



A life in biomaterials and biomedical engineering research: a tribute to professor Nobuo Nakabayashi

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Professor Nobuo Nakabayashi

For nearly 60 years, Prof. Nobuo Nakabayashi (03.03.1936-28.12.2021) has been one of the most notable scientists in the fields of biomaterials and biomedical engineering who also made huge contribution to the advancement of adhesive dentistry.

After obtaining his Bachelor of Science in 1959, Master of Science in 1961 and Ph.D in 1964 from Tokyo Institute of Technology on the topic of "Preparation of Reactive Polymers", Prof. Nakabayashi continued his professional career as a lecturer at the Tokyo Medical and Dental University, as a research fellow at Yale University, Department of Chemistry, New Haven, Conn. (1966-1969), as a professor at the Tokyo Medical and Dental University (1964-1966 and 1970-2001), as Director of the Institute for Medical and Dental Engineering (1996-1999), and since 2001 as professor emeritus at the Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Kanda, Tokyo.

He had been active at the professional organizations such as Chemical Society of Japan; Society of Polymer Science, Japan; Society of Synthetic Organic Chemistry, Japan; Japanese Society for Biomaterials (President;1996-2000), and journals as Associate Editor of *J Biomed Mater Res* (1984-2001); Japanese Society for Dental Materials and Devices (committee member, -2001); Japanese Society of Conservative Dentistry; Japan Society for Adhesive Dentistry (Editor in Chief, 1985-1996); International Association for Dental Research; Japanese Society for Artificial Organs (councilor); American Society for Internal Artificial Organs; International Society for Artificial Organs where he contributed greatly in engaging young scientists in research and opening challenging discussions and being controversial to the general opinions at times.

Prof. Nakabayashi`s scientific achievements and services to the community have been recognized by several accolades some which are the Distinguished Scientist Wilmer Souder Award (IADR) (1994); Hollenback Memorial Prize (Academy of Operative Dentistry) (1997); Technical Award of Japanese Society of Artificial Organs (2000) and the Medal with Purple Ribbon award by the Japanese Government (2001).

Prof. Nakabayashi published more than 360 original papers on synthesis and evaluation of functional polymers, biomaterials including adhesives to dentin, artificial organs, membranes, blood compatible polymers and more than 120 review articles on biomaterials and dental materials. He has been the co-author of 25 books on chemistry, functional polymers, and biomedical and dental materials. The book he wrote together with Prof. David H. Pashley on “Hybridization of Dental Hard Tissues” in 1998 has been one of the benchmark books in adhesive dentistry. Prof. Nakabayashi often resembled the hybridization process and the formation and function of a hybrid layer to wound healing on exposed dentin. A wealth of research for stabilizing and improving the quality of hybrid layer has followed his scientific work on the concept of generating hybrid layer which also reformed the nomenclature in dentistry. Since then, the progress in minimally invasive dentistry through the implementation of adhesion protocols and hybrid layer formation on dentin also significantly changed some of the pragmatic concepts, one of which is tooth preparation. Restorative dentistry shifted largely from macro-mechanical rational in clinical planning towards defect-oriented, tooth substance preserving approach.

On the personal note, he has introduced himself as my “scientific father” when he once met my biological father and made regular visits to the University of Groningen during my previous affiliation in The Netherlands, while he was making his annual excursions in Europe. When I have offered him to show around the dental clinics, he showed resistance saying that he cannot embrace young people learning drilling. With his background in polymer chemistry and tissue engineering, Prof. Nakabayashi contributed significantly to further innovations in the dental research and his scientific efforts definitely decreased the drilling action in the profession.

Throughout his career, Prof. Nakabayashi has been an inspirational, humble, faithful scholar known with his passion to science as well as his family, whose impact to Biomaterials and Biomedical Engineering Research has left a lasting legacy.

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