KRESSER INSTITUTE
FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

Future of Medicine - Part One

Hey, everyone. In this section, we're going to talk about the future of medicine.

We're in the midst of the worst chronic disease epidemic humans have ever faced in our history. Today a billion people around the world suffer from diabetes and obesity combined, a condition that Mark Hyman defined as "diabesity." Obesity in adolescence has quadrupled just in the past 30 years, and now almost 20 percent of kids ages six to eleven are obese. Six hundred thousand people in the US die of a heart attack each year. One in four women and one in six men now suffer from an autoimmune disease. Over half of adults in the US take prescription drugs. Forty percent of the elderly take more than five medications, and 90 percent take over-the-counter drugs. According to the Centers for Disease Control, autism prevalence has more than doubled since the year 2000, and that's not just because of increased rates of detection. The number of people diagnosed with depression increases by 20 percent each year.

Unfortunately, there's every sign that things are going to get worse before they get better. Today is the first generation of kids in modern history that's expected to live shorter lifespans than their parents. If current trends continue, in fact, in two decades, 95 percent of Americans would be overweight and one in three would have diabetes.

Now, the consequences of this disease epidemic are profound. It's been estimated that the cost of diabetes alone is $250 billion a year. Now, to put that in perspective, the World Health Organization has estimated that the cost of ending world hunger would be just $200 billion, which is less than we spend each year treating a completely preventable disease. If healthcare spending continues at its current pace, the US would be insolvent, or bankrupt, by the year 2035. Our annual healthcare expenditure hit $3.8 trillion in the year 2013 and almost 25 percent of our gross domestic product that same year.

Now, with this expenditure, we should have incredible healthcare. We should be reversing and preventing disease and doing minimal harm. Unfortunately, statistics show just the opposite. According to a study that was published in the J*ournal of the American Medical Association* in the year 2000, medical care itself was the third leading cause of death in the US, and since only 5 to 20 percent of iatrogenic events are reported, the authors of the paper speculated that medical care could, in fact, be the number-one cause of death. Each year, medical errors are responsible for 200,000 extra deaths, $77 billion in extra healthcare costs, 8 million extra hospitalizations, and 77 million extra drug prescriptions.

So why is our healthcare so ineffective? Well, the simplest answer is that it's not actually healthcare. A better description of what we have would be "disease management." Modern medicine is amazing in many ways. It's incredible for emergency medicine and trauma care. If I get hit by a bus, I definitely want to be taken to the hospital! Our human lifespan is longer than ever because of this. We're starting to be able to reattach limbs, restore sight to the blind, and in our lifetimes, we may be able to fight cancer with nanorobots. But I think we can all agree that

conventional medicine is not very good at promoting health or preventing or treating chronic disease, which is really the biggest problem that we face today.

Our system is focused on suppressing symptoms with drugs. If you have high blood pressure, you'll be given a drug to lower it. If you have high cholesterol, you'll be given a drug to lower that. There's rarely any investigation into what caused the high blood pressure or high cholesterol in the first place. Now, there's definitely a time and a place for medications, and some are much better than others, but there are four fundamental problems with basing our healthcare system almost entirely on drugs.

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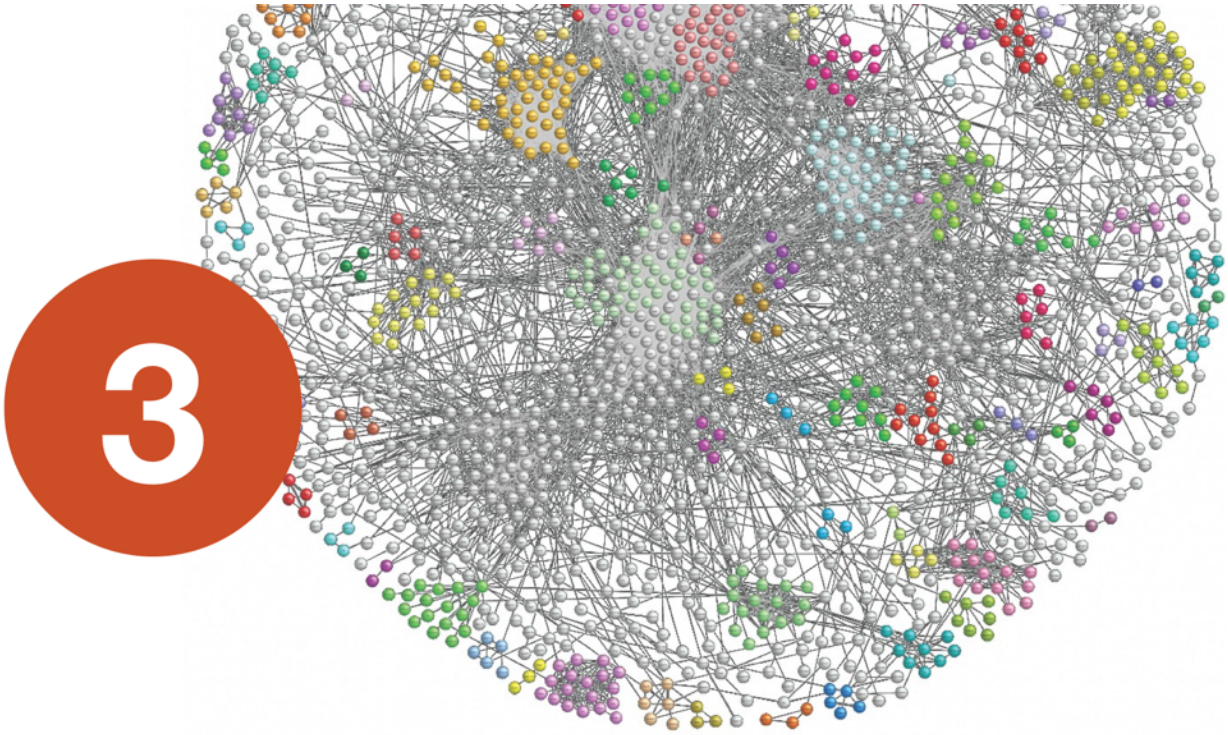
Number one is that drugs rarely address the real problem. To use an analogy, let's imagine that you had a rock in your shoe and it was making your foot hurt. Well, you could certainly take ibuprofen or some other painkiller to reduce the pain in your foot, but wouldn't a better solution be just taking off your shoe and dumping out that rock?

Number two is that drugs don't just suppress symptoms, they also suppress functions. An example of this is that many people take NSAIDs like ibuprofen to cope with arthritis or inflammatory conditions, and these medications can be effective in relieving pain, but the problem is they also reduce blood flow to cartilage. Blood carries all the nutrients and immune substances that we need for tissue repair. Ironically, taking NSAIDs can worsen the problem if they're taken chronically because they actually reduce the tissue's ability to heal.



Number three is that drugs often correct one imbalance by causing another or several others. The diagram on this slide shows the interactions among proteins in a fruit fly.

As you can see, if a drug interferes with one protein, it will inevitably affect many others. This causes what we typically refer to as side effects, but if you think about it, there are really only intended effects of a drug and unintended effects, and of course, the problem is that the unintended effects of a drug often far outnumber the intended effects.

The fourth reason that basing our healthcare system on drugs is a bad idea is that biological systems are redundant. The same molecule will have many different functions in the body. Histamine is a perfect example. It plays an important role in inflammation in local tissues, so for example, if you have a mosquito bite or a bee sting or a rash like you see on this slide, that's often mediated by histamine.

But in the brain, histamine actually increases the function of neurons. So if you take an antihistamine to suppress an allergic rash, for example, it will also affect histamine receptors in the brain and downregulate the function of neurons and cause drowsiness. This is, of course, why antihistamines are often taken by people or prescribed by physicians off label for insomnia.

So we need a new approach to medicine, one that emphasizes healthcare over disease management. What would such a new medicine look like? It would have three characteristics. First, it would recognize the exposome as the primary driver of health. Second, it would embrace an evolutionary and ancestral perspective. And third, it would apply a functional medicine approach to care. So let's look at each of these in a little more detail.

Number one, the exposome is the primary driver of health. The exposome is a concept that was originally proposed by Dr. Christopher Wild in 2005, and it refers to the sum of all nongenetic exposures in an individual lifetime, starting from the moment of our conception through the moment of our death. It encompasses the food we eat, the air we breathe, social interactions, lifestyle choices, and inherent metabolic and cellular activity.