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Forget facelifts, tummy tucks, or liposuction for your cosmetic needs. Botox, one of the newest treatments available to smooth out skin, is now one of the most popular ways to alleviate signs of aging. Ever since its cosmetic usage was approved by the Food and Drug Administration (FDA) in April of 2002, Botox, or botulinum toxin A, has made its way into American popular culture. People view Botox as a miracle remedy for wrinkles at the neck, forehead, eyes, glabellar (space between your eyebrows), or anywhere else on the body where people do not want wrinkles. Since the 1970s, Botox’s popularity, due to its safety and effectiveness, has grown by an enormous amount.

Botulinum toxin A is made from the bacterium, Clostridium botulinum. It is just one of the seven toxins that the bacterium can make. From its name, one can infer that Botox was meant to be some sort of toxin. The chemical nature of Botox actually serves to block a protein, SNAP-25, that is essential in releasing acetylcholine. Without acetylcholine, the muscles in the body cannot be triggered for contraction. One can imagine that Botox could have disastrous consequences if it somehow made its way to a person’s heart. Fortunately, Botox stays near its area of injection and resides there for three to eight months in order to severely limit muscle contraction. The idea is that if muscle contraction is limited, the wrinkles in the skin will disappear.

Aside from its cosmetic usages, Botox can be utilized to treat a wide range of medical conditions. Blepharospasm, convulsive winking caused by involuntary contractions of the eyelid muscles; strabismus, the inability for both eyes to focus on a single object; cervical dystonia, abnormal movement in the neck; migraines; and back spasms are just a few of the conditions that Botox has been found to help alleviate.

Being a toxin, the injection doses of Botox has been kept at the lowest effective dosage. The FDA has recommended that injections should be repeated every three months for continued results.

This drug has so far taken this country by storm, but the price does not come cheap. The average cost per treatment is around $400, a hefty amount for the typical person. Nonetheless, many are willing to shell out the cash to get rid of those pesky wrinkles.

-Kentson Lam

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F or every cell, there is a time to live and a time to die.” Cells die from either deleterious agents or they are induced to commit suicide. The process of programmed cell death or cell suicide is called apoptosis. However, apoptosis is needed for normal development. During apoptosis, cells die in a controlled and regulated way, unlike another form of cell death called necrosis, which is an uncontrolled lysing of cells that can potentially cause health problems. Instead, cells play an active role in their own deaths during apoptosis.

Some examples of normal apoptotic activity include the removal of tissues in between the fingers and toes during human development in the fetus. Another occurrence by apoptosis is the shedding of the endometrium, or inner lining of the uterus, at the start of menstruation.

Yet, another reason why a cell would commit suicide is to eliminate a potential threat to the organism. Some examples for cell death are cells infected with viruses, cells with DNA damage, and cancerous cells due to radiation and toxic chemicals. Since apoptosis is so important in an organism’s normal life processes, its failure results in a variety of diseases, including cancer and HIV/AIDS.

In the early 1990s, researchers discovered that the bcl-2 gene blocks death of B cells in follicular lymphoma, which is a type of immune system cancer. The bcl-2 gene produces a certain protein that blocks apoptosis. This finding about how increased cell division was not the only method of tumor development triggered new research on apoptosis in cancer. Researchers found that the bcl-2 gene causes overproduction of anti-apoptosis proteins; therefore, cancer develops as a result of more B cells failing to die. This increased bcl-2 protein production is found in cancerous diseases such as lymphomas, B cell leukemia, neuroblastoma, colon and prostate cancer. In addition, the gene can also thwart a cancer cell’s ability to resist chemotherapeutic drugs.

Recent research is being done to learn more about the genetic controls of apoptosis and how apoptosis is avoided by cancer. These new insights can help researchers develop new drugs that target genes and proteins to encourage selective apoptotic cell death, as well as to overcome resistance to treatments. Some researchers are currently studying how to selectively trigger induced suicide in cancer cells through genetic therapies. Future research in apoptosis holds great importance in the hopes of finding a cure and treatment for the many with cancerous diseases.

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-Jessica Chow
Carcinogens Where We Least Expect Them to Be

Carcinogens do not just linger in cigarette smoke or polluted areas of a city; in fact, there are plenty of potential carcinogenic products right in peoples’ very own homes. Carcinogens, which are substances that have the potential to cause cancer within a person, are very common in typical day-to-day household cleaners, and even in foods that people routinely eat.

Most of the potentially carcinogenic compounds exist in everyday household products. Some of the more common ones include acetone (which is also a flammable substance), used in fingernail removal, paint removers, art products, and other duties; butyl acetate, which is used in shoe products; ammonia, a very common chemical in any household cleaning item and auto cleaning item; and any pesticide. A lot of these substances will initially act as irritants when one is exposed, exhibiting eye irritation, sneezing, nausea, and coughing as the most common symptoms. Overuse of products containing these substances may, at the biochemical level, alter cellular regulation. This may lead to drastic changes in bodily functions. In the case of nail polish remover, nails can become malformed and/or discolored, eliminating much protective ability for the exposed, fleshy portion of the finger.

Notice that some of these compounds may not necessarily be “carcinogenic”; they are potentially so, but they are also (and more often) referred to as toxins.

More surprisingly, carcinogens can occur in foods as well. A publicly known carcinogen is the group of heterocyclic amines, which are formed after grilling barbequed meat and vegetables. The smoke and grill create pools of carcinogens that facilitate the formation of tumors within the gastrointestinal tract, particularly in the stomach and colon. Beef has the highest capability to form these compounds during barbequing, for reasons that are somewhat unclear. Researchers have suggested the high content of purines as a possibility, which are necessary for the formation of heterocyclic amines. Polycyclic aromatic hydrocarbons are other products of charred food products, which also contribute to the carcinogenic reactions within our body. As hydrocarbons, these substances are hydrophobic, which makes them difficult to excrete from the body. In addition, since these hydrocarbons are structurally similar to nucleotide bases in DNA, these can mistakenly be added as nucleotide bases into DNA synthesis, which leads to alteration of the person’s genetic code that may ultimately lead to cancer.

On a “sweeter” note, health experts warn people who have a fetish for red colored (or any color close to or resembling a mixture of red) candy and sweets. Such foods have a compound called Red 40, a very commonly used food dye for the coloring of red foods. Though the Food and Drug Administration have regulations for the amounts of Red 40 and other dyes to be used in foods, food and health experts advise that in general it is best for our health to avoid consuming foods with these particular dyes (for more information, go to the FDA webpage listed below in the references).

There is no real way to completely avoid carcinogenic compounds in every day life, since we do use these products (or eat these foods) on a daily and/or frequent basis. However, FDA and other health departments suggest that it is wise to carefully check labels before purchasing and/or using carcinogenic products. If using household products, be aware of directing the spray away from people and surfaces of common contact. If the product is used on surfaces of common contact, make sure to wipe it with water and clear away any residue of the remaining cleaning product. If the product is for personal care, then try to minimize the use of such products, or at the very least do not use more than needed. Experts suggest that by avoiding smoked foods, or trimming off any charred bits from smoked foods, helps us avoid consuming too much of these carcinogenic compounds.

Generally, we can avoid exposure to such compounds by avoiding consumption or eating less of such foods. Together, we can make life a little more comfortable to live in—outside and inside each person’s home.

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-Diana Yee
In this day and age, prescription drugs are used to treat every ailment that comes our way. With this increased dependence on prescription drugs, patients can now easily rattle off medication names as if they were alphabet letters. Flonaze, Zoloft, Vioxx, Lipitor; the endless list continues to the point where it is impossible to keep track of what is available on the market. As a result, many doctors are forced to possess handy Palm Pilots equipped with a program that provides a nearly complete list of every existing prescription drug, along with side effect information and dosage. In fact, the government reported in 2004 that 40% of Americans take at least one prescription drug, while 16.5% take at least three. Drug use has increased among people of all ages, not just the elderly, with 24.1% of people 18 years of age or under taking at least one prescription drug medication. The majority of patients view prescription drugs as the sole solution to their health problems. In reality, they only foment the existing problem and often worsen it. They encourage a continual cycle of doctor visits, increased health deterioration, and monetary loss without a hope of an end or a solution to the problem. As patients, we first have to realize that drugs do not cure diseases, but only mask their symptoms. This leads us to ignore health problems without ever working on its origin.

In fact, prescription drugs are becoming more harmful as they produce myriads of side effects on patients. As stated by Dr. Robert E. Willner, a physician who questions traditional medicine, “The so-called ‘side effects’ of drugs are, in truth, unwanted direct effects.” He also comments, “The cumulative result of many of these therapies on the suppression of the immune system, coupled with the multiple insults visited daily upon us from the pollution of our air, food and water, has unquestionably been the reason that the rate of cancer has doubled in the last twenty years.” Thus, prescription drugs are not only temporary solutions that perpetuate a far-reaching problem, but they also ultimately seem to hurt us more than to help us.

This ignorance on the part of patients is only encouraged by their vulnerability to the pharmaceutical industry and physicians’ lack of knowledge about preventative medicine. According to a front page article in the Wall Street Journal (on May 17, 2002), doctors primarily regard a drug manufacturers’ financial influence over a drug’s effectiveness in prescription choices. Pharmaceutical companies, whose sole concern is profit and selling high volumes of their drugs, pressure doctors to work with them, rewarding the physicians with expensive trips, dinners, and other personal benefits if they oblige. The majority of doctors succumb to these requests, rubbing shoulders with these large institutions that are essentially capitalistic businesses.

Although prescription drug expenditure has rapidly increased each year, having spent $90 billion dollars in 2002 compared to $64 billion dollars in 1996, it has not reflected any sign of the improvement of health. More and more different drugs are becoming available, but health problems continue to persist and patients still suffer. This is partly explained by the fact that the majority of drugs on the market are minor modifications of already existing drugs. 80% of drugs approved by the FDA fell in the “standard drugs” category, medication that is similar to what is already available. We can take the highly priced drugs Celebrex and Vioxx as examples. They perform the same function as Advil and Aleve, and have not been proven to be any more effective; yet, they are significantly more expensive than their over-the-counter counterparts.

As a patient being informed about the reality of prescription drug use, you should be more aware of the drugs doctors prescribe. Realize that your doctors’ opinions are mere recommendations that may be biased by the pharmaceutical industry. Make sure you question their decisions and also seek knowledge on preventative medicine and how to combat problems naturally. Once again, prescription drugs are not the only solutions to medical difficulties. In many cases, they exacerbate the situation.

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-Stephanie Wong
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In Vitro Fertilization

The term “test tube baby” is no longer a phrase used only in the realm of science fiction, but is now actually an option for nearly 6.1 million American women and their partners affected by infertility. In vitro fertilization (IVF) and other assisted reproductive technologies (ART) have become very popular in the past few years. Of these ART techniques, IVF accounts for up to 70%. IVF is a procedure that involves surgically removing a woman’s eggs from the ovary. Then in a laboratory, the eggs are combined with sperm in a dish. Once fertilization occurs, the resulting embryos are then placed in the woman’s uterus or that of a donor’s.

IVF has been a gift for couples unable to conceive on their own due to ovulation problems, blocked fallopian tubes or low sperm count. Although IVF has successfully helped with fertilization of the egg and sperm, a successful birth is still hard to achieve. First, there is the financial barrier that parents must overcome. Most clinics will charge around $12,000 to $17,000 per cycle of treatment, and IVF patients typically undergo many cycles. Some insurance companies will pay for this part of the expense. So far, only thirteen states (including California) have enacted some type of infertility insurance, which actually mandates that insurance companies pay for this type of treatment. Because of the high cost, IVF is a treatment for the select few who can afford it. Thus, this technology increases the socioeconomic imbalance that exists in society.

The second obstacle that parents must overcome is the long wait that takes place during the whole process. There is a great deal of stress that comes along with this. Parents’ emotions are already strained from not being able to conceive a child for many years; but now, parents still have to be patient as they wait to hear about their results from IVF treatment. Women also have to undergo subcutaneous injections or intramuscular injections in order to receive fertility drugs that will stimulate their ovaries to develop several mature eggs for fertilization. This is not only a toll on the woman, but also their partner who has to see her suffer. The success rate is also low; there is a 35% chance of getting pregnant and a 29% possibility of delivering a baby with each cycle of treatment.

Once the egg has properly divided and implanted, additional problems may arise. IVF will increase the risk of ectopic pregnancy, where the egg implants in the fallopian tube instead of the uterus. The chances of multiple births can range from 20% to as high as 40%. This is caused by the implantation of multiple embryos, typically 2-4 eggs, into the woman so that the rate of achieving a successful embryo is vastly improved. In order to please prospective couples who look at the statistics of successful births for clinics, clinics must implant multiple embryos to ensure they have a continual supply of customers. The high rate of multiple births results in the high frequency of IVF babies to be born with low weights and with birth defects. Multiple births also put a toll on the family because they may not be emotionally, physically, or financially ready to take care of more than one baby.

Even though this technology is very useful for patients with diseases that would not allow them to bear children, the technology should be used with caution. In addition to the high cost and long waiting period associated with IVF, there are great ethical issues that arise. First, IVF and other ART techniques are procedures associated with genetic engineering. If a mother is over a certain age, a technique called cytoplasmic transfer is used to take out only the nucleus of the mother’s egg and then combine it with the de-nucleated egg of a younger egg donor. In this procedure, the child will be made up of DNA from the parents, as well as the mitochondrial DNA from the egg donor. This is the first step toward genetic engineering. Second, as many as five adults can play parenting roles: the genetic mother and father (egg and sperm donor), the gestational mother, and the intended social parents. By having multiple parents complicates legal issues regarding parental rights. Thirdly, IVF brings society one step closer to the use of Pre-Implantation Diagnosis (PGD) for purposes not of those today. Currently, PGD can be used along with IVF to screen for genetic diseases like Down syndrome, X-linked diseases, Cystic Fibrosis and many more. PGD also allows couples to screen for gender based on reasons such as prevention of having sex-linked disorders or family imbalance. This could potentially lead society to screen for traits in offspring, such as intelligence level and looks. This would be reminiscent of the eugenic movement during the Nazi era.

Before this technology becomes full blown, legislation should be set up to restrict the parameters to IVF. In addition, more studies need to be done to find out the side effects of IVF on the women that receive it. As well, more long term studies need to be done to see if there are risks in IVF children.

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Jennifer Shih
Meningitis

Before coming to Cal, I received a letter in the mail urging me to obtain a meningitis shot since it is a disease that can be easily spread through living in close quarters with others—i.e. the dorms. The letter warned that if I caught meningitis, I could die! Up until that time, I had never heard of meningitis, let alone know that I could catch it with dire consequences. However, being very risk aversive and cautious, I decided to schedule an appointment with my doctor and get it done.

What is meningitis?

Meningitis, or sometimes referred to as spinal meningitis, is an infection of the fluid that surrounds a person’s spinal cord and brain. Meningitis is normally caused by a viral or bacterial infection, and knowledge as to the cause of the infection is very important because the severity of the illness and methods of treatment also vary. Meningitis caused by a viral infection is usually much less severe and tends to resolve itself without specific treatment. Bacterial meningitis, however, can be very serious in that it may result in brain damage, hearing loss, or learning disabilities. For bacterial meningitis, it is also important to know the type of bacteria responsible for the infection. This is because antibiotics can prevent some forms from spreading and infecting other people. The leading causes of bacterial meningitis today are from Streptococcus neumoniae and Neisseria meningitides.

Many of the symptoms of meningitis are similar to those of a common cold or flu. However, since meningitis can be very harmful, it is important to pay close attention to the signs and symptoms. For instance, high fever, headache, and stiff neck are common symptoms of meningitis. Other symptoms include nausea, vomiting, discomfort when looking into bright lights, confusion, and sleepiness. These symptoms and signs can develop in as little as a few hours to one or two days.

Like most illnesses, it is crucial to have an early diagnosis and treatment of meningitis since bacterial meningitis can be fatal. Appropriate antibiotic treatment for the most common types of bacterial meningitis generally reduce the risk of death from meningitis to about below 15%; however, the risk of dying is higher among the elderly.

Some forms of bacterial meningitis are contagious and can be spread through the exchange of respiratory and throat secretions, like coughing and kissing for example. Luckily, none of the bacteria that cause meningitis are as contagious as the common cold or flu since one cannot contract meningitis by casual contact or breathing the air around someone with the disease. However, if one has close or prolonged contact with someone who has meningitis caused by Neisseria meningitides (also referred to as meningococcal meningitis), then there is a chance of contracting the disease. This may be how meningitis is spread through the dorms. Those who may have prolonged exposure to a person with meningitis caused by N. meningitidis should be treated with antibiotics in order to prevent—or at the very least reduce—the chance that they will develop the illness.

There are vaccines that protect against four strains of N. meningitidis, but they are not routinely used in the States. The Center for Disease Control strongly urges that college freshmen, especially those living in the dorms, become educated about the availability of an effective vaccine that can decrease their risk of contracting meningitis.

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-Jennifer Hsu
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Although one needs about 14 years of schooling to become a forensic pathologist, popular television series such as "CSI: Crime Scene Investigation" and "The X-Files" have us all aspiring to become the next high-profile medical detective. However, what do real-life pathologists actually do?

To start, pathology is a branch of medicine dedicated to evaluating tissue samples and pinpointing any abnormalities that may indicate disease. Pathology then breaks down into clinical and anatomic pathology. Clinical pathology is less glamorous as it is dedicated to the evaluation of body fluids in laboratories. Clinical pathology includes chemistry, hematology, microbiology, blood banking, toxicology, and immunology, many of which are important to the forensic pathologist.

On the other hand, anatomic pathology involves the evaluation of tissues recovered from living or dead individuals using only the unassisted senses and microscopes; it includes autopsy pathology, surgical pathology, and cytopathology. During anatomic pathology, samples are often viewed under strong microscopes to focus on specific features of cells and cell patterns. Abnormalities are then observed, documented, measured, and photographed.

General pathologists spend more time with surgical pathology and cytopathology, during which specimens are removed from living patients by biopsies and operations. This is in contrast with forensic pathologists, such as the investigators in "CSI" and Agent Scully of "The X-Files," who deal mostly with autopsy pathology. They are expected to determine the identity of the deceased, time of death, manner of death, cause of death, and the nature of the instrument used to cause the death (if death was caused by murder). This is usually done by an autopsy of the dead body and acquiring data from investigating officers. Sometimes they will also visit crime scenes, but this is usually uncommon.

When asked during a documented interview how forensic pathology in the real world compares with that in television, Dr. Telgenhoff, the medical examiner who consults with the writers for CSI: Crime Scene Investigation, said, "No medical examiner is going to see everything 'they' have filmed in one career. The average day is much more routine and non-dramatic. Every now and then you get a damned interesting case...the thing is, it takes an entire lifetime to accumulate enough interesting cases to actually come up with a book."

So the reality of forensic pathology turns out to be a bit less dramatic, but it definitely still has its perks. According to the research, the hours are better than other physicians, and you feel the satisfaction that it was your help that put criminals away. You can also be a comfort to grieving families. According to the pathologists, the job is ever challenging, but never boring. So what does it take?

Obviously, you need a strong stomach for the startling visuals, and you also need thick skin for probable criticism of your work. You also need to be fairly levelheaded because continual exposure of graphic evidence of man's inhumanity to man could cause you to become a very cynical person indeed. Lastly, you must have good communication skills because you will often have to interact with law officers and convince judges and juries that your findings are valid.

If you consider yourself all of the above, you are halfway there. Next up is education and training, the most daunting parts of becoming a forensic pathologist. First, you have to finish medical school and then complete 4-5 years of residency. To top it off, you will need another 1-2 years to complete a forensic pathology fellowship. Then will you be eligible to take the subspecialty board exam in forensic pathology.

Anyone who can make it successfully through all the above is most assuredly cut out for the job (and deserves to be paid much more than those actors on TV). Glamorized or not, forensic pathology contributes a much needed service to humanity; and even though forensic pathologists do not get to qualify the existence of aliens or single-handedly crack a high-profile case, the satisfaction of accurately identifying patients, putting criminals behind bars, or even the comforting of just one family is motivation enough.

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-Christine Chen
Clubs on Campus

- AMSA (American Medical Student Association)  
  http://www.ocf.berkeley.edu/~amsa/
- BSHA (Black Students in Health Organization)  
  http://www.ocf.berkeley.edu/~bsha/
- CHE (Chicanos and Latinos in Health Education)  
  http://www.ocf.berkeley.edu/~cheucb
- EMBS (Engineers in Medicine and Biology Association)  
  http://www.inst-eecs.berkeley.edu/~embs
- Medical Cluster  
  http://www.ocf.berkeley.edu/~mcluster
- PMHS (Pre-Med Honor Society)  
  http://www.ocf.berkeley.edu/~pmhs/

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Cal Day Pre-Medical Information Series  
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Current students, and some who recently completed their degree at Cal, will discuss the variety of experiences that are pre med. Parents and prospective students are welcome.

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ELIZABETH! I THOUGHT BOB PASSED AWAY LAST YEAR.

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