

## “IMTECH's translational science agenda holds a big promise”

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By : Rahul Koul - June 13, 2019



**A**mong the select few young faces of India's topmost bioscience policymaking, Dr Anil Koul has been intensely involved with the pharmaceutical drug research in the industry over a period of 16 years. Having served as the Senior Director and head of drug discovery research at Johnson and Johnson pharmaceuticals in Europe, he took over as the Director of one of the premier institutes of the Council for Scientific and Industrial Research, the [Institute of Microbial Technology](#) during the year, 2017.

Dr Anil Koul's key career milestone was his role in the discovery and clinical development of Bedaquiline, the first drug to be approved in the last 45 years for the treatment of drug-resistant tuberculosis in more than 40 countries across the world, including India. It has been hailed as the most innovative orphan drug of this decade (Prix Galien award).

For his contributions to this significant discovery, Dr Koul was awarded the 'Sun Pharma Research Award' in 2017. He has been also a recipient of the 'SwissTB prize' by Switzerland's Society of Pneumology in 2005 and the prestigious 'Johnson Medal' in 2013, the highest R&D prize at J&J.

This chapter of 'Face to Face' features an exclusive interview with Dr Anil Koul, Director, CSIR-Institute of Microbial Technology who aspires to bring about transformation in Indian science and make policies which help Indian public sector R&D institutions to compete across the world in the race for innovation and technology development.

In a freewheeling conversation with the BioVoice, Dr Anil Koul talks about the latest activities at the CSIR-IMTECH, his vision for the institute, changes required in the innovation system, startup culture and much more.

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Please tell us about the current top focus of the CSIR-Institute of Microbial Technology? Has the mandate of the institute evolved since its inception in 1984?

**Dr Anil Koul:** The CSIR-IMTECH is a premier scientific research institute of this country, supported by a multidisciplinary staff of around 650 people. The core mandate of this institute is to develop new technologies and novel science in the areas of healthcare especially using biochemical protein engineering, bioinformatics, and biotherapeutics.

IMTECH has set up new drug discovery units in the areas of medicinal chemistry (iMDCHEM), and virology (iVIR), an international microbial depository division (MTCC) and several modern biology and other exploratory scientific areas. We have recently reinforced IMTECH mandate with more focus on translational science and product-driven research especially in healthcare. We have also deprioritized certain research areas, which don't fall in our microbial tech core mandate. We are heavily investing in areas of human microbiome-based therapies.

To provide you a view of broader strategic research frame-work of our activities at IMTECH, I would like to mention that we have created four Disease Area Specific (DAS) units and four Technology Area Platforms (TAP) units. These units provide us focus, team's alignments as well as common objectives so as to address key national challenges. The key DAS areas are – antibiotics discovery and antimicrobial resistance, viral diseases, human microbiome and biopharmaceuticals. The four technology platforms are – Microbial Type Culture Collection (MTCC), bioinformatics unit (BIC), Biochemical engineering and fermentation division and diagnostics. The aim of TAP is to provide technologies and service to help industries to develop newer products and processes for benefit of the common man.

IMTECH is already one of the top 10 institutions in the world in the area of bioinformatics and biological databases, as per database commons – an international peer review organization. This is among almost 2000 institution across 67 countries in the world. Our MTCC division is severing both industry as well as academic institutions since last 25 years and is providing 10,000 cultures per year across the nation.

I feel Indian R&D institutions have to reinforce their mandates and core missions from time to time, in order to stay relevant. Developing global leadership demands strong expertise in core areas of excellence, long term strategic vision as well as sharp focus.



How have been your experiences at the institute since you took over as the Director? Are there any challenges?

**Dr Anil Koul:** My previous work experience of around 16 years was primarily in the pharmaceutical industry before moving to IMTECH by end of the year 2016. My broader aim at IMTECH has been to see how the Government of India's research funding can be leveraged towards more product-driven research in healthcare and life sciences. This involves a sustained focus on novel translational science as well as skilling and human resource recruitment.

For me, IMTECH has been a tremendous learning experience. The social, as well as economic impact which public sector R&D institutions can make, is really tremendous. I believe that public funded research institutions in our country should focus on addressing this nation's challenge. We need good strategic planning as well as disruptive operational working models for translation research to succeed in our R&D institutions. At IMTECH, we are trying to bring together multidisciplinary teams working on a common product driven outcome using our DAS or TAP units.

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I think an amalgam of best operational practices of the industry with the government's ambitious goals and network in social outreach programs can have a transformational impact on people's lives.

We need to implement robust research and financial planning systems as well as through project review processes for the monitoring successful outcomes of these programs. We have initiated at IMTECH a process of 'ease of doing science' so as to make an effort to align our operational and working procedures with best international practices.

Historically, CSIR has done great service since its establishment in early 1940's and delivered technologies and solutions for India's industrial sector growth as well as to this society. Now CSIR is in phase of reinventing itself and is preparing itself for industrial revolution 4.0 so as to effectively compete in the global innovation race.



What was your motivation behind moving from industry job in Europe and heading back to India to join academia?

**Dr Anil Koul:** In my previous role at the industry, I was lucky to be a part of the core team involved in discovery and development of Bedaquiline – the first drug to be approved for drug-resistant tuberculosis in last 50 years. Bedaquiline is approved in US, Europe and several other countries including India. This drug is having tremendous social and economic impacts across millions of patients in the world. That is the power of science.

**My biggest happiness has been the recent announcement (January 2019) by our Ministry of Health and Family Welfare, where Bedaquiline was made available to patients across more than 500 MDR-TB centers in India. This is going to save the lives of thousands of TB patients suffering from drug-resistant TB disease in this country. This is my biggest motivation and brings in lots of satisfaction. We need to effectively define science which happens in our laboratories as an effective tool for improving the lives of people.**

**I had an honor and a chance to meet our Prime Minister in early 2016 and his vision of translational and product focus research is very inspirational and immensely needed in this nation. We need to address our key national challenges via science and technology. I believe IMTECH is progressing well on the translational science agenda set by our honorable Prime Minister.**

**Across all the nations, it has been shown that innovation is a big contributor to national growth. CSIR has a big role to play to drive innovation in this country for decades to come. My aim at IMTECH is to bring this institution to the international forefront – as the world’s premier microbial technology laboratory with strong industry linkages and bring out new science can have transformational social impact. I consider that we as a scientific community and as a premier institution should be totally accountable for the deliverables and outcomes of our research projects borne heavily out of the public expenditure.**



**IMTECH has been known for its translational research efforts in the past. What steps are being taken to promote the industry-oriented research at the institute? Any outcomes that are in the pipeline?**

**Dr Anil Koul: IMTECH’s founding father Dr V.C. Vora, had a great vision of an institution that could support industry via biochemical and bioprocess science. I strongly believe that for IMTECH to progress, we have to reinforce strong Industry-academia partnership and novelty in research. Furthermore, R&D spending in India has to go up and this can happen if the industry contributes big way in R&D and innovation processes. For example, in Israel, the industry contributes more than 90% of their national R&D budget. In contrast, India is heavily dependent of government money for R&D innovation.**

**At IMTECH our outreach to Industry has increased a lot in the last few years and we have managed to garner trust and develop several industry collaborative projects. Recently our business development unit has established collaborations with key industry partners like Zydus Cadila for new antibiotics discovery and with another global giant Reckitt Benckiser (RB). We also have a unique MOU signed with MERCK so as to develop a High-End Skill Development Centre as part of our national skill development initiative. For the year 2019, we have an anticipated several-fold increase in garnering external funding as compared to the year 2018.**

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The key to new product development is also to link basic science happening in our labs with clinical research across premier hospitals. IN our new center for Translational Microbiomics initiative, we are collaborating with premier hospitals, like PGIMER in Chandigarh and ILBS at Delhi so as to better understand the patient's unmet needs and get better clinical ideas of patients' needs and requirements. With ILBS, we are trying to develop human microbiome based therapy for patients who have developed liver failure on account of alcohol misuse and with PGIMER on microbiome applications in neuro-degenerative diseases. Healthcare R&D in this country can only improve with close collaboration with clinical researchers and hospitals.



How do you view the upcoming startup culture in India, especially in the biotech area? Shouldn't there be more effort on this front in the north when compared to cities such as Bengaluru and Hyderabad?

Dr Anil Koul: I believe India is trying hard to leverage its biotech industry and institutions as well as its nascent startups in this domain quite well. India's biotechnology industry comprising biopharmaceuticals, bioagriculture and other bioservices etc is expected to grow to US\$ 100 billion by 2025. CSIR has recently pledged to finance a start-up innovation fund of around 400 Cr (approx. 65 million USD), to support and foster new startups. On the other hand, the National Biopharma Mission Program of DBT in collaboration with World Bank is investing heavily in India Biopharma industry with the Innovate in India (i3) mission and will witness an investment of USD 250 million.

IMTECH has been designated by CSIR as Centre of Excellence in biopharmaceuticals and we are building new investments to develop much needed bioanalytical as well as a state of art cGMP cell line facilities. The aim is to help biopharma industry in this country and make affordable and quality drugs for Indian patients. We all know that protein and antibody-based drugs are conventionally not easy to develop as compared to chemical molecules and as such need deeper expertise and infrastructure which institution like IMTECH can easily provide.

From innovation clusters perspective, North India lacks the industry-academia ecosystem of Hyderabad or Bangalore but Chandigarh's city administration has recently developed the "Chandigarh Innovation Circle" (CIC) project which aims to create a non-profit company with links to this regions national lab like IMTECH or PGIMER so as to help startups and foster innovation in this region. Chandigarh is uniquely placed, as it has 25 premier national institutions and laboratories in a radius of 25 km that can contribute to the success of CIC and make this city as tech epicenter of the northern part of India.



How can academia play a prominent role in 'Make in India' movement? What support do reputed institutes like IMTECH need to increase their participation in public-private partnerships?

**Dr Anil Koul: Academic institutions in India especially national labs like CSIR have a major stake in the 'innovate in India' campaign. IMTECH is geared to support biopharma and healthcare industry in a big way, via new CoE's in new drug discovery including human microbiome based products and biopharmaceuticals. Institute is on an average delivering more than 10,000 microbial cultures via its Microbial Type Culture Collection (MTCC) unit every year to academic Institutions and industry across India. We are able to generate enough revenue via MTCCC with the aim to make it a financially self-sustainable division. MTCC unit is a great success example with social as well as economic impact. For us to succeed further, we need to create more service models like MTCC.**

**“The key to new product development is also to link basic science happening in our labs with clinical research across premier hospitals.”**

**We also need to encourage an 'open innovation system' where industry and other academic institutions, as well as lesser funded universities, can leverage infrastructure and other investments at the research institution like IMTECH. Students from lesser privileged research labs or universities should be able to get access for free to our big infrastructure available at National Labs. We need to open our systems, our labs, our scientific infrastructure for the common public good.**



**What is your broader vision for the IMTECH? How do you plan to achieve the same?**

**Dr Anil Koul: IMTECH is right now a national leader in the field of microbial sciences, bio-products and fermentation processes developments. My aspiration is that our institute takes global leadership in these domains and become the powerhouse of science, innovation, and enterprise in this nation. We want a new drug or molecule or novel discoveries or technologies to be developed here in our labs that can impact the lives of millions of people across the world. IMTECH has to be on a global innovation map.**

**The quality research education programs including newly created human resource management group (HRMG) at IMTECH are actively creating new skill development initiatives to help India's job market growth. Our HRMG group has linked several schools and universities across this region via novel outreach programs like Jigyasa and recently introduced student internship courses for training less privileged students from economically weaker backgrounds. One thing is for sure, that our students and alumni are achieving global leadership roles in institution and industries across the world.**

**For IMTECH to stay relevant in the next decade, it has to innovate in healthcare research and provide cutting edge science, novel drugs discoveries etc. Our biopharmaceuticals processes development team can make a big impact on affordable healthcare in India.**

**Our mantra should be that our research outcomes should benefit society at large. Our administrative processes should make it easier to do science and help our scientist focus on the real job of experimentation in labs rather than be locked in a logjam of bureaucracy and**

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paperwork.

**Our operational excellence is key to our success. The institute has to deliver on all aspects of science, operations and building our next generation scientists. Let IMTECH symbolize “think different” motto in all its areas of existence.**