



DOCTOR *of* HOPE

DR. THANGARAJAN RAJKUMAR
Champion of Chennai – Healthcare

Cancer. A word that brings out emotions that definitely are not happy ones. The world now deals with cancer as one of the fastest growing diseases, across sections of society.



And then there are those who work tirelessly to find possible solutions for the cure, and all ways to handle it in between. From early detection to easy tests to faster results, doctors are finding new ways to tackle the challenges of the disease.

Dr. Thangarajan Rajkumar is one such doctor dedicating his life to cancer research. A Clinical oncologist, he helps treat cancer with chemotherapy and immunotherapy. Dr. Thangarajan Rajkumar credits Dr. Sunithi Solomon and Dr. Shanmugasundaram, for guiding

him towards Clinical Pathology. And, Prof. Sethuraman as instrumental in steering him towards Adyar Cancer Institute. A graduate of Madras Medical College, he joined Adyar Cancer Institute and eventually became a professor there focussing on solid tumours – breast, abdominal and gynaecological cancers.

Selected for the Commonwealth Scholarship (1991-93), with the head of the Hammersmith Oncology Center's recommendation, Dr. Rajkumar stepped into laboratory research with completion of his PhD in 3 years. "I was a clinician

so moving to the laboratory space to learn and apply was very exciting. I worked on Her3 – same family as epidermal growth factor receptor Her1 and Her2 is known in breast cancer. My research was to develop monoclonal antibodies (antibodies that bind to very specific antigens or surfaces) to target it. I managed to develop 2 monoclonals to stain cancer



tissues and a monoclonal to target the same. Such data was generated for the first time", he fondly recalls.

The support and trust of Dr Krishnamurthy, Dr Muthulakshmi Reddy and Dr Shantha was instrumental in Dr. Rajkumar's career. "Dr. Krishnamurthy had a vision to set up a molecular oncology laboratory with the conviction that it will be of use to the general public. He gave me the freedom to set up the department and organized equipment for 75 lacs. A voluntary charitable institute with such a dream was amazing. I built up the

department, got funding and got started. We began with identifying the different sub-types of HPV in cervical cancer in collaboration with International Agency for Cancer Research for first time in the country. And sometime in 2000, we decided to work on cervical, ovarian, breast and gastric cancers for early detection. We thank ICMR, Govt of India, private funders for all the help in our research journey!", Dr. Rajkumar explains.

Going on to explain in more detail about the cancers, and the research his department is doing, Dr. Rajkumar elaborates.

"Focus is on common cancers – breast (now the leading cancer), cervical, gastric and ovarian. 95% of cervical cancer is due to human papillomavirus (HPV). Gastric cancer is quite prevalent in South India and Northeast of the country. Countries like Japan use the barium swallow test but it is not feasible with a population like ours. So right now, it is mostly late detection unfortunately. Similarly with ovarian cancer", says Dr. Rajkumar. He goes on to explain the tests they have developed for each of these cancer detections.

The department developed a P16 assay for cervical cancer, where monoclonal antibodies were developed to detect the upsurge of the P16 protein (tumour suppressing protein) in the pre-cancer and cancer stages, using a ELISA plate reader (detects and processes biological and chemical data). This test does not need a pathologist, and can be done with just the ELISA plate reader and a technician, a huge advantage for wider screening. The kit is under production with HLL Lifecare, to keep costs low and can be stable in all climatic conditions, across the country and other low-income nations.

The general test for breast cancer is the mammogram, but this is not easily accessible. Dr. Rajkumar explains that



the department developed an assay looking at cell-free tumour DNA in blood plasma. Dead tumour cells release some genetic material into capillaries and this gets circulated thorough the plasma. If the free DNA is methylated, it is most likely from a cancer cell. He excitedly says, "This helps detect even non-invasive cancers and this becomes the preliminary test for all cancers in general. This assay will cost around Rs. 2500 and we are in advanced stage of discussion for production."

Dr. Rajkumar recalls the breakthrough

in Osteosarcoma in young adults and adolescents. "It is a very aggressive tumour in the bone marrow, and at the time, the success rate was at 50%. We studied the drug resisting nature of the genes in the cancer, and found that one of the pathways used by these genes was positively affected by an anti-diabetic drug. So we used the anti-diabetics to modulate the resistance of the cancer to the specific drugs, along with chemotherapy, which also helped reduce the tumour size in the presence of liver enzymes", the doctor says.

Dr. Thangarajan Rajkumar adds, "I also run the Hereditary Cancer Clinic over the weekends. We also have Doctoral students working in the department – 17-18 have completed their PhD and I am proud of students who have gone abroad and come back to work in their own country."

The rise of cancer cases is alarming and Dr. Rajkumar cites the change in lifestyle as the prime reason for this. "Couple of generations back, people were more active and the food consumed was converted and the body functioned

at an efficient rate. Now, with women choosing to have kids late, past the age of 30, the estrogen plays truant on the breast tissue. Pregnancy hormones actually plays a protective role, hence the rise in risk of breast cancer", points out Dr. Rajkumar.

On cancer treatment available now, Dr. Rajkumar says, "Large impetus and newer drugs are coming in with better rate of recovery, but the cost of treatment is a big hurdle. The Government of India is stepping in and there is a lot of hope for affordability. We also need to address financial toxicity along with psychological effects. We need to develop these newer molecules for wider reach and accessibility. A lot of research is multi-faceted and plant-based derivatives and hand-held devices are some of the options coming up", clarifies Dr. Rajkumar.

Each journey in our lives is usually marked by milestones and memorable moments. Dr. Rajkumar says, "The recognition by the Center of Excellence, Department of Science and Technology, Government of India, is one of the biggest caps the lab has, and 6 patents we have applied for, we hope will convert at the ground level to benefit people at large."

The satisfaction of actually seeing your work come to fruition might not be for Dr. Thangarajan Rajkumar yet, but the passion is not fading anytime soon! The desire to be a part of an innovation in an area that's evolving is challenging enough, but the bigger goal is what takes precedence here.

"The Department should continue to grow with everyone empowered to continue their work, even when I am not there!", says Dr. Rajkumar proudly. A true Champion of Health is Dr. Thangarajan Rajkumar, and the city of Chennai is indeed much richer with such a dedicated doctor!

Shobana Ravi