Visionary chemist – Dr Yellapragada Subba Row

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Yellapragada Subba Row (1896–1948), Director of Lederle Research Laboratories at Pearl River, New York was an accomplished scientist in the discovery of life saving drugs. His academic and research career and contribution to the discovery of drugs are briefly presented.

The review by Deo and Hazra[1] of the book *Life and Work of Visionary Chemists* authored by Gopalpur Nagendrappa[2] is interesting. Of the 13 scientists included in the book, the last two were mentioned as Indian chemists, viz. Yellapragada Subba Row and Krishnaswami Venkataraman. While Venkataraman was a renowned organic chemist and an administrator in science (Director, NCL, Pune), Subba Row was not so well known in India until his sad demise due to coronary thrombosis in 1948 in New York at the age of 52. The present note is a brief account (mainly drawn from my article published earlier[3]) of his academic and research career and contributions to the discovery of life-saving drugs. I do not know how much of this information is contained in the original book[2].

Subba Row, born in Bhimavaram in the erstwhile Madras Presidency in 1896 in a poor family, was a graduate in medicine from Madras Medical College, and worked as a demonstrator in physiology in the same college for a short period before he left for England to study at the School of Tropical Medicine of London University. There he met with Richard Strong, then Professor of Tropical Medicine in Harvard Medical School (HMS), Boston, USA and at his instance moved to HMS in 1924 to realize his goal of finding a cure for tropical diseases, especially sprue.

After working for one year in Strong's laboratory, Subba Row switched over to biochemistry as he was not happy with his background in chemistry. He worked under Cyrus Fiske on the phosphorus compounds in muscle which earned him the Ph D degree in biochemistry in 1930. His subsequent research work on liver extracts and finding a cure for pellagra and pernicious anaemia won him a faculty appointment as Associate Professor in HMS in 1938. He did very little teaching, preferring to spend his time doing research.

Subba Row's work on liver extracts and contact with Lederle Laboratories (a division of the American Cyanamid Company) through C. W. Clark, a Lederle scientist, who used to visit HMS resulted in his appointment as Associate Research Director of Lederle Laboratories at Pearl River in New York in 1940 and elevation to Directorship in 1942. In guiding the work of 300 and odd research staff in the investigation of several scientific problems, Subba Row was the all-knowing biologist-cum-biochemist to organic chemists and a well-versed organic chemist to biochemists and medical men, and got the best out of them. His groups assiduously worked through the isolation of folic acid which proved to be a cure for tropical sprue, exploitation of a microbial broth for a richer source of the vitamin, and finally its synthesis and role in nutritional anaemia. Some other investigations covered were folic acid antagonists and anticancer agents, antifilarials (Hetrazan), substituted nicotinamides as antitubercular drugs (which later led to the development of isonicotinic acid hydrazide (INH) as a clinically useful drug), and the major discovery of aureomycin (chlorotetracycline), the first of the tetracycline group of broad spectrum antibiotics. Subba Row's talents and leadership qualities in coordinating the activities of different groups were greatly reflected in the selection of organism, fermentation and isolation of aureomycin and its pharmacology and clinical studies.

A special mention may be made of Subba Row's Ph D work. He published two papers in 1927 with Fiske, which created an understanding of muscular contraction and eventually led to the discovery of adenosine triphosphate (ATP)[4] in 1929. According to Murayama[5] (as quoted by Rama Sarma[6]), Fiske and Subba Row[4], and Lohmann[7] both independently discovered ATP in 1929. Lohmann got the Nobel Prize for his discovery. Subba Row presented his paper at the New York Academy of Sciences much earlier on the isolation from muscle extract, a compound of adenosine with three phosphates, one of them linked to ribose. But the abstract was not printed in the Proceedings. Lohmann[7] found that ATP was a derivative of adenosine-5-phosphate with two more phosphates attached in phosphodiester linkages. Had the abstract been printed in the Proceedings, Fiske and Subba Row perhaps could have shared the Nobel Prize with Lohmann. However, it must be said that Subba Row never offered himself as a candidate for any honour, and was unconcerned of the fame and benefits that resulted from his work, a true karma yogi.

Rich tributes were paid by Subba Row's friends and admirers at his funeral service. The *New York Herald Tribune* acclaimed him as a specialist in biochemistry[8]. At Lederle research establishment at Pearl River, the library (one of the finest of its kind in the world) has been named as 'Subba Row Memorial Library'. He was also remembered at the Lederle Plant at Bulsar near Bombay (now Mumbai) in 1952, when his mother was invited to unveil a Tablet in memory of her illustrious son. The Government of India released a special commemorative stamp to mark his centenary year (1995–1996).

1. Deo, A. and Hazra, A., *Curr. Sci*., 2015, **108**, 441–443.
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3. Rao, E. V. and Rao, D. V., *Visakha Sci. J*., 1999, **3**, 69–76.
4. Fiske, C. H. and Subba Row, Y., *Science*, 1929, **70**, 381–382.
5. Murayama, K., *J. Hist. Biol*., 1991, **24**, 145–154.
6. Rama Sarma, T., *Curr. Sci*., 1998, **74**, 953–956.
7. Lohmann, K., *Naturwissenschaften*, 1929, **17**, 624–625.
8. Anon., Yellapragada Subba Row – Specialist in Biochemistry dies, Tribute in *New York Herald Tribune*, 10 August 1948.

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