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# IL1 Beta Monoclonal Antibodies

Since 1963, Adler and his colleagues had dedicated their publications to the explanation of the biphasic immune response, this comprised a deep understanding of the early wave of IgM secretion, followed by a later wave of specific IgG occurring in immunized animals.
In fact, they noticed that infection with a T2 bacteriophage of peritoneal exudate cells triggers an immune response in lymph nodes of non-immune animals, when the two populations subsets are exposed together. Although the IgGs were from the allotype of the donor lymph nodes, the IgMs proved to be from the allotype of the donor exudate cells.
Adler et al. therefore questioned the existence of a specific messenger, making the connection between different immune cell subsets.

## 1. A curious messenger

Since the exudate cells were rich in macrophages, and if the cell of origin was the macrophage that had ingested T2, then the question arose why this cell had to produce messenger RNA relevant for immunoglobulin synthesis when it did not produce such globulins (1).
By the end of 1970, and with the wish to answer this riddle, many teams (2, 3) concluded that the macrophage was involved in antigen processing, antigen concentration, presentation of the antigen to the precursor cell, or in transfer of genetic information specifying immunoglobulin structure to the precursor cell.
A year later, Gery et al. demonstrated that macrophages release one or more mitogenic substances that act on T lymphocytes, greatly potentiating their response to immunogens when activated with lipopolysaccharides. They proposed the term LAF for "lymphocyte-activating factor" for the potentiating activity in question. If they initially recognized that LAF may prove to be heterogeneous, first fractionation studies rapidly suggested that the team was confronted with a single substance (4).

## 2. The mother of all fevers

At the same moment, Elisha Atkins was working on a different topic. Curious about fever as a consequence of virus and bacterial infection, he was trying to identify and understand the compound involved.
This endogenous pyrogen was soon established as a species-specific entity, produced by polymorphonuclear leukocytes and which requires a stimulus to be produced (5).
Subjugated by this discovery, Charles Dinarello decided to set-up a radioimmunoassay to detect and accurately measure

the circulating leukocytic pyrogen (LP) during fever in humans (6), so replacing the limited Atkins' bio-assay. Using a macrophage-dependent T-cell assay developed by Lanny Rosenwasser, Charles tested LP on mouse lymphocytes. After two years of repeated testing, he concluded that LP and LAF were the same molecule (7).

## 3. The very first of its kind

The term interleukin-1 (IL-1) now refers to the originally described endogenous pyrogen and lymphocyte-activating factor. Unlike other cytokine families, the IL-1 family is the mediator of the inflammatory response, at both the receptor and nuclear levels. Members of the IL-1 family of receptors contain activators and suppressors of inflammation and are now the most studied interleukin group.
In 1985, March et al. (8) isolated cDNA libraries from LPS-stimulated macrophages and discovered that IL-1 consists of two distinct proteins, called interleukin-1 alpha (IL-1α) and interleukin-1 beta (IL-1β).
And the latter hadn't said its last word.

## 4. Let's listen to the B-side

IL-1β is a cytokine of 269 amino-acids with a molecular weight of 30,7 kDa. It is involved in a variety of cellular activities, including cell proliferation, differentiation, and apoptosis. This cytokine is synthetized as a precursor (proIL-1β) and then cleaved in its biologically active form (17,4 kDa) by Caspase-1, just prior to aspartate residues (9).
Caspase-1 is part of the inflammasome, a complex formed as a result of the recognition of various inflammatory signals by « NOD-like receptor family, pyrin domain containing 3 » (NLRP3) or cryopyrin (10).
Mutations on NLRP3 genes cause spontaneous activation of the NLPR3 inflammasome and lead to excessive IL-1β secretion. This discovery is the basis of a class of chronic inflammatory diseases, uniquely mediated by IL-1β, and known as auto-inflammatory diseases, such as cryopyrin-associated periodic syndrome (CAPS), gout, and DIRA syndrome.
But IL-1β is also part of the complex puzzle of other diseases, playing a role in:

- type 2 diabetes (11)
- cancer (12)
- liver fibrosis (13)
- rheumatoid arthritis (14)
- COVID-19 (15)

and potentially many others….

**Diaclone have developed IL-1β monoclonal antibodies (the B-A15 clone, biologically active form) and immunoassays (ELISA and ELISpot kits) to help you monitor the immune responses to diverse infections, diagnose auto-inflammatory diseases, and simply get the best out of your inflammation research.**

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