Science AMA Series: My name is Dr. Josh Bloom and I spent 27 years in Big Pharma. Now I write for a science media non-profit. Ask me anything!

Dr$_{J}osh_{B}loom$[1]$and r/ScienceAMAs$[1]

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Abstract

Hi reddit! After getting my PhD in organic chemistry, the first 27 years of my career were in new drug discovery—the lengthy process (typically 10-15 years) during which a potential drug will go from a lab to your local pharmacy. As you probably know, success in drug discovery is so rare that in a 20 year career, a medicinal chemist has about a 5% chance of discovering something that works. During that time, the antibiotic group I led actually did get something to hospital pharmacies. It was called Tygacil—a novel antibiotic to treat resistant infections. However, it is rarely used because of significant side effects. Yet I am proud of our other accomplishments related to HIV, hepatitis C, and oncology. Though none of these campaigns resulted in an approved drug, the research that we did helped develop the science base that other companies would build on. I am also the author of 25 patents and 35 academic papers, including a chapter on new therapies for hepatitis C in Burger's Medicinal Chemistry, Drug Discovery and Development, 7th Edition (Wiley, 2010). As the cost of discovery and (especially) development got higher and higher, companies began to consolidate. In 2009, Pfizer bought my former employer (Wyeth) and in 2010 me and tens of thousands of others were laid off. Unless I wanted to leave my family and friends behind, my career in medicinal chemistry was over. However, since most of us do research in multiple disease areas during our careers, we also become experts in the biology and medicine of that field, as well as a variety of other ancillary fields, such as toxicology. So with a broad base of expertise, I embarked on a new career: doing science outreach for the American Council on Science and Health, where we "separate health scares from health threats", as the Wall Street Journal put it. Now I use my expertise in both chemistry and toxicology to debunk phony chemical scares, which typically arise from environmental groups that benefit by promoting scares about science and medicine - and I also educate people about what really goes on in private sector science. Though the pharmaceutical industry has a bad image, we were dedicated scientists who spent our days trying to find cures or better therapies. We had nothing to do with those ads on television! I loved doing science, and now I love to talk to the public about it. My name is Josh Bloom, I am Senior Director of Chemical and Pharmaceutical Sciences for the American Council on Science and Health, and you can Ask Me Anything! I'll be back at 1 pm EST (10 am PST, 6 pm UTC) to answer your questions, ask me anything!

the WINNOWER

REDDIT

Science AMA Series: My name is Dr. Josh Bloom and I spent 27 years in Big Pharma. Now I write for a science media non-profit. Ask me anything!

DR_JOSH_BLOOM R/SCIENCE

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CORRESPONDENCE:

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What do you think about drug patenting?

How do you draw the line between what is best for society, ie cheap and plentiful drugs, while still allowing drug researchers to profit from their discoveries. Ie, so you don't remove the incentive for drug research

The_Philosochef

Very difficult and complex problem. I'll do the best I can. You get 20 years of patent protection. 10-15 of them are eaten up during development. So, even the most successful drugs have the clock ticking.

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5 minutes after the patent runs out, a generic company will start selling it. It takes a ton of money to discover and develop a new drug. This has to come from somewhere. So, we are talking about the balance between profits, future discovery, and individual hardship from high prices. There is obviously no single right answer here.

Dr. Bloom, I'm an ID doc and I just wanted to thank you for your work. I'm an avid prescriber of Tigecycline and have had great success with it and do not find myself discontinuing it very often due to adverse effects. It has become a useful addition to my practice, especially in pts with multiple drug allergies who still need broad spectrum antibiotic coverage. The work you did has definitely saved the lives of many patients in my practice.

BugDoc

Thanks very much. Very few of us actually get to make a difference. You just made my day.

There are a lot of conspiracy theories regarding Big Pharma, the most notorious one being that they don't research effective cures because that wouldn't be profitable, so:

- How much money does Big Pharma really make?
- Is there a bigger focus on profit, against curing diseases?
- Have you ever known of a case of Big Pharma burying a disovery because it would be too good of a cure?
- Did you carry or see research and development for rare diseases which wouldn't be profitable to cure?
- Is there any kind of active research regarding alternative therapies not approved by the scientific community at large, like accupunture, homeopathy, etc? (I personally have very little respect for most of those, but it would be interesting to see how seriously you guys take them)

And finally:

Is there any kind of Holy Grail for pharmaceutical research? Which would be the big success that would guarantee millions and a Nobel Prize, that is acctually achievable?

Thanks.

MarsNirgal

The Holy Grail in drug research often is found only after a discovery is made. The whole business is a combination of brains and luck. This makes this a very tough question to answer. From 1990-2005 it was clearly hepatitis C. Couldn't have worked out better. The next big breakthrough? You guess is probably as good as mine. My guess would be a new class or classes of really good antibiotics. Would give the most bang for the buck, but this is far from easy.

You said you separate health scares from health threats, so, let me ask: In your view, what's the biggest health "scare" whose significance is overblown, and what's the biggest "clear and present danger" to health these days? I have my own opinions but I'm eager to hear yours.

slash196

That's an easy one. GMOs by far. You'd think, given everything you hear in the media and by environmental activists, that GMOs are going to kill Godzilla. But, in actuality, science has shown them to be very, very safe, not just for human consumption but the environment as well. I firmly believe that much of these scares can be traced back to the organic food industry. They benefit every time they can scare someone.

Hi Dr. Bloom, Thank you for doing this AMA!

My question is, what is your opinion of the CEO of Turing, Martin Shkreli, and his decision to increase the price of Daraprim by 5,500%? Is this normal big pharma behavior and should he have been directly targetted by the media the way he was?

Thanks for your time.

NoodleScience3

I think I once called Shkreli "one step above pubic lice on the food chain." That should answer that. What DOES bug me is when politicians lump parasitic companies like Valeant in with companies that are doing important research. Not even in the same ballpark.

Do you think that the proliferation of hormone therapies (Birth control, trt, etc) is resulting in elevated levels of these hormones in drinking water? Do you think this is a problem? Why or why not?

architechno

No one knows this. Here are two answers that may help a little. 1) Contraceptives have been used forever. When excreted they have to go someplace. But, they are incredibly dilute at this point. 2) Sewage treatment plants cannot do much about chemicals, but nature can. You can find out the environmental half life about most chemicals by looking at the MSDS sheet. Most of them decompose. My best guess is that this is not much of a problem, but that is only a guess.

Wyeth you say? I did not enjoy tapering off of Pristiq. Frankly, I wish I would have known what it would be like from the outset to avoid not only paying for the drug, but making it apart of my body. Anyways, on to my question:

We had nothing to do with those ads on television!

Do you believe drug companies should be permitted to advertise on television or do you think it's an avenue for the uninformed public to get sucked into consuming unnecessary drugs? Can doctors really stop all potentially ineffective/harmful drugs from getting in patient hands? The patient could certainly persist in getting their drug of choice in lots of cases and likely the doctor would permit it on account of many things (primary care physician, kickbacks from drug company etc.).

I simply think its sketchy there are these advertisements for drugs that clearly try to appeal to the senses of the average person, and the sense appeal outweighs the logical thinking side that might consider if the drug is actually worth taking based on the drugs side effects/cost etc.

humidtexan

I hate the ads. Whatever short-term gain they may have realized, the damage to the industry's reputation far outweighed the gain. They make the industry look terrible. This was a pyrrhic "victory" for the industry.

Have you considered doing a podcast? I would LOVE LOVE LOVE to hear regular updates on all of the topics you mentioned

CalvinsStuffedTiger

Never thought about it. But, I never thought that this would attract so much attention. Not a bad idea. Thanks

There is a divide between pro vaxxers (like me) that believe the slight risk of vaccine use is greatly outweighed by the reduction in outbreaks of potential deadly diseases, and by the anti vaxxers that believe that vaccines are largely unsafe but are misrepresented by big pharma in order to sell more drugs. As far as you know, How much truth is there to the claim that big pharma pushes particular schedules or types of vaccines? How slight/significant is the risk of long term adverse effects of common vaccines (not short term adverse effects like swelling, vomitting, headache etc)

eating_mandarins

For most vaccines, the long-term risk of serious illness is vanishingly small. Some serious side effects include Guillain-Barré syndrome (an autoimmune disorder), but this is very rare. The risk of disease is far greater than the risk of vaccination. Anti-vaxxers are mostly a bunch of nuts

Do you think in the long run we will beat the bugs? Or will we see an ever dwindling number of effective antibiotics?

moofrog

Never. The best we can do is stay ahead of them. Selective pressure/evolution pretty much guarantees this. The only exception would be new vaccines (not so easy). Every infection that you don't have to treat with antibiotics is one less that will become resistant

"...also educate people about what really goes on in private sector science."

As an academic researcher, I am curious what really goes on in private sector science?

redditor9000

The drug industry relies heavily on academic science, primarily to understand underlying biology and set up screens. But, academic institutions do not have the resources or knowhow to make a drug from their science. We rely on each other

Are economical motives the only thing that keeps the research on new drugs running? Say, for example, that research of new drugs is no longer profitable enough for the big companies. Will medical research die out? In addition, do you think a situation like this, when companies do not want to invest in new research anymore, and decide to solely keep On manufacturing and selling existing drugs, is possible?

Thank you!

DjuraMormont

For the scientists, it is finding something useful that keeps us going. For the business end of the industry, it is a combination of money and medical need. In my experience, medical need comes first. But keep in mind that something to address an unmet medical need = money. These cannot be seperated

Would you encourage younger generations to go into the chemistry field or would you steer them away?

I am very pessimistic about the field because federal funding is at an all time low and well paying jobs are almost not existent.

unofficialchemist

See my op-ed in the New York Post from 2011. http://nypost.com/2011/06/24/americas-vanishing-science-jobs/

Is there a Flu medicine that works? Im totally sick of getting the Flu and spending a fortune at the chemist for medicine that never works.

kongclassic

I have written about Tamiflu many times. If it isn't useless, it's pretty close. If you take it immediately when you come down with the flu (which is pretty much impossible to know), it knocks a day or so off the illness. And has plenty of side effects. I get a flu vaccine every year, regardless of how effective it is, and have never taken Tamiflu. This is my personal/professional opinion. If your doctor says otherwise, you should probably listen to him.

When you were working in research, did you find that your employer was a help or a hindrance when it came to publishing your research in academic journals?

I'm curious especially in relation to their potential concerns about intellectual property, and giving competitors a leg up in a line of research that could potentially be lucrative.

Also, did you find that the employer help/hindrance change at all after being acquired by Pfizer?

Thanks for doing this, and for all of your hard work in science and science communication!

thatsmycompanydog

Both. It is a bit paradoxical, but in med chem, almost all the publications are about failed programs. Management likes to have you publish, and these are safe to do. When something succeeds, they do not want to give away information that may help other companies, so these papers tend to come out much later. And, thanks!

First of all, I would like to thank you for your involvement in the Tigecycline discovery. Truly an amazing drug despite its drawbacks.

Since you worked in this domain specifically, to what do you attribute the relative lack of advancement in our antibiotic technology and the apparent resistance of pharmaceutical companies to invest in bacteriophage therapy?

madhatter610

You can lay the blame for this on the FDA. The statisticians changed the rules in the 1990s, making it almost impossible to run clinical trials for new antibiotics. Tig was the last drug approved before the rules changed. See David Shlaes' blog, Antibiotics- the perfect storm. He was in the middle of this. My former boss

Thanks for doing this. I'm aware that these may not apply your particular field but I'm curious:

- How do you feel about the current opiate epidemic created largely by the pharmaceutical industry?
- Do you feel about the dangerous research opiates (fentanyl variations/W18/etc) that are now being developed clandestinely to fill demand present a danger to the environment and population at large?
- What's your end goal as a person and scientist in life?

The_Revolutionary

I write about opioids constantly. The fundamental problem is that both heroin and aspirin were invented in the 1890s, and there hasn't been much progress in treating pain since then. The drug industry may have contributed to the addiction problem, but it did not cause it. People have always done drugs. Heroin (before the current epidemic), crack, meth. These were street drugs that people became addicted to. I also write about fentanyl all the time. Perversely, the heroin/fentanyl use shot up immediately after OxyContin because "abuse proof" in 2010. Addicts stopped using it. Now we have fentanyl and analogs of it that are far worse. The war on drugs has never worked. Don't know why it will start to work now.

How effective are animals models in experiments, and do you think anything can/should be done to replace them?

octopusinwonderland

It depends very much on the disease. Mice models of bacterial infection are excellent predictors of success in humans. Mouse models for cancer are terrible. Animal models are what they are. Mice aren't "little humans." They are imperfect, but at the moment, they're the best we've got.

There are technologies that will hopefully replace (most) animal research someday, but there will always be a need. I would not want to try a drug that has no animal tox data. One interesting technology is called organ-on-a-chip, in which cells are grown to resemble human organs on a slide. Hopefully, we can do more testing using technology like that.

Dear Dr. Bloom,

Thank you for doing this AMA.

I graduated this year with a Bachelor's in Bioengineering and am very interested in doing science outreach/communication work. I have received a scholarship to do a Masters in English Lit with a concentration in Science and Technology Studies. Both my bachelor's and masters would come from top ranked schools. Do you think these schools could sufficiently prepare me and others like me for work in science outreach/communication, or do I have to have a good amount of pure science/tech experience in the field first, like you?

Aloice

Too funny. I am also a classical pianist. Not half bad either. I do not know of any specific education that will prepare you for science outreach. I fell into this by a weird series of coincidences. To do it properly, you need to have scientific expertise, and the ability to write. The expertise is more important. There are very few people that have my kind of job. It is a strange hybrid.

Do people who disagree with evidence-based medicine tend to attack you as a 'shill", given your past connection to the pharmaceutical industry? And if they do, how do you typically respond? (Or do you respond?)

It seems to be an overly easy way that people who believe in things other than evidence-based research (or who believe in it only selectively) tend to dismiss experts by attacking their impartiality. What do you think is the best way to respond to these suggestions that seem to amount to stating, *'Anyone with any industry connection whatsoever (past, present, or future) is permanently incapable of honest, rational discourse"*?

MurphysLab

That's an easy one. 1) I don't get a penny from the industry. Neither does ACSH 2) I have written numerous pieces that are very critical of some industry practices. When I see something I don't like, I call them out on it. No one has ever stopped me from writing a single word one way or the other, nor will they. 3) They FIRED me! Why would I want to be a shill?? If anything, I should be MORE critical, but I don't let that color my thinking when it comes to what I write. That is because, fired or not, I still recognize good research when I see it.

What are your biggest regrets in relation to your work?

Anything that is going to keep you up at night in your later years?

Rufiodies

If you mean my previous career, I have none. It was fascinating, and taught me more than I would have ever imagined. For my current job, I have no regrets either. I would do this for free if I could. What keeps me up (sometimes) is deciding what to tackle next. The amount of junk out there is overwhelming. ACSH can only do so much, but we keep trying.

Hello, fellow Med Chemist!

Your story of working (then no longer working) in Pharma was one that I've heard so many times during my internships at startups in the Philadelphia area.

During your tenure, what shift in the attitude of upper management management toward research did you notice, if at all? How have the upper level research decisions changed since you had started in the industry?

Yourdogreallysucks

My story could be told by hundreds of thousands of others. It's that bad out there. Part 2- it depends very much on who is in charge at the time. When we are rewarded for putting X compounds into the clinic, we will give them X+1. Bonus. When they insist on quality over quantity, they will get better preclinical compounds, but most of these will also fail.

I'm a PhD biochemist by training. I'm currently working in scientific strategy for my pharma clients but it's all post-marketing. I'm not fulfilled when I develop a strategy to help my clients wring every last dollar out of their intellectual property. So, I've secured a job as a principle translational development scientist but I'm afraid about the very same layoffs you endured. In agency life I'm a lot more of a precious comodifty so I have great job security, but it's not fulfilling work. Ironically the pay is better in pharma so most signs point to a move.

Do you think pharma is still an unreliable/inconsistent employer? Or is it completely out of my control, and it's time to toss the dice?

hyperproliferative

To answer you second question, hell yeah. There is no long such a thing as stability industry. I wrote this in 2011: http://nypost.com/2011/06/24/americas-vanishing-science-jobs/

Hi Dr. Bloom, I'm curious what's your professional opinion on probiotic treatments for preventative care, and immunotherapy for cancer treatment? Thanks for all your hard work!

SwampViking

My opinion comes from a colleague from Columbia University med school, who a world expert in the field . There is far more unknown than is known. Probiotics are a fad right now. There may be legitimate use for them, but the junk you buy on the internet is unlikely to be helpful.

Do you have an opinion on the Enviornmental Working Group? I see a lot of facebook posts citing them as a source, mainly regarding sunscreen and cosmetics.

diffluere

Yes. In my opinion, they are either incompetent, corrupt, or both. They are very good at throwing out scares, but when you examine their science it is uniformly terrible.

I'm from a developing country in Southeast Asia, and the supplement industry is enormous here. The problem is that regulation is lax here, which results in a ton of scammy products (eg, stem cell pills, alkaline water, etc). Unfortunately, middle-aged and old people in the region eat this stuff up like hot cakes.

Do you have any advice on how one might convince people (ie my parents..) not to take these pills, or how to discredit these companies in their eyes?

It's tough for me to do the convincing, as I did my undergrad and grad in the U.S., and there's almost a bias against anyone with a western education. Any advice at all would be really appreciated!

tofuking

Yes. Read our page every day (acsh.org). I write about supplements constantly. There is one horror story after another. Supplements are nothing except unregulated drugs.

Hey Dr. Bloom! I have a Master's Degree in Biology and because I've spent almost a decade of my life

now working in science, I obviously know from experience that the conspiracies surrounding Big Pharma, GMOs, Big Science, vaccines, etc. are untrue. But I know this because I have experience and education in these fields. This brings me to my questions. I apologize for the length, but this is a topic that fascinates me and I have a lot of questions about it.

-I mentioned my credentials because since I am a scientist and everyone I know knows it, I find that people who are very deep into these conspiracies are less likely to believe me because they think I'm part of it, therefore making them less likely to believe me. How do I prove I'm telling the truth and I'm not part of a science-wide conspiracy?

-How do I convince friends, family, and the public who have little to no science background that the conspiracies surrounding science (GMOs, vaccines, etc., like I said) are just that - conspiracies with no backing and evidence to support them? How can I do this in regular conversation?

-How do you teach someone with little educational or a minimal science background the difference between pseudoscience and real science, and convince them that their conspiracy "sources" aren't real sources and that the real sources aren't "paid for" by the government or conspiracy?

-It's widely known that people are more inclined to read information that is biased toward what they already believe. It is difficult to convince someone to read or research something that disproves their conspiracy because they won't take it seriously. It seems to me that once they're down the rabbit hole, you can't get them out. It's like a cult. How do you reason with someone in that situation?

-Lastly and most importantly, how do we prevent people from falling for fake science in the first place? How can we teach the public what a good vs poor source is? What can we do to get people to critically think about things before accepting them?

Advice from other redditors is welcomed as well.

Varanus-komodoensis

I've been trying to do this for 6 years. I wish you much luck. Some people believe what that believe, fact be damned. MAYBE, once in awhile someone is willing to listen to reason, and will actually think about what you say. It is the exception rather than the rule. This can be VERY frustrating.

How close are we to having personalized medecine? Ie a home appliance or even an implant which makes and activates medicine as needed. No doctor visits or hospitals or ObamaCare etc.

Hecateus

It is in its infancy, so it is impossible to tell where it will go. It is important to note that science and medicine have fads just like everything else, and that the press routinely hypes successes. Personalized medicine is a very hot topic at the moment, but you only hear the successes. It will be a long time (if ever) until it lives up to the hype. Just my opinion

Why do we see our country having the highest drug prices by far of any first world country while also being the wealthiest first world country? Bernie targeted this a lot in his campaign and I was wondering why exactly this happens

hendawg98

Easy one. The US is subsidizing the rest of the world. There are price controls in Europe, so they are getting drugs cheaper, but at the same time making yours more expensive. If Bernie really was in the position to slap price controls on drugs in the US, bye bye industry.

Should we be worried about the amount of BPA being found in humans?

loldude47

I am not the least bit concerned. It has been used for 59 years. Women are not walking around with handlebar mustaches. By far, most of the BPA (and we are talking very small amounts) is found in the urine. It is efficiently excreted. I have looked at countless papers on BPA. Most are pure junk. Others are speculative. There are far worse things to worry about,

Thanks for all your hard work. Is there one particular mistruth out there that is your favorite, so to speak? One that you enjoy educating people about. Like glyphosate, or chemtrails?

katarh

I don't talk much about glyphosate, although all the tox info I've seen on it says it is unbelievably non-toxic. And chemtrails are just insane, just like the people who believe in them. If there is any one thing, I would pick it would be 'natural is better.' SO wrong. And SO misunderstood.

There is a lot of concern recently around the prolific over-use of antibiotics, especially in the West. Do you think big pharma has a responsibility in tackling this, and is it partly to blame?

Valonis

Not so much. Doctors do the prescribing, sometimes just to shut up the patients and get them out of the office. Misuse notwithstanding, this was going to happen anyhow. The definition of an antiviral drug is one that generates resistance. I'm not kidding. This hold true for other microbes, although maybe not as completely. Evolution always wins.

Thank you for doing this AMA Dr. Bloom. You stated you helped make contributions in the fields of Hepatitis C, HIV, and oncology. Do you feel we're closer to finding a direct cure for cancer as opposed to the aggressive treatment of chemotherapy?

CAJUSO

I am not terribly optimistic about a magic bullet for cancer. Of course there are news stories about how some immunotherapy completely cured a person with terminal cancer, and there have been some real advances, like Gleevec. But, the biggest problem with cancer is resistance. A treatment may wipe out 99+% of cancer cells, but some of them will survive the drug. Years later, the cancer reappears, but it is now resistant to the drug. And tumors are heterogeneous. Some tumors contain cells that are already resistant to a drug before they are ever exposed to it. Perhaps most discouraging is if you look at chemo regimens, many (most?) of them contain cytotoxic agents that were discovered in the 1960s.

Why is the pharmacy industry so against Kratom? I have seen first hand the length certain companies have gone to spread misinformation about it and get it outlawed, when it is something that has changed and probably even saved my life. Why instead aren't they studying it in order to find an alternative to addictive pain killers?

Cu1tureVu1ture

I'm not so sure that the industry is against it. Don't know one way or another, but, to me, it is another untested supplement. I've written about this before. (See http://acsh.org/news/2016/01/13/kratom-the-supplement-that-will-kill-godzilla/) Kratom is a mixture of at least 40 different chemicals, some of which seem to be dangerous. I'm in favor of alternatives to opiate pain killers, but Kratom isn't a good idea. At least not yet.

How worried should I be about Zika? I'm a 28 year old female who would like to have kids in the next few years, and I live in the Carolinas!

WhistlingSausages

Right now, not worried. It is hard to say what will happen next, because there is so much that is not known. And the facts don't add up either. I suggest that you read this http://acsh.org/news/2016/07/19/zika-what-the-hell-is-going-on/

Hi Dr. Bloom, What are your thoughts regarding vitamin supplements; pro or con?

KLMN36

Con. Con. Con. I write about this constantly. My colleague (and friend) Dr. David Seres, who is the head of nutritional medicine at Columbia Med School agrees. Read this: http://acsh.org/news/2015/11/17/science-vs-politics-on-supplements-who-do-you-believe/