How biotech is revolutionizing personalized medicine

Over the last several decades, DNA – the genetic material of life as we know it – has completed a remarkable scientific cycle. In 1953, it was a mysterious blur on an X-ray diffractogram. By the 1970s, it was possible to determine the sequence of short nucleotide chains. And now, a scientist can produce her own genetic code of choice with the click of a mouse.

What happens after the mouse click, after an order for a chain of DNA is sent, is an impressive series of events that represents one of the most mature, yet dynamic, sectors of the biotech industry. DNA synthesis companies range from scrappy start-ups to Cambridge-area behemoths, each touting a distinct set of tools that carves out a slice of the ever increasing pie.

Several different industries are reaping the benefits, from agriculture to clean-tech to pharmaceuticals. Emily Leproust, CEO of Twist Bioscience, thinks the biochemical arms race between pathogens and pharmaceutical companies is worse than most people realize. With increasing antibiotic resistance and a diminished rate of new antibiotic discovery, “we’re going back to an era of pre-penicillin,” Leproust maintains, “and it will be a shock to people.” With affordable methods to produce alternative genes, regulatory structures, or even entire metabolic pathways now available, the range of possible products has grown exponentially. “Now we can make new candidates and new antibiotics that will enable us to start fighting back.”

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