Revolutionizing mRNA for Life

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As COVID-19 began its global spread in 2020, a remarkable technology quickly emerged in its wake to change the course of the pandemic. Today that same technology, mRNA, is poised to alter the course of medicine itself. The tremendous therapeutic potential of messenger ribonucleic acid lies in its role as an information-carrying molecule that directs protein production in every living cell. mRNA was long dismissed as too fragile and unstable to be applied in medicine, however, until the pandemic highlighted it as the ideal route to rapid development of safe and effective vaccines. But this power did not come out of nowhere. CureVac first pioneered the use of mRNA for medical purposes upon its founding in 2000, and has spearheaded a 20+-year scientific journey to deliver mRNA technology to patients. At the time of the pandemic, in fact, mRNA vaccines were already on the cusp of making the transition from scientific research to medical application. This presentation will cover the clinical developments that led to effective and safe mRNA vaccines against COVID, and explain the technology's broad potential to prevent other infections and to treat diseases by mimicking human biology to synthesize desired proteins. What makes a good mRNA? What is needed to design a potent mRNA backbone and what is the influence of lipid-nanoparticle delivery systems on the biological activity of mRNA? The presentation will shed light on these components of mRNA technology and their clinical impact. It will conclude by considering the potential for development of therapeutic mRNA vaccines in oncology. The potential of mRNA to mobilize the immune system against cancer and to enable precision medicine approaches is already being explored and has produced stunning initial results.