Podcast interview: Francis Collins

**JM:** I’m Jenny Morber. Welcome to Science Sessions.

**FC:** Science has never been more exciting. The opportunities to transform the practice of medicine are really quite real.

**JM:** In 2009, President Obama tapped Francis Collins, who previously led the human genome project, to direct the National Institutes of Health: the NIH. Collins is an outspoken champion of personalized medicine – a novel approach in which doctors use detailed medical information to better tailor treatments to each patient. I asked Dr. Collins how he defines what has been called a revolution in medical care.

**FC:** Personalized medicine is the ability to apply diagnostics and treatments in a way that reflects the individual. A lot of medicine, frankly, hasn’t been able to do that—it’s been “once size fits all.” But as we get more and more information, more knowledge, more wisdom about individual differences and how those are going to have an effect on particular interventions, we can start to use that. Some of them are pretty straightforward, maybe even common sense, but we haven’t necessarily used them.

**FC:** Your family medical history, for instance, allows you to have some idea about what kind of prevention practices you might want to implement. Well, that’s personalized medicine. We could do a better job of using that information, but now of course with the revolution of being able to analyze DNA we can get much more precise about individual risks. And we can do a better job if you do get sick in picking the right drug at the right dose for you instead of just hoping that we’ve landed in some general average that works for most people.

**JM:** OK, that sounds great, but how close are we to seeing real changes in clinical treatments?

**FC:** Personalized medicine is already here in some instances but its full flowering is still a few years away. If you’re a woman who’s just been diagnosed with breast cancer and you have had a lumpectomy, and your nodes are negative, the big question that has been faced by women down through many years is “do you need chemotherapy?” at that point, or are you effectively already cured.

**FC:** There’s a personalized medicine test now that looks at the breast cancer to see whether it has the characteristics of a tumor that is going to occur and that needs chemotherapy, or whether that’s essentially a very low risk and you can skip the chemo. Fifty-thousand women will have that test this year, and it is also reducing our healthcare costs by about a hundred million dollars a year because chemotherapy is expensive. So that’s a very good example based upon our understanding of the genome, but not just trying to guess by the averages but finding out for that woman, does her tumor have the characteristics that indicate that chemotherapy is needed.
**JM:** So, personalized medicine will move us away from treating patients based on averages, and allow for customized medical care. But custom usually means cost. Will the average American be able to afford this kind of care?

**FC:** People have worried that this sounds very high-tech and maybe high-priced, but fortunately the technology for analyzing DNA and other kinds of genomic information is moving forward very quickly and costs are coming down very fast. In fact, it will be possible in the next five years for any of us who would like to have our complete DNA instruction book read out, our genome, for less than a thousand dollars. And it’s amazing to say that since the first human genome was only finished in 2003 and cost about $400 million: an amazing drop in the cost because of the ingenuity of lots of technology developers. So it will not be, I think, really that much of a technology barrier.

**FC:** The challenge will be to interpret the information, and this going to be a little complicated. One of my concerns is that healthcare providers aren’t really ready yet to become necessarily the interpreters. We have a big educational challenge in front of us.

**JM:** With great power comes great opportunity. I was curious what dreams are made of for someone who yields such a big stick, so I asked Dr. Collins what he would most like to accomplish.

**FC:** I’m a physician, and I’m impatient to see the clinical advances that should arise from this deluge of basic science discoveries. That is often a very long lead-time. Just this week, we were recommended by a distinguished group of experts to create a new center at NIH for advancing translational sciences. And that is to take these basic discoveries and with NIH investments push them as fast as possible towards new treatments, new diagnostics, and not just hope that that’s going to happen. That’s what we’re about. The NIH’s mission is to advance human health. Science has never been more exciting. The opportunities to transform the practice of medicine are really quite real.