

Legends of Allergy and Immunology: Sergio Bonini

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In life, you are lucky if you meet people who can inspire and motivate. Sergio Bonini is one of those people. He can be regarded as a legend for his successful journey through the rapidly evolving discipline of Allergy and Clinical Immunology in the last 50 years. During his career Bonini has demonstrated to have an inquisitive mind that embraced new ideas. His work has provided insights into the understanding of allergic diseases and the role of IgE and his enthusiasm has been contagious among young scientists and physicians.

I had the fortune to meet him when he moved to London to act as an Advisor of the Executive Director and Senior Medical Officer at the European Medicines Agency (EMA). During the 5 years spent in the UK he was also member of the Scientific Board of the Italian Embassy. Despite his demanding commitments he shared with me his limited time and part of his week-ends to discuss research projects, clinical cases and articles of common interest.

I felt honoured to be invited by Allergy to write a commentary on Bonini, and in this I was kindly assisted by Professor Guido Rasi who has been one of his closest and long-standing collaborators.

Sergio Bonini graduated in Medicine in 1971 at the University "La Sapienza" in Rome, defending a thesis entitled "Studies on the new immunoglobulin IgND/IgE". He subsequently trained in Allergy and Clinical Immunology, Gastroenterology and Internal Medicine, under the mentorship of Professor Cesare Masala and Professor Umberto Serafini, who was one of the founders and the first President of the European Academy of Allergy and Clinical Immunology (EAACI).

Following a short period at the Karolinska Hospital and at the Pharmacia headquarter in Uppsala, Bonini persuaded his mentors to set up an allergy research laboratory. Rasi still remembers the huge efforts they made to provide all the facilities and instruments needed for the laboratory, including a gamma-counter which was celebrated with a memorable party.

Bonini, together with other colleagues including Rasi e Carla Rosa, established the first public centre in Italy for the measurement of total and specific serum IgE levels and he was pioneer in work aimed to clarify the non-reaginic role of IgE. The total IgE was measured in relation to circadian rhythms, in smokers and in several pathological states including tumors (Hodgkin disease, lung cancer), infectious diseases

(mononucleosis, schistosomiasis, leprosy) and autoimmune conditions (LES, RA, Behcet's disease). Based on the findings of these studies Bonini hypothesized that there could be a genetic and environmental control of total IgE independent from allergic sensitization. More specifically, he suggested a regulatory role of the T cell subsets known at that time (Tgamma/T mu; Thelper/Tsuppressor) in IgE production.

At the end of the 70s, while studying with Rasi a cohort of atopic twins, Bonini realized that the research of his group could have benefited from an international experience.

In 1979 he joined the vibrant research group of Professor Ivan Roitt at Middlesex Hospital. He then encouraged Rasi to move to London to join the laboratory of Tom Platts Mills, Bruce Mitchell and Martin Chapman.-

As a consultant in diabetes, I was fascinated by Bonini's memories and by the excitement depicted in his eyes when he used to tell me of the time spent at the microscope looking at the fluorescence of the islet cell antibodies discovered by Deborah Doniach and his friend Gianfranco Bottazzo.

During the period spent in London in the laboratory of Jonathan Brostoff, the research activity of Bonini was mainly focussed on the IgE/StaphA interactions. He also worked with Alister Voller and the group of Jack Pepys, on the development of an ELISA for IgG and IgG subclasses to molecular allergens. The ELISA was utilized for a study exploring the genetic and environmental control of IgE and IgG4 to purified grass and mite allergens, conducted with Robert Aalberse.

Beyond the interesting results obtained, the experience gained in internationally renowned laboratories strengthened the knowledge, the methodological skills and the scientific career of Bonini and of his research team.

After his return to Rome and the retirement of Professor Serafini, Bonini established a new Allergy Team mainly focussing on allergic inflammation and its environmental control with special reference to the effect of physical exercise in professional and recreational athletes (Fig.1). In collaboration with his brother, who was fellow at Harvard Medical School in Boston, he firstly reported the occurrence and the features of a late-phase reaction in the eye after allergen challenge and described the role of a non-specific conjunctival hyperreactivity in ocular diseases.

In 1988, Bonini was appointed Associate Professor of Rheumatology, Allergy and Clinical Immunology and after a few years Full Professor of Internal Medicine at the University of Naples. He continued to collaborate with Rasi at the Institute of Neurobiology and Molecular Medicine of the Italian Research Council. With the guidance of Professor Rita Levi Montalcini Bonini and Rasi formed a small team of scientists, including Paolo Matricardi and studied the relationship between allergy and infectious diseases.

Bonini became also interested in the research of Professor Montalcini who was awarded the Nobel Prize for the discovery of the Nerve Growth Factor (NGF). In elegant studies he elucidated the role of NGF in asthma and allergic diseases and its contribution to inflammation and tissue remodelling.

In 2013 Bonini was seconded to EMA, where a new collaboration with Rasi led to relevant contributions in Regulatory Sciences (importance of data transparency and data sharing in clinical research, revision of the Guidelines on First-in-humans clinical trials, publications of Guidelines aimed at harmonizing the regulation of allergen products in Europe).

In these last few years and throughout the recent COVID-19 pandemic Bonini has continued to be extremely active as demonstrated by several relevant papers, including our editorial on Clinical Trials in COVID-19 published in *Allergy*¹. He was part of the Data Safety and Monitoring Committee of a COVID-19 vaccine and contributed to the Research Data Alliance COVID-19 Guidelines and Recommendations² and to the UK All Parties Parliamentary Group Coronavirus³.

The prolific scientific activity of Professor Bonini is proven by over 500 publications, one patent and 3 Copyrights and numerous awards. His H-index (> 70) allows him to be listed among the first 100 Italian Top Scientists working in Italy and abroad⁴.

The scientific activity of Bonini has also been paralleled by an intense organizing commitment. In 1998-2001 he was President of the EAACI and in 2017-2019 he led the Italian Medical Society of Great Britain, an association of over 3000 Italian doctors and scientists working in the UK. In these roles, his efforts were constantly aimed to support and promote young investigators.

Bonini was also a dedicated and passionate educator. Over the years, he mentored numerous scientists enabling them to maximize their potential, pursue high quality research and accomplish their goals. His infectious enthusiasm for medicine and research has changed the course of many careers, mine included.

References

1. Bonini S, Maltese G. COVID-19 Clinical trials: Quality matters more than quantity. *Allergy*. 2020;75(10):2542-7.
2. Research Data Alliance COVID-19 Guidelines and Recommendations
<https://www.rd-alliance.org/group/rda-covid19-rda-covid19-omics-rda-covid-19-epidemiology-rda-covid19-clinical-rda-covid19-1>
3. https://appgcoronavirus.marchforchange.uk/interim_report
4. http://topitalianscientists.org/tis/2274/Sergio_Bonini-Top_Italian_Scientists_in_Clinical_Sciences

Table I. Major research achievement of Professor Sergio Bonini



Original articles

- Demonstration of mucus antibodies in pulmonary tuberculosis and chronic obstructive lung diseases (*Lancet*, 1976;2:821-24)
- Studies of genetic and environmental control of allergy and allergic diseases (*Br med J* 1982;284:512-13; *J.Immunol* 1986;137: 3588-92; *J Allergy Clin Immunol* 1986;78:974-80)
- First demonstration of a late-phase reaction after conjunctival allergen challenge in humans and of a non-specific conjunctival hyperreactivity (*J Allergy Clin Immunol* 1988;82:462-69; *J Allergy Clin Immunol* 1990;86:869-76; *J Allergy Clin Immunol* 1992;89:103-7; *J Allergy Clin Immunol* 1996;97: 1350-55; *J Allergy Clin Immunol* 2006; 118: 872-877).
- First demonstration of the role of Nerve Growth Factor in asthma and studies of its modulatory role allergic inflammation and tissue remodelling (*PNAS* 1996; 93:10955-60; *J Allergy Clin Immunol* 1997;100:408-14; *J Allergy Clin Immunol* 1998;102:454-460; *PNAS* 2001; 98: 6162-6167)
- Evidence that exposure to foodborne and orofecal microbes but not to airborne viruses is associated with a lower prevalence of allergy and allergic diseases (*Br Med J* 2000;320:412-17; *J Allergy Clin Immunol* 2002; 110:381-87)
- Experimental and clinical studies on Th-2 inflammation (*Ann Allergy Asthma Immunol* 2001;87:48-51; *J Immunol* 2008;181:1737-45; *FASEB J.* 2014; 28, 3038–49)
- Significant contributions to Regulatory Sciences (*N Engl J Med* 2014;371:2452-55; *Eur Resp J* 2015;45:1197-1207; *N Engl J Med* 2016;375:1788-89; *J Allergy Clin Immunol* 2017;139:1461-4)

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<https://publons.com/researcher/3022530/sergio-bonini/publications/>

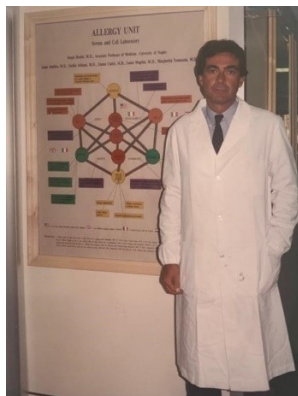
<https://www.scopus.com/authid/detail.uri?authorId=8739114400>;

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Recognitions and Awards

- 2000 International Distinguished Fellow Award, American College of Allergy, Asthma and Immunology
- 2009 R.W. Philip Lecturer on Life-style and Allergy at the Royal College of Physicians, Edinburgh
- 2010 EAACI Charles Blackley Award
- Honorary Membership of the Romanian Academy of Medical Sciences and of the Argentinian, Belgian and Hungarian Societies of Allergology and Clinical Immunology.

Fig. 1. Professor Sergio Bonini presents the study of his Allergy Team (Anna Addabbo, Emilio Adriani, Emma Ciafre', Laura Magrini and Margherita Tomassini) at the Institute of I Clinica Medica, University of Rome.



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