



## Guest Editorial

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It is our great pleasure and privilege to serve as the Guest Editors of this special issue of the Journal of the Indian Institute of Science on “Diabetes Research with focus on India”. The health burden due to diseases has undergone dramatic changes in India. Till a few decades ago, communicable diseases were the commonest cause of death in India. Thanks to better hygiene, sanitation, and improved nutrition, the prevalence of communicable diseases started declining. However, post 1991, thanks to the liberalization of the economy, rapid socio-economic changes took place in India and these were associated with the globalization and urbanization. While this led to prosperity and improved standard of living, it also resulted in a rapid rise of non-communicable diseases (NCDs) like obesity, diabetes, heart disease, and even some cancers. Soon, the primary causes of mortality shifted from communicable diseases to NCDs. Indeed, today nearly 60% of all deaths in India are due to NCDs.

The prevalence of type 2 diabetes (T2DM) which was around 2% of adults in 1970s in urban areas<sup>1</sup> has increased to over 25% of adults living in metropolitan cities like Delhi and Chennai<sup>2</sup>. T2DM, earlier considered a disease mainly of affluent migrant Indians, started rising rapidly in India and indeed its prevalence is now higher in urban India compared to Indian migrants abroad<sup>3</sup>. Simultaneously, the epidemic of T2DM also spread to rural areas, to poor people and it also started affecting the youth and even children<sup>4,5</sup>. There is a huge burden due to complications of diabetes like blindness, kidney failure, heart attacks, and amputations in India<sup>6</sup>. Thanks to advances in technology, today, we know that diabetes is not one disease but a syndrome comprising different types of diabetes. This includes type 1 diabetes, type 2 diabetes, gestational diabetes, and other specific types of diabetes<sup>7</sup>. Even within these types, there are several subtypes of diabetes, each having its own etiology and prognosis. For example, within type 2 diabetes, four subtypes or clusters namely, Severe Insulin-Deficient Diabetes (SIDD), Insulin-Resistant Obese

Diabetes (IROD), Combined Insulin Resistant and Deficient Diabetes (CIRDD) and Mild Age-Related Diabetes (MARD) have recently been described in South Asians<sup>8</sup>.

Our understanding of the genetics of diabetes as well as the pathophysiology of diabetes including environmental determinants of diabetes has improved dramatically. There have also been great advances in the diagnosis and management of various forms of diabetes. It has also been well recognized that so called “Asian Indian Phenotype” or “South Asian Phenotype”, makes Indians (and other south Asians) more prone to T2DM and premature coronary artery disease (CAD). The features of this phenotype include: younger age at onset of T2DM and CAD, hyperinsulinemia eventually leading to rapid exhaustion of pancreatic beta-cell reserve, abdominal obesity with excess visceral fat, higher hs-CRP levels and lower serum adiponectin levels, many of these being attributed to low birth weight. There are also unique lipid abnormalities including elevated triglyceride levels, low HDL cholesterol, and increased small dense LDL cholesterol<sup>9</sup>.

Until a couple of decades ago, there were only two classes of oral antidiabetic drugs—Sulfonylureas and Metformin. Today, we have several newer classes of antidiabetic drugs like the DPP4 inhibitors, SGLT2 inhibitors, GLP1 receptor analogs etc.<sup>10</sup>. Insulin injections have also become better in terms of faster absorption and more accurately reflecting normal physiology. Tremendous developments have also taken place in the delivery of insulins, from the glass syringes and painful needles of the past to disposable syringes, smaller and virtually painless needles, insulin pens including smart pens and insulin pumps making the insulin delivery more accurate and precise. Closed loop hybrid artificial pancreas which is an advanced insulin pump with automatic insulin delivery based on continuous glucose sensing has become a reality and several hundred patients in India are already using these treatments. Therapies to delay the onset of type 1 diabetes by a few

# GUEST EDITORIAL

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years<sup>11</sup> as well as the possibility of a cure of type 1 diabetes are emerging rapidly<sup>12</sup>.

It was, therefore, felt appropriate that a special issue of the Journal of Indian Institute of Science (IISc) should be dedicated to recent advances in in diabetes research with a special focus on India. We were deeply honored when we were asked to take on the responsibility of producing this special issue. We wrote to several of our friends who are leading diabetologists, endocrinologists, and scientists in India and abroad and were delighted when almost all of them agreed to contribute. This special issue that you have in front of you, is the result of all their efforts and a big thank you to all the contributors, many of whom are extremely busy people and some of whom are also Editors of prestigious journals. We must convey our special thanks to Prof. G. K. Ananthasuresh and Ms. M. V. Leelakshi from Indian Institute of Science for their help at every stage in the production of this special issue. We also wish to thank the production team of Springer Nature for their constant support. A special word of thanks to our secretary Ms. M. Muthu Valli Nayaki who took great pains to coordinate the production of this issue. Finally, we dedicate this issue to the millions of people with diabetes. If through the advancements occurring in the field of diabetes, their lives are enriched and improved, we would be more than pleased with the efforts taken to bring out this special issue on Diabetes Research.

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