Prof. Anton Hagenbeek 1948–2021: Father of MRD and Lymphoma Expert

Bob Löwenberg¹ · Marie José Kersten² · Robert Peter Gale³ · Marinus van Oers²

Received: 18 May 2021 / Revised: 19 May 2021 / Accepted: 25 May 2021 / Published online: 20 July 2021
© The Author(s), under exclusive licence to Springer Nature Limited 2021

Whom the Gods love die young

Lord Byron

Prof. Anton Hagenbeek was born in 1948 in Den Haag, the Netherlands (Fig. 1). He received his MD degree from Erasmus University, Rotterdam in 1972. During his medical studies, he became involved in research *via* a scholarship to the Radiobiological Institute TNO in Rijswijk where he worked under the supervision of Prof Dirk W. van Bekkum. Prof. van Bekkum, the Institute Director, was an early pioneer of hematopoietic cell transplantation [1]. The lab attracted scientists from everywhere and Ton (only his mother called him *Anton*) flourished in this vibrant, intellectually challenging environment. After completing his Ph. D.: *Extracorporeal irradiation of the blood in a rat leukemia model*, he began a fellowship in internal medicine and hematology at Erasmus Medical Center. In 1981 he received a Fulbright award and spend a year at UCLA learning clinical aspects of transplants. Returning to the Netherlands he joined the hematology group with Prof. Bob Löwenberg and colleagues at the Rotterdam Daniel den Hoed Cancer Center. Ton and Bob had both worked in the van Bekkum lab and were both visiting fellows at UCLA with RPG. In 1993 Prof. Hagenbeek was awarded a Chair in Experimental and Clinical Haematology (1993).

Throughout his career Ton continued his laboratory research program. Beginning in 1983 and continuing to

1990 Ton and Bob Löwenberg organized a series of symposia on what they called *minimal* residual disease (MRD) in acute myeloid and acute lymphoblastic leukaemias (Fig. 2). In 2020, at the prompting of Prof. John Goldman and RPG, Ton give his blessing to a name change to *measurable* residual disease [2]. In 1987 and the following years Prof. Hagenbeek along with his colleagues Anton Martens (there seems a surfeit on Antons) and van Bekkum published several articles including some in the earliest volumes of *LEUKEMIA* on the use of MRD-testing in a rat model of AML pointing out today several limitations we face such as non-uniform distribution of leukaemia cells [3].

At the Rotterdam Cancer Center for 15 years, Ton focused on hemopoietic cell transplants in lymphomas. He contributed greatly to the growth and development of the Department's Haematology/Oncology program. Even more importantly, during these years Ton met his second wife Annemiek Mellink who was a radiation oncologist and with whom he would spend a happy marriage.

In 1997 Ton was appointed chairman of the Department of Haematology at Utrecht University. In 2005 he joined the Haematology Department of Amsterdam University Medical Centers where he collaborated closely with MJK and RvO with a focus on lymphoma He was fundamental to initiating pivotal multi-center clinical trials in lymphomas within the HOVON cooperative group network and beyond. Ton's laboratory research continued his focus on acute leukemias including studies of MRD, allotransplants and cancer cell contamination of autotransplant grafts. Not one to sit still, Prof. Hagenbeek's interest shifted to innovative lymphoma therapies, notably antibodies and antibody-drug conjugates. Ton was co-principal investigator on a multi-center European Organization for Research and Treatment of Cancer (EORTC) study of rituximab in advanced follicular lymphomas, now the *standard-of-care* therapy. He was also pivotal in the 1st international studies of ofatumumab ⁹⁰Y-ibritumomab tiuxetan and of brentuximab vedotin in Hodgkin disease. Prof. Hagenbeek published on cost-effectiveness of different therapy strategies and on fair

This article is co-published in the journals Bone Marrow Transplantation and Leukemia <https://doi.org/10.1038/s41409-021-01375-x> or <https://doi.org/10.1038/s41375-021-01310-5>.

✉ Robert Peter Gale
robertpetergale@alumni.ucla.edu

¹ Erasmus University Medical Center Rotterdam and ErasmusMC Cancer Institute Rotterdam, Rotterdam, The Netherlands

² Department of Hematology, Amsterdam University Medical Centers, University of Amsterdam, Amsterdam, The Netherlands

³ Haematology Research Centre, Department of Immunology and Inflammation, Imperial College London, London, UK

Fig. 1 Prof. Anton Hagenbeek.

Fig. 2 1st MRD Conference.

pricing and access to expensive drugs. His patients' well-being was foremost to him developing an e-health program to help people with cancer cope with fatigue. In the European Hematology Association (EHA) Ton had many roles. He loved to teach and was instrumental establishing a EHA Clinical Research Training in Haematology Programme.

Ton was an extraordinarily decent person with a sly sense of humor and a contagious *joie de vivre*. And he was brave. When he was diagnosed with a level-4 melanoma just before his marriage he postponed it until it was certain he was cured. The death of his love Annemiek in 2019 was a severe blow but he labored on buoyed by his sons. Ton is survived by his sons Bart, Thijs, Joris and Friso and his grandson Jacob and in the hearts and minds of his family, colleagues, patients and friends.

Acknowledgements RPG acknowledges support from the National Institute of Health Research (NIHR) Biomedical Research Centre funding scheme.

Compliance with ethical standards

Conflict of interest RPG is a consultant to BeiGene Ltd., Fusion Pharma LLC, LaJolla NanoMedical Inc., Mingsight Pharmaceuticals Inc. and CStone Pharmaceuticals; advisor to Antegene Biotech LLC, Medical Director, FFF Enterprises Inc.; partner, AZAC Inc.; Board of Directors, Russian Foundation for Cancer Research Support; and Scientific Advisory Board: StemRad Ltd. MJK reported honoraria and travel support from Amgen, Bristol-Myers Squibb, Celgene, Janssen, Kite/Gilead, Merck, Miltenyi Biotec, Novartis, and Roche; and reports research support from Celgene, Roche, and Takeda. BL and MvO have no conflicts to declare.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

1. Gale RP, Löwenberg B, Dirk Willem van Bakkum: a pioneer in haematology, transplantation and radiobiology (1925–2015). *Leukemia*. 2015;29:2275–6.
2. Goldman JM, Gale RP. What does MRD in leukemia really mean? *Leukemia*. 2014;28:1131.
3. Martens AC, Van Bakkum DW, Hagenbeek A. The BN acute myelocytic leukemia (BNML) (a rat model for studying human acute myelocytic leukemia (AML)). *Leukemia*. 1990;4:241–57.