

Drugs in Science Fiction Cinema

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Better Living Through Chemistry

In total, there are about 10,000 approved drugs available and these can be sorted into about 50 categories. Those categories with the most drugs available are cardiovascular (heart), antibiotic (infections), and antineoplastic (cancer). Some of these categories have many hundreds of drugs available for use so the options are extensive. In general there are two major types of drugs, either synthetic meaning they are chemically made or natural products meaning they are obtained from nature. Always consult your physician regarding proper drug use and remember, there is better living through chemistry.

And speaking of, one topic in SF cinema that has provided much interest is drugs. These drugs come in all shapes and sizes, flavors and colors, bitters and sweets, ingestible, inhailable, or injectible. And their power to work is extraordinary. We are referring, of course, to cinema drugs. Not the recreational kind nor what we would all consider standard drugs like aspirin, insulin, or blood pressure medications, but rather, those fictitious drugs that are used as conveyances or shortcuts to advance plots. We will be taking a closer look at some of these drugs and perhaps learn if there is any basis in reality for how they work. In the pharmaceutical industry how drugs work is called "mechanism of action" or MOA. The MOAs of cinema drugs, all things considered, are really not that far removed from how real drugs actually work. As it turns out, many of the cinema drugs, though they may have fancy names, are essentially ordinary drugs with ordinary MOAs.

The word "drug" is believed to originate from an old French word, "drogue", meaning "dry barrels" referring to containers with medicinal plants preserved in them. A drug is any substance that may have medicinal, intoxicating, or performance enhancing effects when taken or put into an animal, including humans. As such, these drugs are not considered a food or food-related product. That being said, it must also be pointed out that what some cultures call a drug other cultures may call a food so the distinction does blurr. And governments do play a role in this in determining what is or is not a drug. This is especially important when considering the drug's origin or used form. Those drugs derived from natural products such as plants and microorganisms are perceived differently than those synthetically manufactured.

Since some drugs can be quite powerful substances that can do harm if not used correctly they are regulated by law and only legally dispensed through prescriptions. Since many of the approved 10,000 drugs are available only by prescription this may or may not pose a problem for our annoyed cinemascientist. If he has a medical degree then he can easily obtain the drugs of choice himself by writing his own prescription, a perfectly legal procedure using his own medical credentials. Otherwise, he would either have to obtain the drugs from a colleague (willingly or otherwise), steal them, obtain them from the black market, overseas where less questions are asked as long as the money is good, or perhaps make it himself. And, of course, he will need a large enough supply of the drug(s) to serve his needs. It should be noted that more often than not his drug of choice is so rare or experimental that no pharmacy carries it so he must make it himself.

Many of these drugs have special problems when combined with certain other drugs and collectively these are called counterindications. One drug can inhibit the MOA of another drug thereby neutralizing the effects making the drug(s) essentially useless or perhaps enhance the effects making it potentially life threatening. It is the combinations that are the issue and not the individual drugs in that one drug can up regulate a biological process while another down regulates and when combined could result in serious physiological trauma, coma, or even death.

In the pharmaceutical world the meaning of a drug is any chemical substance that is used in the treatment, cure, prevention, or diagnosis of a disease. Also, the drug can be used to enhance physical or mental well-being. Lastly, drugs can be taken for a limited time or on a regular basis, depending upon many factors such as the disease and overall health of the patient.

Recreational drugs

To be thorough, the other class of drugs are the recreational drugs which are chemical substances that affect the central nervous system. (The central nervous system, separate from the peripheral nervous system, contains the majority of the nervous system, including the brain, spinal cord, retina and cranial nerves.) Such chemical substances are either opioids or hallucinogens. These are primarily psychoactive substances designed to enhance pleasurable experiences and to have fun. The perceived benefits of recreational drugs involve perception, consciousness, personality and behavior changes. As such, some of these drugs can be addictive with habitual use. Many natural substances such as beers, wines, and certain mushrooms do blur the line between foods and recreational drugs and when ingested do indeed affect both the body and mind.

When mentioning recreational drugs most people think of cannabis or marijuana. However, the most common recreational drugs used in the world are alcohol and tobacco with others being betel nut and caffeine. Other recreational drugs are

ayahuasca, a psychoactive drug mostly used by shamans in the Peruvian Amazon; peyote, primarily used by native Indians in Meso-America and South America; opium, primarily used by Asians as part of their culture; and Khat, an amphetamine-like stimulant used in Islamic countries. Some hallucinogenic drugs are LSD, mescaline, peyote, psilocybin, and ecstasy.

Drugs that medicate.

Pharmaceutical drugs that have a medicinal element are aimed at a cure or to improve particular symptoms of an illness or a medical condition. Also, such drugs can be used as a preventative medicine that will have future benefits but does not treat any existing symptoms or disease. In addition to having the drugs the dispensing of the drugs is a highly regulated element. In a traditional sense drugs can be obtained by prescription (prescription only medicines or POM), over-the-counter (OTC) meaning anyone can get it or as behind-the-counter (BTC) in which a registered pharmacist dispenses the drug without needing a physician's prescription. The range of all this varies from country to country and culture to culture. And, of course, those drugs that are natural products have a different regulatory element, if at all.

Most non-generic drugs currently available have been patented meaning the developer of the drug has exclusive rights to produce and commercialize it. This also prevents others from making and selling the patented drug. Those drugs that are not patented are called generic drugs because they can be produced and sold by anyone. At one time most of these generic drugs were patented but the patent has expired (patents have a life of 17 years of exclusivity and after the patent expires the drug then becomes a generic).

Since the dawn of man the spiritual and religious use of drugs has been very common. The cultivation, use, and trade of drugs, in particular psychoactive drugs, began before civilization. Drugs that have spiritual and religious use are called entheogens and some religions are completely based on the use of these drugs. Entheogens are mostly hallucinogens that are either psychedelics or deliriants but some are also stimulants and sedatives.

Smart drugs

Drugs that are commonly referred to as smart drugs are called nootropics which are designed to improve human mental abilities such as memory, concentration, thought, mood, and learning. These drugs have been used to treat such conditions as attention-deficit disorder (ADD), Parkinson's disease, and Alzheimer's disease. Also, those patients who have lost some brain function, especially those during aging, have been treated with nootropic drugs.

Drug prevention

Due primarily to their addictive nature and personality effects many drugs have been prohibited or banned through government and/or religious laws. This seems obvious for such hard drugs as heroin and cocaine but less so for such drugs as

alcohol and tobacco (Bhutan is the only country that has outlawed tobacco, both possession and use). Though this is to prevent certain drug use or abuse it should be noted that the easiest way to regulate drug use is through the prescription system. Through such a system the manufacture, distribution, marketing, volume, and sales of some drugs can be tightly regulated. However, this does not concern our cinemascientist who, either through illegal trade, the black market, or perhaps making it himself, can access and use whatever suits his purposes. The general overall reason for banning some drugs is due to the violence and harm to the body they can cause. The most common groups of banned drugs are barbiturates (nembutal, seconal, amytal), benzodiazepines (restoril, normison flunitrazepam, and erimin), and opiates (morphine, codeine, oxycodon, heroin). Also, even though such drugs as alcohol and tobacco may be legal to use certain measures have been put in place to discourage their use such as age limits and label warnings not to mention a "sin tax" in which the consumer pays a premium to buy the product.

There are two key elements to banned drugs namely the relative dependence they cause and the amount of harm they can cause to your body. The worst offender on both accounts is heroin followed by cocaine and barbiturates. Right behind those are the drugs that are mildly dependent and can cause some bodily harm and examples are tobacco, alcohol, benzodiazepines, and amphetamines. Lower on the list are those drugs that have little to no dependence with very little bodily harm and examples are cannabis, khat, amyl nitrates, LSD, and (in moderation) anabolic steroids.

Stimulants

Amphetamine (speed), cocaine, dexedrine, methamphetamine, and ritalin are examples of stimulant drugs. Caffeine as well as theophyllin (the main active ingredient in tea) are also stimulants and therefore considered a drug. Stimulant drugs are mostly psychoactive that induce temporary improvements in mental and/or physical functions. Examples of such include alertness, wakefulness, and enhanced physical activity; heart rates and blood pressure increase with stimulants. Stimulants enhance the neural activity of the central and peripheral nervous system. With these effects a nickname given to this class of drugs is "uppers". It should be noted that epinephrine is not the speed alkaloid; speed (amphetamine) is a synthetic adrenaline. The speed stuff is ephedrine. Epinephrine and ephedrine unfortunately are spelled and sound alike though their MOAs are completely different.

Administration of drugs

Since not all drugs are the same it follows that not all drugs are taken in the same way. For example, drugs given as an injection can be intramuscular, intravenous, intraperitoneal, or intraosseous; some drugs are inhaled as an aerosol; drugs snorted through the nose is insufflation; drugs taken orally must be absorbed by the intestines; suppository drugs are those given rectally which are absorbed directly by the rectum or colon; sublingual drugs are those placed

under the tongue that diffuse into the blood stream; and topical drugs are those used as a cream or ointment that are absorbed into the body.

Drug addiction

The nature of addiction and why addicts are so desperate is beyond the scope of this article. Suffice it to say much research and effort is going into understanding the causes and ways and means to treat the disease, which indeed it is. However, for you gentle readers there is a brain hormone called dopamine that may be a significant player in drug addictions, though some neuroscientists are debating this. Dopamine is a natural neuromodulator that is associated with reward and is the engine that powers attention to goals, the need for urgency, and whatever it takes to get there. Many addicts have a dopamine spike when they get high on drugs and this only helps the reward process in wanting more and more again and again. Neuroscientists have been able to separate the neural circuitry that functions with liking and wanting. The liking element is mediated by the body's own opioid-like molecules where the wanting element is mediated by dopamine, the pleasure and therefore the pursuit of that pleasure. Though not obvious key elements of addictions are the emotional and personality makeup of the addict, or as often in our case, the cinemascientist.

In SF cinema the drive of "it would be great to have some now!" and "how can I get some now?", though not particularly obvious, are the reasons for behavior justification in getting the wanted drug. Plus the drugs are used as a means to drive plots. Also, there is the ability to make one drug look like another though have an entirely different effect and MOA. In the real world drugs have a limited MOA that does not apply to fictitious SF drugs that can work in any way intended to advance the plot. In the world of drugs in SF cinema the possibilities are endless.

Natural products vs synthetic drugs

As mentioned above, natural products are those small molecules isolated from plants, fungi, bacteria, and other microorganisms that are used to alleviate and treat diseases. Such natural products have mostly been the basis behind many of the FDA approved drugs and they still inspire drug hunters and makers to search for more effective treatments. Most drugs have started out as a plant extract (the French, 'drogue' or dry barrel emphasized this origin) which was analyzed later to separate out the active component(s). If possible, this active component was then synthetically made to bring down the relative costs of manufacturing.

Typically, natural products are very complex molecules that are very difficult to synthetically make so they are harvested and purified from natural sources, hence the name, natural products. Overall, it is generally cheaper to synthetically make the drug (for example, it is much cheaper to make aspirin than it is to harvest it from a plant source) but in cases where the drug is very complex then it must be harvested from a natural source. Traditional medicines have

used local flora and fauna for centuries indicating that they do have a basis of effectiveness. The general costs of natural product drugs is typically more than their synthetic counterparts due primarily to all the labor intensive steps involved compared to the cheaper synthetic steps.

Overseeing all of this is the Food and Drug Administration or FDA. As a regulatory body the FDA came into being by President Theodore Roosevelt in 1906 to make sure drugs were made safely and used properly. However, it wasn't until 1938 when the government gave the FDA authority to monitor the safety of new drugs. World War II put everything on hold and after the war the era of modern medicine began with the FDA playing a larger and larger role in drug policy.

Placebos

A type of drug that is essentially a non-drug is the placebo. The word, placebo, is derived from the Latin meaning "I shall please", and refers to any simulated or ineffective medical treatment that is nothing more than a deception. A common name for a placebo is a "sugar pill". What is interesting is that some patients given a placebo pill have perceived or actual improvements in their conditions which has led to what is called the 'placebo effect'. In medical research placebos are typically given as control treatments as a way to separately measure and compare the effects of the actual study drug. What this means is that the brain's perception and the brain's role in physical health is important. It should also be noted that placebos work differently in different diseases.

Drugs vs non-drugs

To help you Scary readers better understand drugs in SF cinema it is important to also understand what are not considered drugs. Typically, any natural food is not considered a drug no matter how much of it you eat, even though certain chemicals derived from natural foods can be considered a drug. Vitamins are not considered drugs as well as nutraceuticals since they mostly deal with nutrition and therefore do not have the MOAs of classical drugs. The boundaries here do blur since many foods and nutraceuticals can help regulate say, blood pressure and some infections. Poisons and toxins are also generally not considered drugs; however, purified extracts of poisons and toxins, carefully used and administered into the body, are considered drugs.

There are many endogenous biochemicals that work essentially as drugs but are not considered so because they do not come from outside the body. A drug, natural or man-made, must be introduced into the body. Hormones like insulin are natural biochemicals and are not generally considered as a drug. However, with diabetics insulin is considered a drug because they need to inject the substance, even if it is of human origin. So, even if a molecule is a natural substance it is not considered a drug until it is purposefully introduced into the body from the outside.

For our cinemascientist some would like their drugs to be disguised. They would like to have them look like one drug but have the effects of a different one. The only reason one would want to disguise a drug is subterfuge. Our cinemascientists do have their nefarious means. One question that comes to mind is are any of the cinema drugs like “energy drinks” or like energy pills?

Drugs with no names

Since this article deals only with drugs with fictitious names it must be noted that those films that do have unnamed SF drugs that work in their own unique way are plentiful. Some examples of drugs used in SF cinema that do not have any names are the various potions used in any Dr. Jekyll and Mr. Hyde film; the “green reagent” from RE-ANIMATOR; and various “truth serums” as well as any “knock-out” drugs. Though unnamed they work just as wonderously and dramatically as our named drugs.

The Films

It must be pointed out that this is not an exhaustive listing of all SF films that have drugs, real or otherwise, as part of the plot. That would be a long list indeed. Also, drugs mentioned in the literature that films are derived from are way too numerous (look no further than any Philip K. Dick novel) so to keep it simple our focus is in film itself and of these we limited ourselves to just 20 titles. When looking at the overall list of drugs used in some of our favorite SF films some generalizations can be made. In these films most of the drugs work by altering brain function, directly or indirectly, usually in some sort of hallucinogenic way (perhaps as behavior controls?). Other drugs work like amphetamines or have hormone-like effects in that they influence metabolism and control cell growth. And, of course, they all do *exactly* as the drug’s inventor intended. As a safety precaution perhaps the drugs in SF films should have warning labels not to mention expiration dates.

Drugs in SF films prior to 1960 are relatively scarce with only four mentioned in this article. Films after 1960, 16 for this article, are more common with drug involvement. One of the reasons for this is that drugs, at least the synthetic kind, are a relatively new post-World War II occurrence. As such, they did not really factor that much in society prior to WWII and this relative absence is reflected in film. When drugs became more prominent in society, post WWII and into “modern medicine”, after 1960, then this was reflected in film, especially since the 1970s with drugs being more visible. Again, to reiterate, we are talking about fictitious or fake drugs in SF films and not real drugs taken during a film.

Monocane – THE INVISIBLE MAN (1933).

From the start we will acknowledge that no such substance like monocane really exists that can render anything invisible. As described by Dr. Crawley, the employer of Dr. Jack Griffith, the original invisible man, monocane is, “a drug made from a flower grown in India. It draws color from everything it touches.” For something to be invisible light must pass through it and not simply just “draw

color". (In reality for anything to be invisible would be all about changing the physical optical density of matter.) To extract and test a substance like monocane (or monocaine), a compound from a plant and therefore a natural product, would require some sophisticated lab apparatus, mostly glassware to isolate the natural product's main ingredient in the plant. Crawley further goes on to state that monocane "turned a dog dead white, like a marble statue." There is no known substance that can do that either. And "white, like a marble statue" is nowhere near invisible.

However, assuming monocane does exist then a laboratory is necessary to study it. For monocane itself, Griffith describes how he used it thusly, "a little bit of this injected under the arm every day for a month". This is what is called an IM or intramuscular injection. It is unknown if the effects of the drug were a gradual progression to invisibility during the 30 days of treatment or was he OK until the 30th day when, on the last injection, he immediately became invisible? While describing the mode of injection he is holding a large open glass container about half filled with around 500ml (for comparison, a large plastic soda bottle contains around 750ml) of a dark liquid, presumably monocane. I am not sure what a "little bit" actually is and an injection under the arm (arm pit?) is unusual; the actual injection site would be irrelevant but most likely be at the bend of the arm because of easy access. However, should an IM injection be necessary then this could easily be done at the deltoid muscle located at the upper arm near the shoulder; also, the buttocks or upper thigh are a good place for an IM injection too.

Duocane – THE INVISIBLE MAN RETURNS (1940)

In the film, RETURNS, the word, monocane, is not used. Instead, the word "duocane" is (inexplicitly) used and defined as, "an extract of an east Indian herb that took the color out of things...combined with other ingredients...made the body transparent when injected in the blood stream." This description is very similar to that in the original THE INVISIBLE MAN. To extract the active ingredient, duocane, from a plant a large amount of exotic glassware would be needed to do all the purification steps and this glassware is all seen scattered around the lab benches. Since duocane is derived from a plant source it can be considered a "natural product", meaning it is not synthetically made, and therefore one that could be regulated differently by the drug governing bodies like the FDA. Overall, there are more stringent requirements for synthetically made drugs than for naturally obtained drugs. Natural drugs are extracted and purified whereas synthetic drugs are manufactured so their FDA requirements are different.

Sulfa hydral – THE AMAZING COLOSSAL MAN (1957).

Sulfa drugs were first discovered in 1935 and consist of a family of antibiotic drugs that are used to treat bacterial and some fungal infections. Sulfa drugs work by interfering with bacteria and fungi metabolism and were considered "wonder drugs" before penicillin was developed. Sulfa drugs concentrate in the

urine before being excreted which is why they are primarily used today to treat urinary tract infections.

Here is an interesting verbal exchange between Dr Linstrom and his colleague Dr Coulter in the film. After a long night of research Dr Coulter says, “the answer is in the bone marrow. We were so close we couldn’t see it.” Dr Linstrom immediately senses what he was saying and responds with, “inject sulfa hydal compounds into the bone marrow.” [Note his use of the plural of that word.] Though there are a number of sulfa drugs available none of them are named “sulfa hydal” so it is anyone’s guess as to what that is and what it does to bone marrow. Dr. Coulter then says, “the thing that fooled us was we were looking for some unknown quantity in the plutonium radiation while all the time it was acting to a degree the same as a hydrogen exposure. (whatever that means.) The secret was in the degree of exposure.” Dr. Linstrom replies with, “then the injection of the sulfa hydal compounds should correct the body’s regenerative balance...it may stop his growth but it won’t diminish his size.” This is in reference to Glen Manning, the Amazing Colossal Man. Dr. Coulter added, “the stimulation of the hormone secretions in the pituitary or growth controlling glands will take care of that...I used high frequency stimulation of the pituitary gland causing the hormone secretions to reverse the growth process.” Dr. Linstrom then adds, “first injections of the sulfa hydal compounds into the bone marrow.” Dr. Coulter responds with, “that will stop the growing.” It appears that in the film sulfa hydal is used to treat bone marrow and pituitary secretions thereby controlling an animal’s size. The reality of an antibacterial is a long ways from controlling an animal’s size through hormones.

Digenerol – FRANKENSTEIN’S DAUGHTER (1958).

Digenerol is a synthetic drug needed by Dr. Morton for his formula that is supposedly useful in preserving cells and tissues. (The drug’s name is very appealing. It sounds like something you could get at the local pharmacy, “One bottle of digenerol, please.”) Morton tells Oliver Frank (aka, Oliver Frankenstein, grandson of *the* Dr. Frankenstein), “I’m on the threshold of developing this drug. It would be a boon to mankind. Think what it would be like. To be able to wipe our all (!) destructive cells and organisms that plague man. No disease. No destructive tissue or growth. Man would be ageless.” Oliver replies, “I’m afraid you’re on the wrong track. Your formula may work on internal cells (called endothelial cells) but it causes violent disfigurement to sensitive exposed skin areas” (also composed of endothelial cells). [Note: no single formula will be able to “wipe out all destructive cells and organisms”.]

In one exchange, Morton says to Oliver, “We’ll start the day by using acid pentyl to hold the formula together.” Though it certainly sounds important its meaning and use are unclear. Compounds that are used to “hold formulas together” are collectively referred to as incipients and acid pentyl could serve this function. Acid pentyl, more commonly known as amyl acetate and a derivative of acetic

acid is primarily used to solubilize organic molecules suggesting that the drug Morton is trying to develop is a small organic compound.

Morton says, "I'm sure if I could get digenerol as a catalyst it would work." The drug's MOA is temporary in that after a while (it is dose dependent) the changes revert back to normal. As the developer of digenerol says, it is "a drug we've been trying to perfect for a number of years...right now that drug is very dangerous...it hasn't been perfected yet. As it is now it degenerates tissues and cells. In the wrong hands it could seriously disfigure anyone who might take it internally." Most drugs go through various phases of development and a precursor could indeed be "very dangerous" but the details of why were worked out, removed, and understood way before the drug becomes available.

Trimorphonite – UNEARTHLY STRANGER (1963).

As described in the film, the drug, trimorphonite, is a "powerful and totally immediate sedative" that is "part of the morphine family". In the film, the drug appears to control behavior. In one scene, a woman dosed with the drug was able to lift a hot casserole pot from a 275 degree oven with her bare hands. Though the drug would deaden the pain receptors skin damage would still occur due to the excessive heat.

Most of the film's action takes place at the 'Royal Institute for Space Research' where a team of scientists is trying to "harness the power of concentration." Aliens took note of our space interests and wanted to stop the work by killing off the scientists. The scientist's deaths were caused by having their minds explode and "blood vessels at the base of the spine were completely destroyed". Also, there was a fusion of neck vertebrae. Traces of trimorphonite were found in their arteries. By way of an explanation small amounts of the drug were found inside space capsules so there is the implication of a "not of this earth" origin. Trimorphonite is seen as a means to subjugate and control people so it is a behavioral control drug.

Moloko Plus – A CLOCKWORK ORANGE (1971)

Distributed in the Korova Milk Bar are several stimulants that are mixed with a milk substance called, milk plus or Moloko Plus. There are three types of milk plus called, vellocet, drenchrom, and synthemesc (sounds like synthetic mescaline). These stimulant drugs are used by Alex and his droog friends to go on psycho rampage benders. These milk plus drugs are similar to PCP and angel dust (amphetamine) in that they produce acute alertness and ultra-violent tendencies. As Alex describes, it "sharpens you up and make you ready for a bit of the ol' ultraviolence". Moloko Plus is a combination of all three: vellocet (barbituates or opium related), drenchrom (adrenachrome), and synthemesc (mescaline). Barbituates, opium, and mescaline mixed together would make an interesting cocktail and certainly prep you for some "ol' ultraviolence".

Why the drug needs to be taken with milk is interesting. Perhaps the many biomolecules and natural chemicals in milk help stabilize the drug and help it get absorbed through the digestive system and into the rest of the body. A secondary benefit could be a pseudo “slow-release” like effect in that the milk helps delay some of the absorption processes making the effects of the drug longer lasting since it slowly gets into the blood system. A result would be a longer lasting high. Of course, if one of the drugs were lactose intolerant then milk plus would be a problem.

In addition to the above another drug is mentioned in this film. “Science has cure” screams a newspaper headline. This is in reference to an experimental drug, referred to as “serum114”, apparently a drug which causes severe nausea, pain, and discomfort when violent criminal tendencies are starting. The serum 114 drug treatment was developed as a means to cure violent tendencies in criminals in that when a violent act is about to be committed other physiological countermeasures of pain, etc take over thereby decreasing the tendency and stopping the criminal act before it happens.

Kalocin – THE ANDROMEDA STRAIN (1971)

A wonderful invention by author of *The Andromeda Strain*, Michael Crichton. As described by Crichton, the drug, kalocin, has the amazing ability to cure all diseases, known and unknown, including every known virus, bacterium, fungus, parasite, and cancer. Unfortunately, those who stop taking the drug quickly die from opportunistic super infections resulting from a shut down of the natural immune system caused by the drug. Crichton even went so far as to name the fictitious company that manufactured the drug in 1965 (Jensen Pharmaceuticals) as well as a (fictitious) reference to the science journal, *Nature*, indicating the “actual source” of the drug. The main protagonist in the film, Dr. Stone, a Nobel Prize-winning bacteriologist, is the developer of kalocin. For the record, there is no such single drug that has the ability to cure “all diseases” so kalocin is, alas and alas, fictitious indeed.

Muscle – LOGAN’S RUN (1976)

The drug, muscle, is briefly used on Logan while he was running to find Sanctuary by one of the Cathedral cubs, children and adolescents that live under homeless conditions. Apparently, this drug seemed to be saturated in a cloth that is used to cover Logan’s mouth thereby disabling him so it can be considered an inhalent. Nevertheless, the drug wasn’t used long enough for it to have any real effect on Logan. Muscle is supposed to be like a super-amphetamine that overstimulates neurotransmitter release in the brain and help speed everything up. As explained in the original book, *Logan’s Run*, by William F. Nolan and George Clayton Johnson, the sandman Logan says, the drug muscle, “shakes you to pieces...speeds everything up to a blur.” It would be an interesting contest to compare muscle with polydichloric euthimal (see OUTLAND below), both amphetamines. As uppers, compare muscle, the “super-amphetamine” with polydichloric euthimal, “the strongest thing you ever saw”.

Also, during an early scene in LOGAN'S RUN a pleasure drug in a glass ball was thrown up against the ceiling causing it to break releasing a thick red cloud of dust apparently bringing about a mass orgy . This unnamed drug would enhance libidos as well as provide a sense of euphoria.

Blue Dreamers – SATURN 3 (1980)

A blue dreamer is a small blue gel-paste like tablet that is easily cut with a knife and taken orally with a liquid (appears to be tea). As described, blue dreamers is a synthetic drug that “when they send someone out alone (in space) they give them one of these to keep them from going static”. The action in the film takes place on an isolated moon of Saturn, at a hydroponics lab, so a “better living through chemistry” motif of taking drugs to help you get through the long and lonely days may be useful. Both a male and a female took half of a pill so presumably the drug works on both sexes. The drug apparently takes a while to have its effect and supposedly enhances libido and overall erotic experiences and may be a version of viagra. Also, the drug may provide some hallucinogenic perceptions especially while sleeping. The overall effect of the drug would be to eliminate boredom.

Ephemerol – SCANNERS (1980)

As Dr. Paul Ruth, a psychopharmacologist, the inventor of the drug describes, “the drug is called ephemerol. It is a scanner suppressant. It does nothing when given to ordinary human beings. When given to a scanner it prevents the flow of telepathy. It stops the voices.” The drug interferes with cognitive senses and neural network. The apparently readily available drug, in liquid form, appears to be given in 5cc doses, IM, via hand muscle. In the film, Biocarbon Amalgamate (owned by ConSec) manufactures the drug. As stated, “the production of ephemerol is computerized. Its being sent out in huge tankers.” As explained in the film, ephemerol was given to pregnant women during the mid 1940s (by Dr. Frane), perhaps as a way to relieve morning sickness, resulting in children born as scanners. (Shown in the film is the July 22, 1946 issue of *LIFE* magazine with a (fictitious) full-page ad for ephemerol.) Ephemerol is a tranquilizer aimed at pregnant women (when during pregnancy? First, second trimester? And for how long should the drug be given?) with “invisible side effects on unborn children” [shades of thalidomide poisoning. Thalidomide was originally a sleeping pill that also helped morning sickness in pregnant women primarily given during the 1940s and 1950s. Unfortunately, multiple birth defects resulted in this causing the drug to be pulled from the market.]. A prototype of ephemerol was given to Dr. Ruth's pregnant wife 4 years before marketing and she had two sons born who are scanners. Some potential side effects may include nosebleeds, nausea, earaches, gastric cramps, telekinesis powers as well as telepathy, including the mental power to explode heads.

Bacta – THE EMPIRE STRIKES BACK (1980)

Useful for full body regeneration so the drug must have growth hormone-like properties. A synthetic solution useful for everything from superficial injuries like minor cuts to serious whole body engineering such as Luke Skywalker needed when he was totally immersed in a tank of the semi-viscous fluid after suffering injuries from a mauling by the ice creature, Wampa, as well as frostbite (severe cellular damage) from the extreme cold temperatures of the ice planet, Hoth. Since these injuries were superficial and not internal, though severe, a different means of healing was needed such as a drug that focused on skin growth and integrity. The drug, bacta, was dissolved in a fluid, probably something resembling serum and/or plasma, fluids that mimic the body's natural fluids, that allowed all skin surface areas to be equally bathed in the drug. According to Star Wars lore bacta is a synthetic chemical consisting of a gelatinous fluid containing bacterial particles that promote wound healing and rapid skin tissue regeneration all the while preventing scar tissue from appearing. An interesting concept.

Polydichloric euthimal – OUTLAND (1981)

A red liquid given in doses of about 5cc per injection. The illegal drug is a “company tranquilizer...company issue” to help alleviate the boredom of working at a mining colony on a moon of Jupiter. After a blood sample was taken from a seemingly suicidal victim it was discovered to contain polydichloric euthimal. As Dr. Lazarus explains to Marshall O’Neil, “its an amphetamine. Strongest thing you ever saw. Makes you feel wonderful. You do 14 hours of work in 6 hours. It makes you work like a horse.” It also has side effects as Lazarus says, “it makes you psychotic. It takes a while...10, maybe 11 months. And then it fries your brain.” Some taking the drug over prolonged time commit psychotic suicide. The effects of the drug build up and affects some more than others indicating some fundamental psychotic tendencies must be present that are exacerbated by the drug.

Amphetamines are a class of psychostimulant drugs that produce increased wakefulness while decreasing fatigue and appetite. Specifically, amphetamines increase neurotransmitter activity in the brain through the release of dopamine and norepinephrine hormones. This activity brings about less fatigue, an elevation of overall mood, a heightened libido, a sense of euphoria along with a loss of appetite. As with any drug repeated high-dose intake can lead to a variety of mental states such as delusions, psychosis, and paranoia. Through the release of the serotonin neurotransmitter the user could experience hallucinations and perhaps hyperthermia. Keep in mind that recreational doses of amphetamines are far greater than those given under a physician’s care so there are significantly increased risks of serious side effects. Perhaps similar to those in OUTLAND where the ones that took the drug over prolonged times went psychotic and killed themselves are the real world chronic abusers of amphetamines that also show psychotic tendencies.

Marca herbs – RETURN OF THE JEDI (1983)

This drug can be considered a natural product since it is derived from a plant and apparently not synthetically made. When we first see Jabba he is smoking what appears to be a hookah like device. The water in the device is being aerated with bubbles and smoke is seen rising out. Stating the obvious the marca herb drug seems to be an analog of marijuana and perhaps opium that perhaps only the Huts use (a cultural and/or religious practice?). After smoking on his hookah the overall look on Jabba's face is one of relaxation and euphoria, complete with puffy eyes.

Melange – DUNE (1984)

This is one of those cases where the information on melange is so engrained and famous from the Frank Herbert novel, *Dune*, that it is difficult to separate this from the film. Nevertheless, the drug, melange, also known as the "spice" is only found on the planet, Arrakis, also known as Dune. This drug can be considered a natural product since it is derived from secretions from the giant sandworms that inhabit Dune. This amazing drug expands lifespans (an anti-ageing geriatric drug), gives greater vitality (increases adrenaline and testosterone), and through the use of navigators makes possible interstellar travel in that suspended animation-like effects can be used to survive long distances. In some people it even gives them the ability to see the future by unlocking prescience or forethought. Amazing stuff indeed. Unfortunately, there are side effects such as addiction, very blue eyes (the sclera or the 'white' area), and with high doses there could be fish-like morphological changes as well as weight gain. Also, alcohol seems to enhance the effects of melange.

Zombinol – THE SERPENT & THE RAINBOW (1987)

The drug, zombinol is a wonderful name that seems so obvious when the intended target group is understood. The real life ethnobotanist, Dr. Wade Davis, is the author of the book, *The Serpent and the Rainbow*, a fictionalized version of his experiences in the Caribbean while doing research on voodoo and zombies. The actual chemical Davis discovered as the basis of zombification is tetrodotoxin, a real deadly toxin obtained from puffer fish. Tetrodotoxin is an inhibitor of nerve cell responses and acts on both the central and peripheral nervous systems that results in loss of respiration and vasomotor control. Just a small dose of 1-2 milligrams is enough to kill a human.

In the film the drug is ingested so it has to be absorbed through the digestive system. Upon examination by a physician a zombified man "displayed negative pulse, no heartbeat, no respirations, no pupil dilation, no brain waves, no response to pain." As a result he was buried only to be discovered alive years later. The head of the drug corporation investigating zombinol says, "somebody brought him back from the grave and I want to know how they did it." As explained by the scientist, "the ingredients to the powder are terrifically varied. There is the poisonous sea toad, *Bufo marinus* [cane toad], the same animal Lucretia Borgia used. Made even more toxic by frightening it with a stinging sea worm. And the puffer fish that produces one of Nature's most powerful poisons,

tetrodotoxin. Plus a whole pharmacy of herbs, minerals, charred and ground and mixed with a skill that is astonishing...the process takes 3 days and nights." A complex procedure indeed and one that would be difficult to exactly reproduce each and every time with no variation.

Back at the drug corporation the effects of a sample of the zombie powder on a baboon are noted. Measured were the limbic, sensory, autonomic, and motor responses, all neuromuscular related. Shortly after receiving the drug the baboon's respiration, pulse, and blood pressure registered "zero". From the results a scientist concluded that the zombie drug is, "very focused. Targets only certain areas of the brain...area of the brain that controls sensory, thoughts, and emotions are still active...hear, see, maybe even feel, think, but you couldn't do anything about it", meaning you are alert but could not move. It was noted that the effects of the zombie powder wore off after 12 hours or so leaving the victim completely normal again so to remain a zombie the powder would have to be given at regular intervals.

Nuke – ROBOCOP 2 (1990)

"Thank you for your cooperation" a frequent voice over says on behalf of the mega powerful corporation, OCP (Omni Consumer Products). As stated in the film, the drug, nuke, is "the greatest health threat facing our nation. Nuke, the most addictive narcotic in history" as even a single dose is enough to cause addiction. Since nuke is a designer drug this means it is synthetically made and therefore controlled by special interests solely out for profit, not caring how addictive it is. In the film, nuke is a generic name for several varieties such as red ramrod, white noise, black thunder, and blue velvet. Those who take this addictive narcotic, as explained in the film, "...will know paradise every moment of their lives. There is a nuke for every mood. We will offer our customers every opportunity to control every aspect of their emotional lives."

The most common form of nuke seen in the film is red ramrod that comes as a red liquid in a single use, injectible vial form. Each vial dose is about one milliliter of volume and there are 10 vials per container (which is nothing more than a cassette tape holder) and the dose is self-given in the neck, probably the jugular vein. In this way the drug will immediately circulate to the brain and the rest of the body thereby satisfying the addictive craving. However, injecting anywhere in the body would be effective. Nuke appears to be similar to crack cocaine in that it gives a powerful high with strong elation and heightened senses.

Reds – SCREAMERS (1995)

The surface of the planet, Sirius 6B, is heavily contaminated with radioactivity. To help neutralize the effects of radioactivity the inhabitants occasionally take the drug, "red". This drug is distributed in the form of a cigarette, quite ironic saying that you can "smoke your cure". As said during the film, "I can't believe you gotta put this shit in your lungs just to neutralize the shit in your lungs." When asked how one knows if the drug is working the response is a terse, "you don't die."

The intent of the drug is to prevent radiation damage to those on the surface of the planet Sirius B. When a large cloud of radioactive particles approaches a base the people at a crowded nightclub are instructed to 'light up' (a voice over says, "radiation alert...please light your reds") to help provide some protection. This suggests the drug has a temporary effect and not a long lasting one since frequent light ups are necessary.

Apparently, they are more concerned about inhaled radiation instead of what is hitting the body from other sources. Just wearing a suitable mask would be efficient to keep out inhaled radiation so cigarette smoking as a method is excessive. How often do they light up? Inhalation therapy is a common method to administer drugs, especially those with lung problems. For inhalation therapy to be effective in neutralizing radiation the drug would most likely be a chelator, meaning a drug that literally grabs each radioactive atom in a cage grip-like structure thereby making it easier for the body to eliminate and not be absorbed. Taking such a drug prophylactically does not make sense since the radioactive particles would actually have to be there for the chelator to be effective. Otherwise, the chelator would be flushed out of the body naturally.

Blarcy – DARK ANGEL (aka, I COME IN PEACE; 1997)

Blarcy is the alien name for human endorphins, a recreational drug for the aliens. To obtain the drug an alien injects humans with a high dose of heroin which causes a massive release of endorphins that the alien extracts and subsequently uses as his drug. As an alien said, blarcy is "a priceless drug from where I'm from...rare, illegal." It was stated that "one ounce would be enough for 1000 doses." An ounce is 28.35 grams and dividing it by 1000 would make 28.35 milligrams per dose. A large dose for anyone that would more than achieve the 'high' sought after. The alien is essentially a drug dealer from outer space.

As a coroner states upon examining a victim of the alien, "heroin stimulates the pituitary to make endorphins. Endorphins are a hormone that create an incredible sense of well being. Nature's ecstasy." It is this 'high' that the alien wants and his way of getting it is to overdose humans. If that were me I would go to a pharmacy that sells endorphins or, better yet, order some through biochemical catalogs (its legal) and remain anonymous with the order.

Endorphins are, as the coroner states, "nature's ecstasy" so though normal in humans it is apparently a recreational drug for aliens. Natural drug compounds are "natural" to the endogenous species but can be highly reactive in another species, such as man. Many of the products harvested from plants are natural to the plant species but can have quite dramatic effects in different species such as man, heroin being a good example with opium being another. That natural product drug heroin is natural to poppy plants but has significant and highly addictive effects in humans. In the same way, endorphins (blarcy) are natural to humans but addictive to these aliens.

Red/Blue pills – MATRIX (1999)

These drugs must be anti-psychotic and LSD related to cause such strong mental images in those who take it. Maybe a 'super-acid'. One makes you enter the Matrix whereas the other might make your world appear normal. They essentially enhance the senses in mainly hallucinogenic ways. The blue pill provides the blissful ignorance of illusion (the fabricated Matrix reality) whereas the red pill is the painful truth of reality, the real world (why would one need a pill to stay in the real world of reality?).

Upon taking the blue pill the person will lose consciousness and remain in the fabricated world of the Matrix perhaps wondering how deep the rabbit hole does go. The person taking the red pill will become unplugged or freed from the Matrix and live in the real world. It should be noted that each person has only one choice for pill taking with no reversals once taken. In its simplest form the pill taker can either live in reality (red pill) or a fantasy world (blue pill). It is tempting to speculate that those who would take the red pill live in 'red states' whereas those living in 'blue states' would take the blue pill.

Neuroin – MINORITY REPORT (2002)

The drug, neuroin, appears to be a combination of heroin and a neuro compound. Neuroin is taken via an inhaler so it can be considered a gas form of heroin and therefore huffable. The drug gets into the lungs and then directly into the bloodstream via the lung tissues. Use of the drug gives extremely relaxed euphoria with a dullness of the senses. The drug can be considered a psychotropic in that it alters mood as well as cognitive and perceptual alterations, maybe even enlightenment. The offspring of neuroin addicted users have clairvoyant abilities and are used as a plot device to locate extreme crimes such as murder in advance of the event taking place to essentially stop crime before it happens.

Some also rans

In addition to the above 20 drugs there are a few more fictional drugs that may be of interest. The drug, "hypnocil" is used in the film *A NIGHTMARE ON ELM STREET #3* that supposedly suppresses dreams though an overdose results in an irreversible coma. In the original TV series, *Star Trek*, in the episode, "Mudd's Women", a 'Venus drug' is used to enhance the appearance of women and to make men more aggressive. *Star Trek* also has hyronalin which counteracts radiation poisoning; or cordrazine. There is "Soma" from Aldous Huxley's novel, *Brave New World*, a drug that keeps everyone sweet, blissful, and happy. Also, "Substance-D" from Philip K. Dick's, *A Scanner Darkly*, a drug that essentially twists your mind in a way that only Phil Dick can. Some other fictitious names are: Mindjacks from *STRANGE DAYS* and Tek from *TEKWAR*. [Yes, there are more and we can leave it to the gentle readers to list them.] Comic books (for example, Zombrex – ambuzol vasiplatin (from the popular *Dead Rising* comic book) and other popular forms of literature and entertainment also have fictitious drugs and are way too numerous to list in this article.

Other examples of real drugs, prescribed, OTC, or experimental, in SF films are: WHITE ZOMBIE: “just a pinprick”; and THE UNDYING MONSTER: cobra venom factor, a toxic drug that paralyzes.

Summary

The films discussed here span a time frame of about 70 years and during this time much has changed about our understanding of what drugs are, what they can do, and ways to use them to improve life and health. “Better living through chemistry” is the unstated motto of these films. Though the extraordinary drugs used in SF cinema have interesting and unique names they essentially represent real drugs that act in similar ways. Basically, they are ordinary drugs with unusual names. Even those “one-of-a-kind” drugs uniquely made by our cinemascientist for a specific application work in relatively ordinary ways. And of course those drugs not of this earth act in their own unique ways too. These SF drugs, both natural products and synthetic, are mostly hallucinogens, amphetamines, opioids, or hormone enhancers. All in all, both real and imagined drugs in the SF film world are of interest and help move our favorite plots along. And drugs help make our monsters and their creators scary.

Thanks for reading. It’s back to the lab for me. Stay healthy and eat right.