue coloration is the only actual symptom. Luckily, the methemoglobin can be chemically altered back into functional red blood cells with an injection of methylene blue, a blue dye that removes an electron from the methemoglobin and re-opens the ability to bond with oxygen. The treatment is so effective that it can change a sufferer from blue to normal skin tone in a matter of minutes.

The very presence of methemoglobin cells within a human body is itself not unusual; over time many red blood cells oxidize and change into the non-oxygen carrying cells. Healthy people have enzyme systems that remove these altered cells from the bloodstream, so the overall number of them never becomes dangerous. However, there are many drugs and chemicals that can accelerate the oxidation of red blood cells far beyond what a normal body can clean up. Ironically, a form of indigo has been shown to cause this effect... the dye called “indigo carmine,” used medically to make systems of the body more visible for study.

In 2006, a case was documented of a sixty-seven year old woman who developed methemoglobinemia after an injection of indigo carmine was made into the skin of one of her breasts to help map out where her lymph nodes were. Luckily, when her face turned blue the doctors knew what was happening and immediately treated the condition. This report was the first time indigo carmine in particular had been known to cause methemoglobinemia, but other dyes used in similar fashion have long been known to potentially cause the condition.

Nitrates can cause this condition as well. These have been used as agricultural fertilizers, and have been known to bleed into well water. Babies up to six months of age are especially vulnerable to nitrates in water, and this is the second cause of “blue baby syndrome.” Enough cases of nitrate based methemoglobinemia were documented in babies that current Environmental Protection Agency standards of what is okay nitrate-wise to allow in drinking water was specifically designed to protect infants. But not everyone with methemoglobinemia has acquired it from their environment; in fact, there are two known groups of humans that were being born blue and living with the condition.²

Living the Blues

Congenital methemoglobinemia is passed as a recessive gene in humans. If a person inherits this gene from one of their parents, there will be no effect at all; but if they inherit this recessive from both their mother and their father, then the enzymatic systems in their bodies that are meant to reduce the number of methemoglobin cells in their blood are less effective. This allows a larger number of these cells to continue to exist on average, enough to tint the person’s skin blue... but not enough to pose any serious threat to the person’s health otherwise. Normally the chances of two parents carrying this gene is so remote that there is practically no possibility of the condition occurring; but in at least two cases, people in isolated communities with small breeding pools have nurtured this recessive gene into a common occurrence among their populations.

The first of these populations was documented in 1958 in an article by E.M. Scott and Dale D. Hoskins in the journal *Blood*. The two men had studied fifteen cases of children born blue in nine Eskimo and Indian families in Alaska. The occurrences and families were spaced out enough that they were not likely directly related to each other; in fact, the researchers felt they had four distinct areas where these births were happening independent of each other. Four of the families studied had relatives in common. Not enough was known about the history of the other families to know if the methemoglobinemia had started from a single source. But what was known was this: the fact of fifteen known cases in an area with an approximate population of 20,000 people was an incredibly high number that pointed to the possibility of the condition being passed genetically. The individuals were treated with either methylene blue or ascorbic acid, both of which helped temporarily to re-oxygenate their blood and make the blue tinge to their skin vanish. Years later, Scott and Hoskins’ article was to help solve a medical mystery in the United States.

In 1960, a hematologist named Madison Cawein heard rumors about a group of people with blue skin living in the secluded Troublesome and Ball Creek areas in the state of Kentucky in the United States. After interviewing a number of people in the area and determining that, yes, these blue skinned people did indeed exist, he made many attempts to find them in the hills and at their homes. Once or twice Cawein spotted someone blue skinned at a distance in the creek area, but they inevitably ran away before he could reach them. He found some of their homes, but these were guarded by extremely unfriendly dogs... so it was clear that strangers were simply not welcome.

Nonetheless he persevered and continued to visit the area on a regular basis, using the

American Heart Association clinic in Hazard as his base of operations; and, finally, he was rewarded. Siblings Patrick and Rachael Ritchie came to visit the clinic with skin as blue as the sky. Cawein, naturally, examined them up and down; once he was sure they did not have heart disease, he started to ask them about their families... and started to draw a chart mapping out who was blue and who was not. In addition, he drew blood samples from the siblings, to test for abnormalities. It was clear that both were embarrassed by the color of their skin, and that this was likely the reason he'd had such trouble finding any of the blue people to talk to in the first place.

With the help of these siblings, the doctor was able to contact and talk to many members of the reclusive families that lived in the creek areas, and was able to draw up a brief genealogical history. It seemed clear that the original carriers for what was finally proven to be a recessive genetic defect that caused methemoglobinemia had settled in the area in 1820. Their names were Martin Fugate, who was an orphan from France, and his wife Elizabeth Smith. They were the first people in the creek areas to have blue children... four of their seven children were said to have blue skin. Because the gene for methemoglobinemia is a regressive trait, even if both parents carry it only about half of their children would be expected to display blue skin; but all of their children are carriers for the trait. So, unlikely though it was, both Martin and his wife Elizabeth were carriers of the recessive gene to start with; and though there is no direct proof of it, family rumors claim that Martin Fugate himself was blue, which may be why he and his spouse settled in such a remote area to start with.

Over time, the Fugates' recessive gene was spread to the other families in the area through marriage. As more and more of the population of the Troublesome Creek and Ball Creek areas became carriers for the recessive gene, more and more children were born blue; and with no medical experts aware of the situation, blue they stayed.

Cawein was able to change that situation however; having determined that he was probably dealing with the same condition that Scott and Hoskins had seen in the Alaskan Eskimos and Indians, he determined to try a standard cure for methemoglobinemia on the Ritchie siblings. He injected them with methylene blue... and within minutes, both Patrick and Rachael had pink skin color for the first time in their lives. Cawein prescribed all the people with blue skin daily pills of methylene blue to supply the necessary ions for their bodies to convert the methemoglobin to normal red blood cells. Since that time, the gene pool has gotten larger in the area, and blue babies have been born less and less frequently; so this is one group of blue people that no longer have to be blue.

But there is yet one more way for humans to have blue skin; and this last group is not so lucky as to have any miracle cure for their condition.

The Precious Poison

There exists yet another group of people with blue skin, but this group is very different from the previous. It is not a social group limited to a particular area of the world; rather, anyone worldwide can join this group. Few join willingly or knowingly, and none can choose to leave, for this group represents the victims worldwide of a bizarre and uncommon

poisoning.

Rosemary Jacobs was prescribed this poison in nose-drops in the 1950's when it was sold as a cure for allergies; about three years later her skin turned slate gray. Paul Karason started to drink this poison and rub it on his skin in 1993 to treat swelling and irritation due to dermatitis; and slowly, his skin turned a deep blue. Stan Jones, a Libertarian party politician, feared that computer troubles in the year 2000 would make antibiotics unavailable, so in 1999 he started to take this poison due to a claim for it as a great anti-bacterial agent; by 2002, his skin had become a blueish gray color. All three have one thing in common... all three consumed silver in one form or another.

Silver poisoning is rare; an extreme case can result in many health problems, but a minor indulgence of silver is all that's needed to bring on the most immediate and noticeable effect. When digested, about ten percent of the silver a person consumes is carried through the bloodstream and deposited as silver granules in the layers of the skin. Over time and continued intake, this process can lead to a skin color that ranges from a deathly gray to a bright blue. The condition is called *argyria*, and it is, as of this writing, utterly incurable.

A Brief History of Silver Poisoning

Most elements and substances of a rare and precious nature have been attributed to have medicinal value in the past, and silver is no exception. Perhaps after it was already in use for a variety of treatments came the first notice of the precious metal's limited germicidal effect; this fact merely convinced healers even more so of the value of silver in magical and medicinal cures.

The earliest documented use of silver as medication is said to have been recorded by the Persian philosopher and experimenter, Avicenna. In 980 CE, it is said, Avicenna used silver filings for a blood purifier, palpitations of the heart, and to cure offensive breath. Avicenna also made note that one of his patients who had been eating silver had developed a bluish discoloration of the eyes, which also makes this the earliest documented association of silver and bodily discoloration. It is likely that the connection between silver and body discoloration was understood by some of our ancient ancestors, even if just the ones living near silver mines who had a greater than average chance of both eating the metal or breathing it in (*which can also cause discoloration*). In the Middle Ages, silver was used for treating nervous disorders.

Modern age scientists and doctors only really started to acknowledge a connection between silver and skin discoloration around 1816, with the publication of "*On the Effect of Nitrate of Silver on the Skin*," by E. Harrold, a member of the Royal College of Surgeons, London. At the time of publication nitrate of silver was a popular antibacterial and germicidal agent often administered orally for a variety of ailments... and many doctors had begun to notice the unfortunate discoloration of the skin appearing among some of their patients. Harrold simply pulled the evidence into one place, making the connection obvious. Despite this, nitrate of silver continued in general use; doctors were just careful to administer much smaller doses, on the assumption that the discoloration was due to single overdoses of silver, not a continued build-up.

Around 1840, the condition finally gained a name. In that year a book by William J. Hamilton — *“Researches in Asia Minor, Pontus and Armenia: with some account of their antiquities and geology”* — documented his discovery of what he believed to be the long forgotten ancient Greek silver mining town called Argyria. The disease was soon called “argyria” as well, so the very name given the illness is evidence of its believed connection to silver... and those that studied it were now aware that it was caused by a slow build-up of silver within the body, so any long-term use of a silver medicine carried the danger of argyria.

Captain Fred Walters, born in England in 1855, was prescribed nitrate of silver as a medication for a degenerative neural condition called “Locomotor Ataxia,” an inability to control body movements; this treatment for the disease was in use until at least 1873, and was considered safe by those prescribing it. Walters’ regular oral dosage of the metal led to his skin turning blue, and in 1891 he moved to America to earn money by touring with Buffalo Bill’s traveling show and displaying his unusual appearance.

It is an illustration of how the connection between silver and argyria was basically unknown outside of a small scientific community that, in 1922, an article printed in the *Illustrated World* magazine explained Walters’ blue skin tone as caused by an accident with a horse that left Walters’ heart with a hole that allowed de-oxygenated blood to mix with the oxygenated blood as it flowed through his body, giving his skin a blue tinge. Clearly, the author had not talked to either Walters or his physicians; that Walters’ knew it was silver that gave him his skin tone is undoubtable for, over time, Walters continued to deliberately eat silver — and may have even continued to increase the dosage — to make his skin as blue as possible, and increase his fame. He died on August 20, 1923, of heart failure, leaving behind his wife and non-blue skinned six-year old daughter. After his autopsy, Walters was declared to be the most singular case of silver poisoning to have ever been documented.

Right up till the early 1900’s, nitrate of silver was still prescribed as a treatment for syphilis, a common cause of nervous disorders such as locomotor ataxia. But by the 1930’s in the United States of America, enough evidence existed to bring into question the usefulness of silver as a germ fighting agent or a cure for any sort of nervous disorder. It was noted that while silver did indeed kill bacteria and germs, it also killed healthy tissues. Far more effective antibacterial agents had been found, such as penicillin, and these didn’t harm the human body or have the other side effect of possible blue skin. For these reasons, silver was largely replaced in antibacterial and germicidal medications... but it was a voluntary change that not all medicine manufacturers followed.

Some manufacturers created a less harmful version of the silver germicidal agents. It was discovered that by binding silver ions to protein complexes, the silver became noticeably less harmful to healthy tissues... this new product was marketed as “mild silver protein,” and the manufacturers ignored the fact that it was also noticeably less harmful to germs and bacteria as well. Marketed under names like Argyrol and Protargol, tests performed in 1937 showed that they were nowhere near as effective compared with other antibacterial products. Despite this, these mild silver protein products were used as antibacterial eye drops in many places well into the 1990’s, when evidence of them being both ineffective and causing a bluish gray film to develop in the conjunctiva of the eye (the skin under the eyelid) led to an end in their use.

Silver was still used in other products as well. In 1953, when Rosemary Jacobs was eleven years old, an eye, ear, nose, and throat doctor prescribed her nose drops containing silver as a treatment for allergies, to be taken “intermittently as needed”. Three years later her skin was slate-gray. A nun in a convent Jacobs was visiting told her to stop using her nose drops, because they knew of another nun who was using the same drops... and also had gray skin. Jacobs visited a dermatologist who immediately diagnosed her as having argyria. Despite the difficulties her altered appearance has caused her, Jacobs doesn’t cast blame on her doctor; instead she casts blame on drug manufacturers who place profit above both obvious truth and the health of their customers.

Silver was also used in anti-smoking lozenges in the form of silver acetate; in 1978, the *British Medical Journal* reported a case of argyria caused by these lozenges. The discoloration was limited to the woman’s face and neck; and it was noted that the lozenges she was using – brand name Respaton – was not widely used, and she had taken an unusually high dosage of the medication because she was a heavy smoker. She was down to four cigarettes a day after she stopped the medication... but the discoloration was there for life.

Recent History of Argyria

With the birth of the internet came a new plague of misinformation about silver, this time in the form of colloidal silver. Colloidal silver is a suspension of microscopic silver particles in a fluid (*usually water*). Even with all the known evidence regarding silver and it’s impact on the human body, there remained (*and remains*) a massive gap in the public knowledge of the matter... a gap that has allowed the existence of companies claiming every form of health benefit possible for this magic elixir.

Paul Karason started to use colloidal silver in 1993 to self-medicate his dermatitis, which causes red, swollen, and itchy skin. Even after his skin turned blue he continued to drink the colloidal silver, but in smaller amounts; this was because he believed it was safe to drink, and he believed it helped him with his arthritis and acid reflux disorder. He also believed that his skin changed colors because he had rubbed the silver bearing water directly on his skin as a treatment, so viewed his skin’s color as the result of his own misunderstanding of how the colloidal silver was supposed to be used. The color transition was slow enough that he didn’t notice it immediately himself; it was finally made clear to him when a friend who hadn’t seen him for a few months asked what he had done to his skin.

The new wave of colloidal silver promotions on the internet was noticed by Rosemary Jacobs in 1995... and she was enraged by it. In the years immediately after, Jacobs became the single most influential voice in the fight to have silver banned from all forms of medication. Due to the rising number of argyria cases and pressure from individuals like Jacobs, the Food and Drug Administration of the United States (*aka the FDA*) declared in 1999 that colloidal silver and silver salts could no longer be included as an ingredient in any over-the-counter drug, due to a lack of benefits compared with the possible health problems it can cause.

Unfortunately, most of the companies selling colloidal silver just changed their tune a bit, and re-marketed the silver as a “dietary supplement,” which is not regulated by the FDA. As the year 2000 approached, colloidal silver was advertised with more and more false claims

for its abilities: for example, it was claimed to be effective against 650 different diseases including cancer, acne, leprosy, AIDS, arthritis, and anthrax – in short, anything that could sell the product – and it was often claimed colloidal silver had no side effects. Rosemary Jacobs, despite the obviously high amount of silver in her body, had to undergo surgery for breast cancer... so the claim silver prevents cancer is clearly false. Nice vendors of silver products stated that Jacobs was simply confused about how the connection between silver and argyria works; the not-so-nice ones flat out accused her of being funded by the government, the medical industry, and drug cartels to spread lies about the colloidal silver products they were selling.

The vendors of colloidal silver fall into one of two categories. First are the people willing to lie to defend their little sales niche. Second are the ones who truly believe colloidal silver is a miracle medicine. Both groups argue that silver as a medicine is being covered up as part of a governmental and medical conspiracy to hide cheap and effective medicines that would undercut sales of the medical industry worldwide, and they further claim that evidence of a connection between silver and argyria is also falsified. Unfortunately, this strategy is effective because many of the people who buy the colloidal silver products are basically distrusting of both the government and medical industry, and have expectations that miracle medicines have been actively hidden from the public... that's what convinced Stan Jones to drink silver.

Due to fears that problems with computers and communications in the year 2000 would make antibiotics unavailable, Stan Jones started to use home brewed colloidal silver instead. This was because vendors advertised colloidal silver as a "universal antibiotic," and the fact a person could make it themselves meant it would always be available. He started to drink it in 1999, and claimed that it cured his psoriasis (*a condition that causes scaly skin to build up, flake, and itch*); but by 2002 his practice of drinking the colloidal silver had turned his skin blue-gray. Despite this fact, Jones continues to promote the use of colloidal silver as a home remedy, and only blames himself for his argyria... he remains convinced that colloidal silver is an effective medicine, but he just didn't make his own batch properly. He feels his overall good health – other than his skin color – is entirely due to his use of colloidal silver. But silver – colloidal or otherwise – is not an antibiotic; it is an antiseptic. The difference is that an antibiotic agent retains its ability to fight bacteria, germs, and viruses, as it is absorbed by the body... an antiseptic loses this ability as it is absorbed. So while colloidal silver might have a germ fighting effect in the mouth and digestive tract, once it is actually absorbed into the bloodstream and combined with a protein, it loses the ability to kill germs and bacteria. This is the same reason that the "mild silver protein" products were ineffective as antiseptics.

And all of this points up the final defense of the current sellers of colloidal silver; if all else fails, blame the victim. It has been stated that argyria results from the use of impure water, or that the colloidal silver wasn't brewed right to start with. This second claim is based on the fact that colloidal silver products vendors only actually sell mechanisms or plans for mechanisms that brew colloidal silver; by making their customers brew the "medicine" themselves, they avoid being accused of selling colloidal silver directly as a medicine, which is what the FDA made illegal. These promoters often don't tell their customers that silver can cause argyria, or they claim that it is perfectly safe if "prepared right". But the amount of

silver needed to cause argyria is unpredictably different for each person, and the condition is absolutely unavoidable as long as silver is ingested, no matter how it is prepared.

Paul Karason moved from Oregon to California in 2007, hoping that people there would be kinder to him. He has not sought medical attention for his skin color. Both Karason and Stan Jones remain convinced that the colloidal silver has helped their health, and that their argyria is entirely due to their own misunderstandings of how to brew or use the colloidal silver correctly... neither blames the vendors who gave them the idea of using silver for causing their argyria.

The Science of Argyria

The excuses vendors of colloidal silver give to clear themselves of responsibility when their customers turn gray or blue are completely unacceptable, and the reason is simple. Argyria has only one cause, consuming silver... and it doesn't matter what form the silver is in, or how small or large the dose. All that matters is that silver is consumed long enough.

Most of the silver that a person eats gets passed right through their bodies and out with the excrement; but a small percentage — usually about ten percent — is absorbed by the gastrointestinal tract in the mouth and nasal passages or in the lower intestines (*depending on the form of silver ingested*) and enters into the bloodstream. The absorbed silver travels in the bloodstream either as silver salts or combined with an available protein, and only leaves the blood when it is deposited along with nutrients and oxygen into the tissues of the body. Organs that receive a greater amount of blood also receive a greater amount of the silver. The silver forms small dark granules in the tissues of the organs, and it is these granules that lead to the discoloration of skin; in fact, a skin biopsy showing these granules is the standard test for argyria.

Skin is the largest organ in the human body and receives a huge amount of blood, which is why the silver can end up there. It has long been noted — as early as 1817 — that the discoloration of argyria seems to begin in and stay strongest in areas of the body that are exposed to the sun... the head, back of the neck, and arms are typically darker in tone than the remainder of the body, and many people who stop consuming silver when the argyria starts have these portions of their body discolored, but normal skin tone on the rest of their bodies. The granules formed by the silver tend to accumulate around the eccrine glands, which are the sweat glands that empty directly to the surface of the skin, below the epidermis (*outer layer of skin*) where melanin resides and determines normal human skin tone. The granules are never found in the epidermis. This may be because the tissues of the epidermis are not directly supplied with nutrients and oxygen by blood vessels, instead allowing these to pass on their own through the tissues by molecular diffusion from areas of high concentration (*the lower dermis*) to areas of low concentration (*the epidermis*). So the silver only goes as far as the bloodstream can carry it, but also seems to follow the flow to the sweat glands.

Because the deposits depend on blood flow, people with argyria not only have discolored skin, but they also have discolored internal organs due to further deposits of silver granules: the liver, spleen, and adrenal glands can all be effected. The deposits also build up in capillary walls, joints, nerves, and even in the brain. Luckily, at low dosages the body

appears to pass more than enough silver intake to prevent health problems past the change in colors; but eating a single large dose of silver — as in multiple grams — is likely to kill you. In fact, argyria requires regular doses of silver to occur; single, large, un-repeated doses separated by years can't cause it, but daily small doses can bring the condition on in as little as ten months... though three years seems to be more the average time frame it takes for the discoloration to clearly appear.

When large doses of silver are taken in, the deposits start to impinge on the central nervous system, causing loss of voluntary movement or weakness and rigidity of legs, and can effect the muscle tissue and nervous tissue of the heart... which is probably why Captain Fred Walters died of heart failure in 1923 after consuming silver for most of his life. Consuming large doses of colloidal silver in particular can result in a coma, a buildup of fluid in the cavity around the lungs, and cause red blood cells to break apart (*hemolysis*). It is also toxic to bone marrow — where red blood cells are manufactured — and can impair the bone marrow's ability to produce the white blood cells needed to defend against bacteria and viruses (*agranulocytosis*). This is similar to the effects of consuming any corrosive solution; and in a large enough concentration, it can be lethal. This appears to be because colloidal silver has a higher rate of absorption into the gastrointestinal tract, due to the submicroscopic size of the silver particles being consumed. But most consumers of silver will never take a dose large enough to cause the more severe health problems; and for most, having gray or blue skin is severe enough a condition.

The real problem with argyria is that there is no known threshold of how much silver consumed will cause the discoloration. Some people have higher than usual exposure to environmental sources of silver, and therefore may need less intake to become argyric. In addition, some people appear to be more vulnerable to the condition, and to generally need less silver intake to cause it... this may be due to differences in the mucous membranes of the gastrointestinal tract — the mucous membranes are what traps most of the silver consumed and forces it to be passed in the excrement. Weaker mucous membranes could lead to a higher absorption of silver. There may also be chemical differences in the blood, resulting in a higher rate of deposit compared to the silver being filtered out by the kidneys. In short, different people appear to need differing amounts of silver to become argyric.

Consuming small amounts of silver on a regular basis will slowly deposit silver granules in the tissues of the body, and some people will do this faster than others... and when there is enough deposited, the color caused by the deposits will slowly become more and more evident. The color, also, seems to be different for each person; and whether they are slate gray, shiny silver, blue, or purple may also depend on chemical differences within the victim's body. Once the discoloration appears, the color never changes except to become a more intense version of the same color if consumption of silver continues. Claims have also been made that only large silver particles cause argyria, and that silver prepared as small particles won't; but the smaller particle size likely makes the silver easier for the gastrointestinal system to absorb.

So, once again, nothing in the preparation or amount of the silver really matters as much as the fact that silver is being consumed. All a larger dose will do in most cases is speed up the inevitable change... and the true believers in colloidal silver who insist that consuming

it in small enough amounts avoids becoming argyric are just gambling with how much time and silver is needed to prove them wrong.

So the saddest part of this whole situation is that the fact that eating silver will permanently change your skin color has been a sort of open secret for at least 170 years, known to many individual scientists and doctors, but never clearly stated to the public or scientific community at large... and that this situation is being used by unscrupulous or misguided people to sell a product that poses a health threat to those that use it.

Hopefully, *you* will think twice before trying silver as a cure-all.³

NOTES

1. Some larger molecules can pass from the mother's bloodstream to an unborn child because they fool the placental barrier into treating them like nutrients. The best known and most tragic of these large molecules is thalidomide, which was a commonly used sedative for pregnant mothers in Europe during the 1960's... but it was soon discovered that thalidomide prevents the formation of normal limbs in children exposed to it in their first trimester of development; instead, they are born with flipper-like limbs. Not surprisingly, thalidomide lost its popularity when this fact was proven. There is no evidence that the indigo molecule is carried across the placental barrier in this way.
2. A newer form of this deoxygenated blood is now caused by overdoses of drugs containing sulphur; the condition is called Sulfhemoglobinemia. In these cases, the iron in the normal hemoglobin picks up a sulfide ion instead of oxygen, becoming sulfhemoglobin, and incapable of normal oxygen transfer... stranger still, these new cells are **green** in color! The June 11, 2007, issue of The Lancet, a premiere medical journal, includes an account of a 42-year-old man from Vancouver who was found to have green blood when it was drawn; he had been overusing a prescription medication called sumatriptan which contained sulphur.
3. An Afternote: As of October 2009, colloidal silver vendors are now claiming that their product will prevent and/or cure the Swine Flu that has become a public concern, even going so far as to post ads for themselves in the user commentaries of a Newsweek article about the disease, and to post commentaries meant to undercut an article that states colloidal silver is a bad choice for fighting the disease. One site even claims that the FDA approves of the production and sales of colloidal silver!

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