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Editorial

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To conclude this year, full of rich in insights and valuable experiences, the Journal offers a single-topic update on the use of biologics in allergy.

This is a remarkably up-to-date and precise range of clinical applications, food for thought, and practical information on the experimental bases of these drugs, which represent a true revolution in the treatment of many diseases bringing about not only improvement, but often a complete reversal of the prognosis and quality of life for patients. Few milestones in history have had such a significant impact: vaccinations represented the first such milestone, producing a dramatic reduction in mortality rates for the infectious disease targeted by the vaccine. We can also mention the discovery of antibiotics, which still save lives in serious infections (and we are well aware of the current concerns about the emergence of antibiotic resistance). Last but not least, blood products (plasma, coagulation factors, fibrinogen, immunoglobulins, etc.) and, finally, in recent decades, biologics. Even in the field of allergy, their use has complemented and often replaced traditional therapies for complex diseases such as severe asthma and atopic dermatitis, urticaria, and eosinophilic diseases. The ability to selectively intercept immunological nodes makes monoclonal antibodies (mAbs) a precise, customizable therapeutic weapon.

The history of mAbs began just 50 years ago, in 1975, when César Milstein and Georges Köhler developed the hybridoma technique, which allowed them to produce identical antibodies specific for a single antigen. Köhler and Milstein crossed paths at the Laboratory of Molecular Biology in Cambridge. There, Milstein was studying antibody diversity and the generation of antibodies with known specificity by myeloma cells in mouse models of myeloma. In 1974, Köhler arrived in the laboratory and began discussing with him the idea that spleen cells might be fused with myelomas to create immortal cell lines capable of specific antibody production.

They began working together on this hypothesis and the following year published their promising results in Nature [1]. It was truly a major discovery, but its clinical implications were only understood two years later, when they published an editorial in the Lancet outlining its potential applications. This work earned them the Nobel Prize in Medicine in 1984. In the first decades that followed, however, clinical applications were limited, primarily due to immunogenicity issues, since the monoclonal antibodies produced were of murine origin. The introduction of chimeric (humanized) and later fully humanized antibodies allowed for safer application, essentially free of side effects. At the same time, recombinant DNA technologies and phage display platforms have increased their specificity and therefore clinical efficacy, drastically reducing production times and costs. Phage display is a technique that exploits the ability of bacteriophages (viruses that infect bacteria) to produce and display proteins on their surfaces. Thus, if a gene encoding a protein of interest is inserted into the genome of a phage, it begins to produce and display the protein on its exterior. The phages displaying proteins of interest can then be selected to, for example, identify natural protein binding partners or antibodies with a high binding affinity.

This began industrial production that has progressively expanded to include chimeric, humanized, bispecific, and conjugated antibodies, which have further improved the therapeutic efficacy of mAbs.

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We won't talk at length on their mechanisms of action or current clinical applications for allergic diseases, as the entire issue of our journal discusses them in detail through highly detailed reviews by well-known and experienced pediatric allergists. Many topics remain pending, especially regarding long-term side effects. Regarding immediate side effects, the safety profile of mAbs is largely favorable: adverse reactions are generally mild and transient, while severe ones are rare. Long-term observational studies are obviously underway to evaluate possible late reactions, but the data currently available appear very encouraging.

Other points of interest are related to our specific role as Pediatricians. Many of these drugs are approved only for adults (ages 18 and older), or for diseases that are more common in adults, and Pediatricians can only use them off-label, under their own responsibility. Finally, a note of frank optimism: the research field is more active and fertile than ever, with new products being synthesized and tested, from mABs targeting epithelial pathways to products with extended half-lives (fewer administrations) or multiple specificities.

To date, there are over 200 mAb therapies on the market [2]. Furthermore, among the nearly 1,400 experimental products still undergoing clinical evaluation, 21 (biologicals consisting of bispecific antibodies or antibody-drug conjugates) received initial approval in at least one country during 2024. Another 30 products are awaiting marketing authorization from at least one regulatory agency, and still others based on bispecific or multispecific antibodies are accumulating such favorable clinical and efficacy data that a marketing authorization application may be imminent. It seems that the future of treatment not only for allergic diseases, but transversally for all diseases with known etiology, could benefit from the use of mAbs, which are proving increasingly effective and with a growingly customizable profile.

References

1 Köhler G, Milstein C. Continuous cultures of fused cells secreting antibody of predefined specificity. Nature 1975;256:495-497. https://doi.org/10.1038/256495a0.

2 Crescioli S, Kaplon H, Wang L, et al Antibodies to watch in 2025. MAbs 2025;17:2443538. https://doi.org/10.1080/19420862.2024.2443538.