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"The motto of our research is affordable health for all. This is the motto with which we all commit and work together. And we try to make simpler chemicals which are available at very cheap prices in the market, put them together and make complex molecules."

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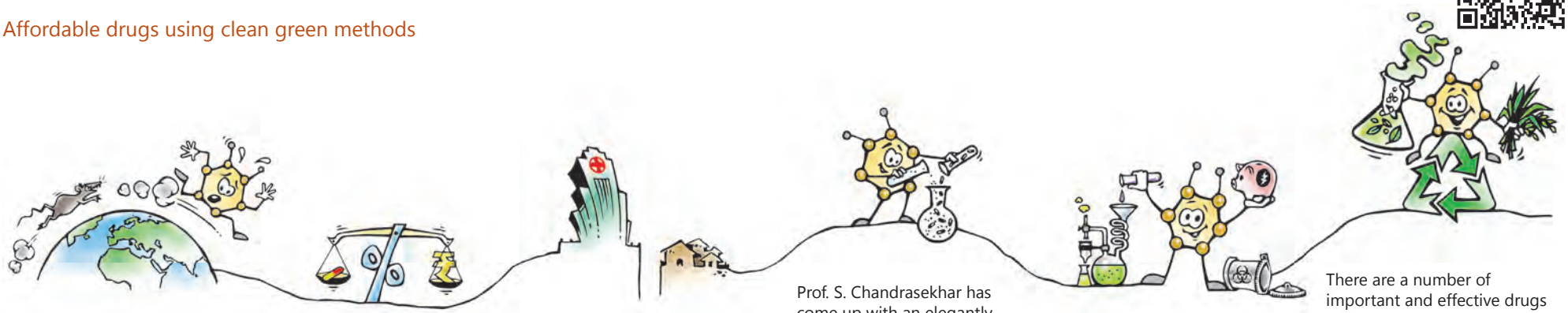
Prof. S. Chandrasekhar's research efforts, with an impressive degree of innovations and enterprise, have led to the synthesis of complex and scarcely available natural products and new molecular entities for affordable healthcare. In addition, his research has provided cost-effective technologies to the chemical industry through identification of new reagents/solvents for specific transformations.

Affordable drugs using clean green methods



There was a time when access to good quality affordable healthcare and medication was an impossible dream for most people. When the Black Death or bubonic plague hit England in the 14th century or the Spanish Flu pandemic in 1918 devastated large populations globally, millions could possibly have been saved if the right technology and access to medication had existed.

In comparison, we live in a world where technological advances and medical knowledge have improved lives. However economic constraints among other factors prevent millions from getting the care they need. In India the ratio of doctors to patients stands at a staggering 48 doctors to 100,000 patients and 45% of the population needs to travel more than 100 kms to access better healthcare.

The economic disparity between the urban and the rural areas means that rural populations have no access to good quality therapeutic drugs for several deadly diseases such as multidrug-resistant tuberculosis. In India in 2012 alone there were over one million reported cases of tuberculosis. Prohibitively expensive drugs prevent the people who need it most from being able to access them.

Prof. S. Chandrasekhar has come up with an elegantly simple solution to this crisis. His research has led to the synthesizing of low-cost good quality drugs such as bedaquiline and misoprostol. The former is an effective anti-tuberculosis drug, while misoprostol has a wide variety of therapeutic uses including in treatment of gastric ulcers, and as a safe drug to terminate unwanted pregnancies. Chandrasekhar has come up with innovative approaches of synthesizing these drugs making sure of their ready availability.

Manufacturing of pharmaceutical products takes a huge toll on the environment, producing toxins and using enormous amounts of energy. Sustainable or 'green' chemistry helps in manufacturing useful drugs and chemicals keeping in mind factors such as waste reduction and energy conservation. Chandrasekhar has been promoting the use of eco-friendly PEG (polyethyleneglycol) as a solvent for processing and recycling expensive metal catalysts in diverse reactions.

There are a number of important and effective drugs that can be developed from natural products such as plants. However, these are a finite resource and extracting the active products is not a cost-effective or sustainable practice. Prof. Chandrasekhar solved this conundrum by synthesizing structurally complex bio-actives in lesser number of steps for maximum benefit. His group has managed to synthesize over 30 complex natural products in this way.