The Premed Perspective

Going Green in Medicine

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http://www.ocf.berkeley.edu/~pmpnews

editor's note

Dear Reader,

With a growing concern on the sustainability and conservation of our environment, our staff looked at several of these issues from a pre-med perspective—the environment's impact on our health and well-being. Our interview with Professor Guiterrez, who teaches Ecosystem Sciences in the Environmental Science & Policy Management Department, provides a discussion on the importance of environment and its sustainability. As the semester comes to an end, we encourage all of you to think about what you can do to help make our environment a better place for living.

Before my time at Berkeley comes to an end, I would like to introduce to you Larry Cai and Youngwon Youn as Premed Perspective's next Co-editors in chief! I have had the pleasure of working with both Larry and Youngwon this year and I am confident in their abilities to manage the newsletter and to present you with more exciting topics in the field of health and medicine.

Thank you for reading with us this semester. We hope you will look for us again in the Fall. If you are interested in joining our staff next year as a writer, please contact us at premedperspective@gmail.com.

Sarah Pan
Editor in Chief

about the newsletter

Each month, our newsletter covers a themed topic and includes feature articles related to this theme that may be relevant and of interest to the pre-med community here at Berkeley. Every month the newsletter includes interviews with important figures in healthcare, as well as graduate/medical school information and local volunteering highlights. Working in conjunction with various pre-medical organizations, we seek to educate the community on events held by these organizations for the betterment of the entire pre-med population.

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in this issue

med school profile

UC Irvine's School of Medicine

{ Youngwon Youn }

| history |

By the time University of California, Irvine, was constructed in 1965, UC Irvine's Medical School had already been 69 years old. Founded in 1896, by A.C. Moore, the UC Irvine's School of Medicine, is the oldest operating medical institution in the Los Angeles area. The school was originally an establishment for osteopathic medicine, holding its first 12 students in a hotel in South Pasadena. However, by 1936, it became a graduate school that opened its doors to students interested in earning doctoral and masters degrees. UC Irvine's School of Medicine ranks within the Top 50 in the nation.

| student life |

UC Irvine's School of Medicine offers a range of special interest groups and student organizations to allow its scholars to branch out to their fellow peers. They also offer a special program called "Program in Medical Humanities and Art." This program was a result of an initiative the University took to integrate the realm of humanities into the learning of medicine, via literature and creative writing. In addition, the clubs on campus range from cultural groups, to religious groups, to journal-writing/photography clubs.

| academic requirements |

Requirements include a year of math (plus statistics) and physics, a year and a half of biology, with lab, two years of chemistry (inorganic, organic, and biochemistry), and any college composition course.

| feature: curriculum |

First year: learn the basics via classes such as human anatomy, medical genetics, medical physiology, and immunology. Second year: shift toward clinical-based courses such as clinical pathology and clinical foundations. Students also learn about medical pharmacology and microbiology. Third year: get a better feel for the different areas within the clinic with classes such as surgery, psychiatry, obstetrics, substance abuse, and family medicine. The school also offers many electives classes such as anesthesia, dermatology, and plastic surgery.

Sources

University of California School of Medicine. Dept. home page. 28 Oct. 2008. University of California. 12 Apr. 2009 <http://www.ucihs.uci.edu/som/>.

| just the facts 2008 applicants |

In-State Applicants: 3, 818

Out-of-State Applicants: 834

Total Applicants: 4,652

Matriculated 104

Mean Cumulative GPA: 3.8

Mean Science GPA: 3.7

Mean MCAT: 32


http://ecnr.berkeley.edu/facPage/dispFP.php?I=604

Dr. Gutierrez is a Professor of Ecosystem Sciences in the Department of Environmental Science, Policy, and Management (ESPM) in the College of Natural Resources (CNR). He taught ESPM 2 ("The Biosphere") in the Fall 2008 semester at UC Berkeley with Professor Banfield.

Q. Sustainability and going green...we hear these words a lot. What do these words and phrases really mean?

Sustainability requires ecological, economic and social sustainability, but the basis is really ecological sustainability – i.e. being green. There are two perspectives we can take. We can take the social perspective where we work to preserve the ecological commons for the present and the future. The alternative is the self-centered perspective: if you don't contribute to preserving the commons, you are likely to contribute to destroying it – there is little middle ground. We have the "Tragedy of the Commons" -- overexploitation. Thinking sustainably means taking the social perspective: you have to take into account the best interests of everybody, including future generations.

Q. What can the average Berkeley student do to "go green"? How drastic of a lifestyle change would it be if we actually lived sustainably?

It probably won't be too much of a drastic change – it's really just a change in attitude through the everyday choices we make. These choices include everything from washing hands to prevent disease, to buying things in the market while considering the consequences of the manufacturing and packaging, where it's made, what things are in it, and how much trash it will produce. We need to pick up after ourselves. Most importantly, once we adopt this vision, we need to help spread the word. A lot of people just don't seem to have any notion of how they should conduct themselves on a daily basis to preserve the global ecosystem.

Q. I'm not sure, but I would suspect the Berkeley campus and university campuses in general as being little bubbles where people think about this stuff more than the average US citizen. Is this true?

To be honest, I don't think our campus is very green. I see people spraying herbicides on the grounds everyday. Strawberry Creek has been "cleaned-up", but the water running through it is sterile! Nothing much lives in it. Berkeley supports the biofuels initiative. It's ecologically a silly idea, but as one proponent said, "even if it doesn't work out, it's a lot of money". Many of the proposed biotechnologies in agriculture pushed on campus are not sustainable. UC Berkeley still has a long ways to go in changing its attitude toward what is ecologically sustainable.

Q. How much of a dent do we make in the overall scheme of things? What can we do to affect more change?

Well if we don't start – it's a self-fulfilling prophecy. All the issue we have solved started with a small group of people wanting change. If it's truly important, such movements will grow, but I wonder if our current global crisis of climate change can be solved in time.

Q. Could you tell us a little more about what you do?

I study Ecosystem Sciences - putting complicated agro-ecosystems together as models. I try to answer questions like: "What management options are really needed for the sustainability of a system?" How should we spend public money to achieve this? For example, the government wants to eradicate light brown apple moth. The program costs $100million, but they don't even know if it is a pest! My approach to things is to analyze the problems and then make rational decisions based on a sound knowledge base. Another example - Bt cotton – for the farmer, the basic issue is whether we should use toxic pesticides or genetically modified Bt cotton. The farmer would think that Bt is great because it displaces the use of insecticides. But the reality is that in many areas much of the insecticide use was not needed in the first place. Farmers had been convinced that they needed pesticides and now Bt is a better alternative to imaginary pest problems. The problem with finding sustainable solutions is that this kind of thinking goes against commercial interests and quite likely will continue to be squashed until public outcry deems otherwise. It has been an uphill battle.

Q. Could you tell us more about where our food comes from and the costs of producing it?

Everything is pretty much globalized. Lot of the food we consume comes from Mexico or the Southern Hemisphere in the off season. In contrast, Alice Waters at Chez Panisse uses foods that are organic and in season. You have to spend a lot of energy to produce and ship produce, but these environmental costs are rarely mentioned.

I recall driving down the freeway once and laughed when I saw a truck load with alfalfa bales driving one way and another equally loaded with alfalfa driving in the opposite direction. Why couldn't they just keep the alfalfa where it was? Sustainability has to do not only with the impact that agriculture has on the environment (e.g. emissions of carbon, NO_2, CH_4 and other greenhouse gases), but also part of that footprint is the distance our food has to travel to get to our plates. Being green in agriculture is more than just good business; it really has to do with how big of a carbon footprint we're leaving in producing food. American agriculture is inefficient economically, but also socially and ecologically unsustainable.

We are a society that went from 90% to 10% rural. Often agricultural scientists do not consider important issues in agriculture production outside of their specialty. There is a huge fragmentation of knowledge between the technology of agriculture and ecology. We can insert genes to produce GMO crops, and that's cool, but what are the consequences of actually doing it? Sustainability requires knowledge of ecological consequences and the underlying issues about the production system. In the case of Light Brown Apple Moth, ignorance of the issues leads pest control bureaucracies trying to eradicate a non pest, and likely they will fail. We need to take a holistic approach – we need to be asking questions from different perspectives: not only what's good for farmer, but what is in the best interest of ecosystem sustainability—locally and globally.

Q. What about biotechnology and its relation to sustainable agriculture? What are its pros and cons? Is it safe for us? For the environment?

For example, in making plants herbicide resistant – we use more herbicide and there are more consequences for the environment. We've already done this and we are seeing the effects. Herbicide resistant weeds are appearing, and non-target organisms are being affected -- amphibians are obvious recorded victims as we discussed in class. But what about us? Are cancers increasing because of increased use herbicides (and pesticides in general) that contaminate ground waters, air and food? How about immune system problems? Is the EPA and FDA doing enough to protect the public? You could argue that more food means better nutrition and hence we're living longer – but what are there tradeoffs between stuff like cancers, birth defects, autism, etc. vs. extending life?

Still, there are applications of biotechnology that are wonderful – if we have a pest problem – we can probably find out where it came from by studying its DNA – we can transfer traits from one plant to another. However, the synergistic consequences of using biotechnology without restraints in agriculture (and medicine) should be of concern. It is a tool and not magic bullets.

Q. Another thing we hear about a lot is climate change. Is it really something we can control if we change our current practices? What technologies are best for doing that?

Well, climate change is definitely real. There are a lot of things like the environment that we take for granted, but this could all change. Species of trees and a lot of species associated with them can't be moved as the climate changes and they may perish. We really don't know how it will affect such things. If we don't start doing something about climate change before it really gets out of hand – it may be too late – we could go over the ecological tipping point where the Earth's climate changes and falls into a new, undesirable state - like a ball rolling from one valley (the one we're living in now) into another that we don't recognize. We may not be able to bring the environment we know back to the state we're used to. For our own self-interest, we need to start curbing climate change. Increasing population and increasing per capita demand both contribute to this growing problem. Globally, people have the aspirations to live (consume) like we do in the developed world, but if everybody did that, we would need 5 or 6 more earths – it's just not available. There is a global ecological carrying capacity, and climate change will just make it smaller.

Q. What technologies do you think will realistically and effectively curb climate change?

The first and most important technologies are those to curb population growth. Nobody talks about this – it is not politically correct. Greatly reducing greenhouse gases is always a priority. Now, as for the technologies you're thinking of...

Biofuels – it's probably a dumb idea – my wife's family in Brazil is involved in producing ethanol. A lot of these companies are going bankrupt. Check this one out...http://berkeleydailyplanet.com/issue/2009-04-02/article/32634. There are lots of problems with biofuels – it's not very transportable, especially compared to gasoline, ethanol in particular has a lower energy content than gasoline, and in addition you're producing the biofuel crop on land – you're mining the soil – it's not sustainable. As soon as you start using land for biofuels vs. crop – there's a food-fuel tradeoff. Farmers are going to grow whatever's more profitable – price of corn and corn products are going to increase as the European Union and US mandate that more of our fuel comes from biofuels. The land required to meet this demand does NOT exist, so what do they do? They go looking in Africa and other developing areas – but the people in Africa have a hard time feeding themselves already. For example, in Indonesia, they want to grow palm oil on peat lands – the carbon debt from transforming this land will not be repaid for 450 years. If we think about the consequences, biofuels are a silly idea.

Clean coal – you're going to burn it, but scrubbing some of carbon to make it clean is still a future technology. Currently, it's an oxymoron.

Wind energy – it's unsightly, but I like it.

Photovoltaic cells – It might be expensive now, but the technology will get there. It'll be like rolling linoleum on the roof in the future.

Fusion would appear to solve many problems, but it is not available yet and there may be problems. I know too little about this.

Overall, it's still a question of conservation. They're not making any more Hummers...that's great! But we have short memories, and we'll probably start still other over-exploitation cycles if we ever solve our current problems. I am not optimistic about the human species.

Q. What are the effects of climate change on our food and ecosystems?

Agriculture will be heavily affected. Where crops are grown may change and of course this will affect food web relationships in many crops. For a crop such as olive – the thermal limits are very broad while the thermal limits for olive fly (a pest) are narrower. Climate change would cause olive fly to no longer be a pest in some areas. But there are certainly other examples that could work against us. For example, cotton in the San Joaquin valley – as climate warming increases, pink bollworm (a serious pest) could invade the Central Valley. Another example is the Mediterranean fruit fly which could increase its range throughout California.

Also, California's climate is predicted to get drier – we're already having problems with water, and we'll have still more difficulty in the future. Climate change could be especially severe in areas of the world already facing food shortages.

Q. Our journal is primarily concerned with health issues, do you have any final comments about sustainability, public health and our personal health?

I travel a lot in Europe and frequently compare health care systems – I used the Italian health care system a year and a half ago. I had 3 weeks of treatment – it cost me 100 Euros, and I received the service as a foreigner and didn't pay into their system. The out of pocket costs were less there than the deductibles for the same service from my Kaiser plan in California that would have cost thousands, and the medical practices and the service were better in Italy. In contrast, a Brazilian friend sprained an ankle in Berkeley, they x-rayed her ankle and finding no breaks, wrapped it – she was without insurance, and her total cost was more than $2500 for a couple of hours in the emergency room. Nobody in Europe worries about going bankrupt due to health care costs, but it is a common occurrence in the US. We can have beautiful stainless steel medical facilities, but the difference between whether you're able to afford health care can change *snap* like that.

There was this thing on 60 minutes recently; it was about access to medical care in Nevada. A woman who had breast cancer was being denied chemotherapy because she had lost her job and insurance because she was sick – the victim of a vicious cycle. Many people don't have access to medicine – the lack of access costs us more and weakens our society. People my age worry their medical plans will not be stable or affordable. What will happen when we need assisted living care? Apparently, insurance companies prefer to insure the ones who don't need it. At the social level, we continue to worry about the pill, abortion and other hot issues while the whole system is crumbling around us. This system is as illogical as is solving the energy crisis with biofuels. Being a doctor is a highly respected profession, but quite frankly, if we had to choose between not seeing an MD for a year vs. the absence of the garbage man, lack of garbage collection would have the greater public health effect.

Our medical system is not sustainable. Many people do not have access to medical care -- this shouldn't happen – medical care, like food and shelter, are basic human rights.

by Larry Cai

In this issue of the Premed Perspective, we have tried to highlight the importance of recognizing a larger, global issue and exploring its inevitable connection to medicine and health. One of the issues that is on the top of our world's to-do list today is the current state of the environment and its relationship to both human action and inaction. By working with a representative from U.C. Berkeley's own Sustainability Team, or STeam, we have tried to demonstrate the environment's impact on our own health and what we, both as current students as well as future physicians, can do to make a difference.

One of the most direct connections to the environment is the food that we put into our bodies. The quality and quantity of our food intake is linked to several key environmental factors as well as health issues. Our nation is facing an epidemic of huge proportions, literally. Obesity is a worsening problem in the United States today and as future physicians we should come to the realization that this is something that is directly attributable to the choices that we all make. An essential factor in this disease is the increased prevalence of synthetic sweeteners, trans fat, and processed foods in our diet. For example, high fructose corn syrup and partially hydrogenated oil are a part of some of the largest issues in nutritional health as well as the sustainable food movement. These "agri-business" crops are implicitly supported by our federal government and because of their cheaper prices they find their way into almost everything we eat, even in the most surprising of places including ketchup and commercial drinks such as Vitamin Water. High fructose corn syrup (HFCS) is a processed combination of fructose and glucose and is harmful because it is metabolized in the liver, which converts it into a fat. In fact, diets that are high in HFCS have been linked to insulin resistance and type 2 diabetes. Although fructose comes naturally from fruit, our bodies are not made to process HFCS. Similarly, the long-term effects of partially hydrogenated oil are extremely harmful for our health. Oil is hydrogenated by a process of heating oil and then passing Hydrogen through it. If fully hydrogenated, it solidifies but when it is partially hydrogenated it becomes a softer, and ultimately unhealthier substitute to butter. Because this is cheaper and richer in flavor and texture it appears in many of our foods. It has been shown to contain high levels of trans fat, which have been repeatedly shown to contribute to poor health. Both of these ingredients are made from large-scale crops that are subsidized by the government and their effect on the local ecology is extremely harmful. Because these are mono-culture crops, meaning that they are the only product of large acres, more nutrients are depleted from the soil. Furthermore, processing these crops requires a large use of fossil fuels causing the nation's already high Carbon footprint to remain at a top level. We can, however, make a difference by changing just a few of our habits. By buying more organic and less

http://www.dwej.org/images/finalCSAEJlogo.gif

Going green, literally

http://www.treehuggingfamily.com/wp-content/uploads/2009/01/earthlust-long-water-bottles1.jpg

processed foods we can decrease our dependence on unhealthy ingredients such as HFCS as well as increase the sustainability of our diets. An easy way to do this is to stop by The Local, a weekly event on upper Sproul which offers organic fruits and vegetables directly from local farmers. Also, try eating "in season," which means to try to consume fruits and vegetables that are usually grown and harvested the same time you are eating them. This will serve to better the local, and ultimately national economy, and is also much more delicious!

http://provokare.files.wordpress.com/2008/08/temescalmarketbig.jpg

By cutting down on processed foods, there will also be a decrease in consumption of those foods that are shipped in synthetic materials, such as plastics. Plastics not only have a negative environmental impact because they are not biodegradable, but are also extremely harmful for health. In fact, one of the main components of food packaging, polyvinyl chloride, has been found to cause cancer and birth defects. Similarly, in water bottles, even low exposures to the chemical polycarbonate with bisphenol (BPA), can cause immune deficiency and is suspected to contribute to the early onset of puberty, obesity, diabetes and hyperactivity. Some easy ways you can reduce the plastics in your life include buying food in glass or metal containers, avoiding storing fatty foods in synthetic packaging, not heating up foods in plastic containers, and switching to a re-usable water bottle that is made of metal instead of plastic. Even when going to the store, it is possible to take your own cloth bags instead of asking for plastic or paper bags. If it is hard for you to avoid plastic packaging, try reusing what plastics you already have. For example, you can use your washed yogurt containers to put your left-overs in or as snack containers.

The final issue we will tackle in this article is the importance of air-quality and what we can do to improve it. Exposure to pollution is undoubtedly a cause of asthma, as the components of particulate matter, including fossil fuel exhaust, are being released into the air we breathe. These pollutants flow into our airways, and increase the chance of irritating any pre-existing asthma or developing asthma. In Berkeley, we already have an excellent public transportation system in place, so instead of driving, we should utilize it to reduce our pollutant emission. When going home for visits, and driving is unavoidable, you can carpool. Of course, for short distances, walking or biking is always an option. Not only will you be benefiting the environment, you'll also be doing yourself a favor by sneaking in exercise when you don't plan for it.

A simple change in habits can help make a difference in the sustainability level of our community, the nation, and ultimately the world. By being members of such an environmentally-conscious campus as U.C. Berkeley, we are at the crux of making great strides of improvement if we chose to. It is important to realize that as future physicians we will be not only be members of a community but also leaders; by encouraging more these kinds of choices, we will be ultimately ushering in a healthier planet.

by Aditi Gupta and Tulsi Patel (Guest writer from the Sustainability Team)

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http://www.ecologycenter.org/factsheets/plastichealtheffects.html
"Air Pollution Health Effects"
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http://www.thenutritionreporter.com/fructose_dangers.html

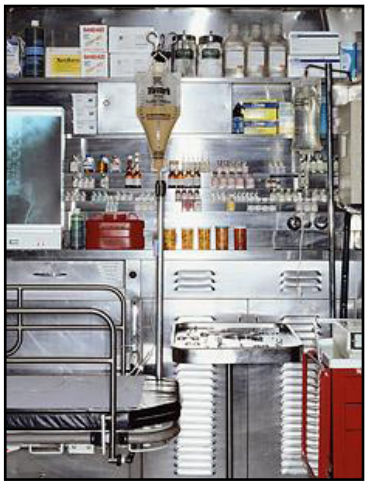
The Green Hospital

Hospitals are a major source of waste, including the large number of plastic materials that are used and discarded every day, high electricity bills, and hazardous chemicals used in treatment and building materials. In fact, according to The Health Care Blog, "hospitals generate 6,600 tons of waste per day, and about 80 percent of that is nonhazardous waste." One may question whether it is effective and efficient to enforce LEED (Leadership in Energy and Environmental Design) standards upon this seemingly insurmountable obstacle.

However, hospitals across the country have already taken measures to be more eco-friendly and have experienced the health and economic benefits of doing so. By reviewing their facilities, chemicals, waste management, food services, design, construction, and clean energy, hospitals are developing different ways to become greener, according to Practice Greenhealth.

GreenerBuildings gives examples of practical applications: hospitals are reducing the use of harsh chemical cleaners, which often contain formaldehyde and allergenic fragrances that cause respiratory problems for both patients and employees. Also, larger windows let in more sunlight, which not only saves energy, but also improves employee performance and patient recovery. Hospitals are watching their wastes as well by recycling more, decreasing use of mercury, and reducing waste that is discarded through incinerators and garbage dumps.

When hospitals engage in practices like energy efficient lighting, they can save financially, considering they are open 24/7 and have to operate advanced medical equipment. According to The Health Care Blog, Kaiser Permanente announced that it saved $500,000 "by using green building materials," "solar panels, asphalt parking that filters water," and "locally grown produce" when building its new facility in Modesto, California.



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The greenest hospital in the nation, according to The Green Guide, which ranked the top ten greenest hospitals in the United States, is Boulder Community Hospital Foothills Campus in Boulder, Colorado, and it is a stellar example for other hospitals to follow. To become more eco-friendly, the hospital reduced water used for irrigation by 70 percent by improving their landscape and other operations, installed bike racks and priority parking for those who carpool to promote alternative transportation, and used carpet to work on indoor air quality.

By following Boulder Community Hospital Foothills Campus's example and using green organizations' tools and education resources, more hospitals can further adhere to LEED standards and improve upon their operations to help the world become a little greener.

by Stephanie Ng

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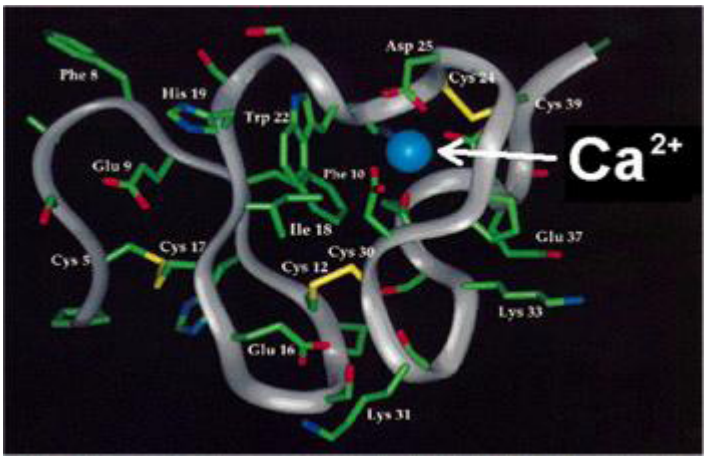
class perspective: physics 8a/8b

why does physics matter?

Having taken a significant number of upper division biology classes at Berkeley, I can see why physics is a part of the pre-med curriculum. For instance, if you want to study neurobiology, it would probably be a good idea to understand how electric circuits work because they are the model system for how the human body conducts signals. And if you really wanted to understand certain aspects of neurobiology, it would also be a good idea to know how to solve complex differential equations. Or, on the other hand, if you are studying the body's circulatory system, understanding the laws that govern fluid pressure and osmotic pressure is helpful. It should come to no surprise that the laws of physics ultimately determine the laws biology.

> "It should come to no surprise that the laws of physics ultimately determine the laws of biology."

For the most part, biological and medicinal studies are becoming more mathematical and quantitative. No longer is the conduction of the auditory pathway described by qualitatively pointing at structures that light up upon hearing a sound; now, it is fairly accurately described by mathematical equations and physical properties. Even the effects of drugs on a population have been studied using statistical approaches.



With that said, it seems to me that Berkeley's approach to mathematics and physics in molecular cell biology is largely to keep it at a minimum; Physics 8A and 8B, then, provide the foundation to understand certain physiological processes. This, however, does not mean that they are easy. In fact, the physics classes could be two of the most conceptually difficult classes. Mastering Physics is the bane of many students; it is a weekly set of online homework problems that can be very difficult, but more often than not, is aggravating and a huge time vacuum. Expect to spend two to three hours per week on this.

Students who are skilled in calculus are likely to do better in physics, but for those who have never taken physics before, the first few weeks may be a hurdle. The manipulation of equations and variables is not seen in other pre-med classes; it is much easier, for instance, to use equations in Chem 1A than it is in Physics 8A. It doesn't get any easier in Physics 8B either. Physics 8B touches on the study of infinitesimally small particles, point charges, and light waves. Physics 8A has a more physical foundation (the study of forces, motion, etc.), while Physics 8B is more abstract.

One fatal flaw that many students make is to assume that they can plug-and-chug their way through physics. But this often leads to brick walls. The fact is that it does no good to know how to do one or two problems. Homework is not simply something "to take care of" and "get out of the way." Rather, the ideal way to approach homework is to view it as something to ponder about over several days, with the hope that some kernel of understanding might reveal itself through that process. This is only my personal opinion though, based upon my personal experiences, so take my advice for what it is. Of course, it also helps to visit the SLC and office hours regularly. Ultimately, the process of learning to understand physics is a very personal process. If you go to lecture, you will learn the material once. If you go to office hours next, you will have learned it twice. But to do well, you will need to have learned it dozens of times through homework problems, through studying and contemplation, and through a desire to really care about the material that you are learning about.

by Eric Trieu

Global Green Spotlight: Water-Borne Diseases

Almost a quarter of all disease is caused by environmental exposure (WHO, 2006).

There is a good reason why a global sentiment exists that an unclean environment correlates with poor health. In particular, "rivers are a source of life. They are also a source of disease" (WorldFocus). Differing water conditions in different geographic locations has created many global environmental health concerns.

Water. We all know it, are made mostly of it, and often crave a large glass. But when do we stop and recognize the effects of unsanitary water? Access to clean, safe water is an exponential concern. When water is scarce, often the only source is dirty and contains bacteria and parasites, waiting to infect; there is an abundance of diseases strictly related to unsanitary water sources. Some of these include diarrhea, onchocerciasis (known as river blindness), dracunculiasis (guinea-worm disease), dengue hemorrhagic fever, and more commonly known diseases such as malaria and hepatitis. I have chosen to focus on river blindness, which afflicts approximately more than 37 million globally, and more than 3 million people in Tanzania alone (WorldFocus).

http://www.sciencedaily.com/images/2008/01/080131121753-large.jpg

Onchocerciasis (river blindness) is a parasitic disease that breeds in water and is caused by a very thin parasitic worm which can exist in the human body for up to 14 years. A black fly transmits the disease from human to human, with the action of a simple bite. In brief, the fly breeds in a river and the eggs transform into adult flies. Then, the black flies ingest the larvae from an individual infected with onchocerciasis. When this same black fly goes on to bite another person, the larvae gets transferred to a new human host and the infection will continue to spread. The death of the worms and subsequent immune system response induce a host of human impairments, including the following: obvious formation of nodules under skin, depigmentation and intense skin irritation, epilepsy, lack of sleep, effects of the ocular system, and ultimately when the worms reach the site of the eye (surface of the cornea, specifically), blindness. The drug Mectizan is used to cut off reproduction of more worms within the system but does not fully kill the worm. Despite the effectiveness of this drug, at the local level there is a reluctance to take the drug for fear of loss of libido. Thus, many local villagers, as is the case in Tanzania for example, turn to local healers.

At this point, it is only natural to ask what is being done to resolve the issue. There is a two-fold approach to conquering river blindness: large-level spraying of larvicide to kill the black fly carrying larvae in fast-flowing rivers and the drug intervention, as mentioned above. For example, the Onchocerciasis Control Program in West Africa (known as OCP) began in 1974 and works to cut the transmission by spraying larvicides at the parasite's breeding sites. This has had a positive impact, and thus reduced spread of infection.

According to the WHO, controlling insect breeding sites in various rivers could be a main source of intervention and thus prevention. Furthermore, based on WHO data, currently river blindness can be found in about 36 countries throughout the African continent, such as Tanzania, in addition to Colombia, Ecuador, Guatemala, Brazil, Venezuela, the Arabian peninsula and the southern region of Mexico.

by Jacquelyn Hoffman

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There is really no great mystery to what is required in order to be able to compile a good medical application; at the end of the day, in order to have a good application, you will need to be a good applicant. However, what constitutes a "good applicant" is often ill-defined—and for good reason! There is no set standard for what it takes to get into medical school, and oftentimes the same medical school will accept a diverse range of students with varying GPAs, MCAT scores, interests, and extracurricular activities.

Good academics are the foundation of most medical applications. Ultimately, grades and MCAT scores serve as indicators of a capacity to excel in an academic setting. Medical admissions committees want to clearly see that you will be able to survive the academic rigors of their school, and they feel that this is reflected best by high grades and exam scores. The implication is that if you were only just able to get by in a college level setting, then you likely will not be able to get by in medical school. What constitutes "solid" grades? This is a very vague question, because each school has their own definitions of what distribution GPA and MCAT scores are "good." However, if I had to give numbers, I would say that if you have a 3.7 GPA and an MCAT score of 33, then you will have put yourself in an excellent position for many U.S. medical schools. For the top medical schools, I would push the numbers a little bit higher.

From what I hear, grades only make up 40% of what medical admissions committees consider when deciding whether or not to accept a given student. The remaining 60% includes all extracurricular activities, presumably. This seems about right; I have acquaintances with high GPAs and MCAT scores who got accepted into one or two "middle level" medical schools, and other acquaintances with lower scores who have been accepted to several top tier medical schools. Extracurricular activities come in all sorts of flavors: volunteering, internships, research, shadowing, and leadership, to name a few. Many students often wonder whether or not research experience is required to get into medical school. The answer to this is an emphatic no, but it must be stated that extensive research experience is oftentimes reflective of certain qualities that medical schools want in their students. Clinical experience is definitely recommended as well, because it will give you something concrete to discuss when interviewers ask, "Why do you want to be a doctor?" At the end of the day, however, it is most important to show that you are passionate about something. It won't do you any good to do research and volunteer at a hospital for only several weeks. Long-term consistency is an aspect of your application that you must have in order to pique any sort of interest of the admissions committees.

Another question that comes up fairly often is, "Should I take a year off?" Something to consider is that by taking a year off, another year's worth of activities and classes will be included in the application, and there will also be an extra year to prepare for the MCAT. Taking a year off has a lot of advantages, so look into this if you have yet to make your decision.

by Eric Trieu

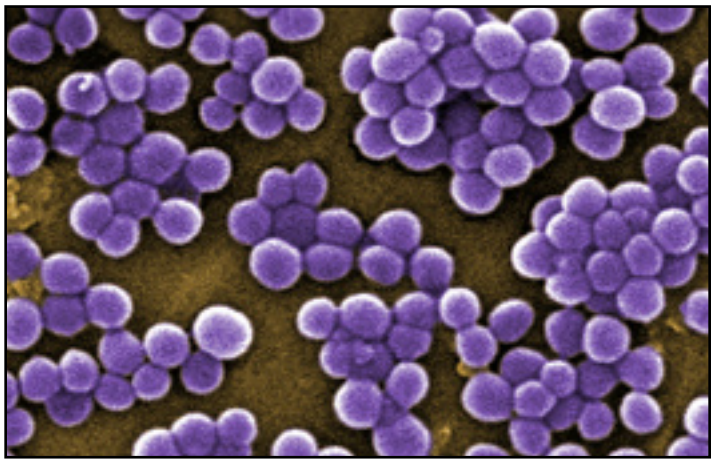
How To Compile A Good Medical School Application

So Resistant

the consequences of antibiotic misuse

Bio 1A is taught in three parts, with a different professor responsible for each one. About a month ago, having completed the first midterm, I rolled out of bed and into my early morning Bio 1A lecture to find that our professor for the second unit comes into Pimentel around 6:20 AM in order to fill the majority of the 12 boards in the lecture hall with incredible amounts of information, from scientists' names and the dates of their salient experiments to color coded diagrams of said experiments.

It took me about a month (and a second midterm) to realize the importance of the information on those boards in Pimentel. The lecture on microbiology by Professor Jasper Rine helped me understand the processes responsible for what the Medical College of Wisconsin calls "one of the world's most pressing public health problems." An antibiotic-resistant bacterium, has the potential to not only spawn trillions of likewise resistant bacteria within a few hours, but is also able to transfer resistance to its non-resistant neighbors. Of course, these neighbors can reproduce just as much as the original bacterium and also transfer resistance to even more bacteria; it is clear that antibiotic resistance is by no means trivial.



http://www.atcc.org/Portals/1/MRSA%201.jpg

The Centers for Disease Control and Prevention discusses the example of methicillin-resistant Staphylococcus aureus (MRSA), responsible for staph infections that are resistant to usual antibiotic treatment. Staph infections, caused by Staphylococcus aureus, are characterized by pus, redness, and inflammation; they usually affect the skin but may affect any organ. In 1974, 2% of these infections were caused by the resistant strain of the bacteria; in 1995, 22%; in 2004, 63%. Antibiotics other than methicillin are available to treat staph infections, but these are more costly, more toxic, and less effective. MRSA infections are at least preferable to those caused by bacteria "so resistant that no available antibiotics are effective against them," in the words of the CDC.

What does this mean for physicians? Medical College of Wisconsin said the misuse of antibiotics is the primary cause of the spread of resistance and called for prudence on the parts of doctors. Pediatricians will prescribe antibiotics 65% of the time if they feel that parents expect them, versus 12% in the absence of parental pressure. This is clearly unrelated to the efficacy of the antibiotic and contributes to the proliferation of resistance more quickly than necessary.

Bacteria are an enormous component of our environment (a handful of soil contains more microbes than humans that have ever lived). The manner in which we choose to control bacterial infections has profound public health consequences. A patient with an antibiotic-resistant infection faces longer hospital stays, higher healthcare expenses, larger side effects from treatment, and ultimately a higher likelihood of dying that antibiotics should be easily able to cure. As pre-med students, it is our job to spread awareness about antibiotic misuse.

by Ayesha Punjabi

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Food for vehicles

While on the BART, an ad caught my attention. The skies were deceptively painted bright blue, indicating the absence of air pollution or any other harmful emissions. Attached to a genetically engineered corn at the center was the handle to the gasoline pump. A farmhouse sits in the distance in the middle of a vast cropland, filled with golden produce.

http://hydrogencommerce.com/images/EthanolHuskPump.jpg

Actions have been taken to reduce carbon emission by generating energy from organic products, one of them being an important part of our diet– corn. However, the current plan requires further destruction of our natural environment to create additional croplands, but recent studies on the effects of biofuels demonstrate that the solution to reducing the greenhouse effect is not that simple. In fact, croplands tend to absorb less carbon emissions compared to other natural habitats such as rain forests and grasslands. According to Joseph Fargione, a scientist at Nature Conservancy, clearing of grasslands releases 93 times the amount of the greenhouse gas that could have otherwise been conserved[1].

Consequently, corn prices have soared even higher because of increased demand for corn. Others argue that biofuel use further contributes to the already existing world hunger. Many companies, except for the few survivors, are losing out in this competition for biofuel research and development.

While many research groups tend to focus on the greenhouse effect, David Tilman, a professor of ecology, evolution and behavior at the University of Minnesota, analyzed the effects of biofuels on human health. Many of the health problems stem from particles released during growth and manufacture. The increased production of corn and use of nitrogen fertilizers, some of which come in the form of ammonia, leads to the binding of charged ammonia particles to the dust in air. These 2.5-micron particle formations, when blown into areas of dense populations, eventually become responsible for increased cases in heart disease, asthma, respiratory symptoms, chronic bronchitis, and even premature death.

New measures are being taken to find more effective solutions to the current crisis of global warming. Several companies have looked into using organic food waste or green waste as a potential fuel source. Currently, the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) is researching how to produce biofuels from cheap waste, like crop residues and waste paper, instead of competing with the food industry. Lignocellulose, a chemical compound found in most plant wastes, is renewable and neutral to the greenhouse effect; it looks almost promising as the source for the next bio-ethanol generation.

These new approaches to the current problem with corn-ethanol fuel just might build momentum in the next few years. However, much more research is needed to determine the effectiveness and health benefits of using green and organic waste as biofuel sources. ***by Sarah Pan***

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Ask the Premed Perspective Staff

How many med schools do people usually apply to during the application process?

The application process consists of four parts: AMCAS (primary application), secondary (supplemental materials), interview, and a hopeful acceptance. On the AMCAS, most people apply to 24 schools, give or take four. Don't restrict yourself to the top 20 med schools; look around and apply to some "lower-tier" schools. Applying to a mix of schools could increase your chances of getting in. And in the end, there is no such thing as a good or bad medical school, despite the rankings. Also, some schools screen their applicants before sending out secondary applications. Thus, it is possible to apply to 24 schools and send in only 18 completed secondary applications. Since the application process can be time consuming, it is better to complete your AMCAS in early June so that you will have plenty of time to polish your (short) essays for the secondaries.

Want to know more about being pre-med? Send your questions to premedperspective@gmail.com and we'll answer them in the following newsletter.