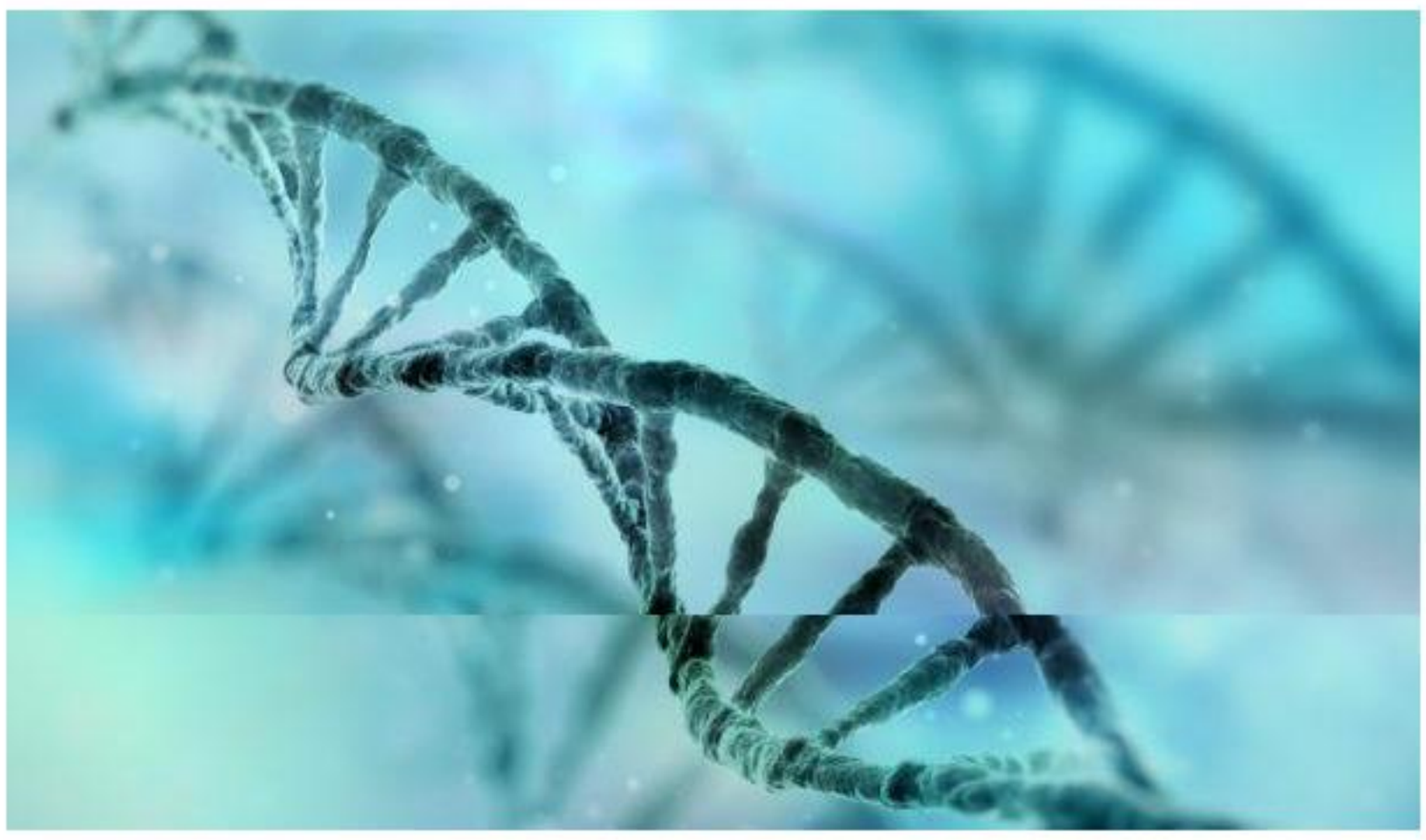
BIO & LIFE SCIENCES INNOVATION

India: A Wellspring of Untapped Genetic Knowledge

By **Sam Santhosh** | January 10, 2018, 10:30 AM | *Techonomy Exclusive*



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We have known for more than a decade that family history protects us from some diseases yet makes us vulnerable to others. Increasingly, scientists are recognizing that the citizens of one country provide unique insights into the relationship between genetics and disease. That country is India.

India has a long history of people from relatively few founder families who, in many cases, kept to themselves—much like the Amish in the United States or those who live on remote islands. Across this immense country and over many generations, people were separated by geographical barriers, religious restrictions, caste isolation and other societal constraints.

Endogamy, the practice of marrying only within a local group, hasn't turned out well in terms of health. Today, many of these isolated populations experience genetic diseases at rates higher than in more genetically mixed communities. Simply put, in these homogeneous groups there was more chance of two people who carried a mutated gene to marry and have kids. Sometimes the impact was visible right away; other times it took generations. In India, people in isolated communities have roughly twice the chance of developing an inherited disease than, for instance, the general population who live in the United States or Europe.

India is a wellspring of untapped genetic knowledge. Its people represent 20 percent of the world's population but only 0.2 percent of the sequenced population. The isolated groups there individually show tremendous similarity within their communities but are extremely distinct from each other. And there are some 4,000 to 5,000 of these groups, or population isolates. Genomic insights are, therefore, substantially easier to discover in India.

New insights await in disease-related biomarkers and drug-related biomarkers. Pharmacogenomic discoveries can be applied generally, in many instances, to those who suffer from a specific form of a disease. Others maybe relevant down to the individual.

Building the database of Indian genomic data is one of the goals GenomeAsia 100K, a not-for-profit consortium that MedGenome co-founded with Macrogen and Nanyang Technological University (NTU). Our goal is to sequence 100,000 people's genome to create a high-quality baseline against which more insights can be generated. More exciting pathways to drug discovery are within reach. More effective and efficient drug trials can be conducted. More people can be helped with more diseases if only the Indian genome is more fully studied.

For example, the *European Journal of Clinical Pharmacology* published a finding on genetic polymorphisms by studying the South Indian Tamilian population. Significant differences in how patients reacted to the antiplatelet drug Clopidogrel were described. Such work can lead to physicians more wisely using this drug to keep certain patients' blood flowing smoothly, avoiding clots and strokes.

Why has the Indian population been overlooked for so long given the rich information held in the isolated populations? Many of the genomics studies to date have been initiated and funded by U.S. and European organizations, and it follows that the vast majority of sequenced DNA hails from citizens of U.S. and European ancestry.

Now is a unique time in the history of world healthcare. We can sequence faster, and we can sequence at a lower cost. Indian genomic data will unlock more of life's source code to benefit everyone—people in India as well as Indianapolis and Innsbruck.

The near-term payoff will be seen in precision medicine. Large-scale genetic research studies in Indian patient cohorts increases the possibility of uncovering new insights into the biology of diseases, and enables better understanding of each type of cancer, heart disease, diabetes or any disease condition where genetics plays an underlying role. Over time, researchers and pharmaceutical companies hope to personalize medicine —personalized to a single individual's health and genomic heritage. The journey advances with discovering more disease and treatment-related biomarkers. India represents arguably the most promising genetic treasure trove in the world.

Sam Santhosh is Founder, Chairman and Global CEO of MedGenome.