Immunology

Our immune system is vital in protecting us from illnesses. Yet in many cases, the immune system can malfunction, underreacting or overreacting to a real or perceived threat. The field of immunology has long been at the heart of what we do at Sobi, allowing us to gain extensive experience over many years.

Our Immunology portfolio allows the treatment of serious, disabling or even life-threatening diseases. With our understanding of the mechanisms involved, we are studying how our existing products can potentially help in new indications, and searching for new late-stage treatment candidates that show promise in other areas of unmet medical need.

And building on our history of making innovative therapies available to the people who need them, we continue to work with healthcare professionals, patient organisations and other stakeholders to get our treatments to as many patients as possible.

Interleukin-1 and autoinflammatory diseases

The interleukin 1 (IL-1) family is a group of pro-inflammatory cytokines that play a central role in regulating the body's immune response. The IL-1 cytokines are produced by different cells such as macrophages, monocytes and fibroblasts. By binding to the IL-1 receptors on cells, they play a major role in acute and chronic inflammatory reactions.

In addition, the IL-1 system is also involved in several other biological functions, such as metabolic and haematopoietic activities. Members of the IL-1 family have emerged as therapeutic targets for an expanding number of auto-inflammatory diseases where inhibition of IL-1 activity may form the basis for novel treatments.

CAPS (cryopyrin-associated periodic syndromes), a group of rare and potentially fatal autoinflammatory conditions, are characterised by excessive production of the protein interleukin 1β (IL-1β). Common symptoms include rash, periodic fevers, headaches, malaise and joint pain. The most severe form of CAPS is known as NOMID (neonatal-onset multisystem inflammatory disease) or CINCA (chronic infantile neurological, cutaneous and articular syndrome).

Before the development of medication for NOMID/CINCA, an estimated 20 per cent of children affected would die before reaching adulthood.[i] Today, the prognosis for most patients who receive treatment is good.

IL-1 is an important factor in Still's disease, a rare, systemic autoinflammatory disease characterised by high fevers, joint pain and a rash. In rheumatoid arthritis patients, IL-1 is also elevated and correlates with various parameters of disease activity.

Interferon gamma and HLH

Interferon-gamma (IFN-gamma or IFNγ) is a cytokine secreted by cells of the immune system to help regulate immune functions. The body's immune system uses IFN-gamma to fight viral and intracellular bacterial infections.

This particular cytokine is important to the immune system, in part, because it can directly inhibit the ability of viruses to replicate. It also helps to stimulate and regulate other immune responses in the body, particularly inflammation.

However, abnormal levels of IFNγ are associated with a number of autoinflammatory and autoimmune

diseases including lupus, insulin-dependent diabetes, arthritis, and haemophagocytic lymphohistiocytosis (HLH), among others.

HLH is an extremely rare, rapidly progressive and often-fatal syndrome of hyperinflammation in which massive overproduction of IFNy is thought to drive immune system hyperactivation, which ultimately leads to organ failures. The primary form of the disease is typically seen in paediatric patients, is fatal if untreated, with a median survival of less than two months. The secondary (acquired) form of the disease typically arises later in life, and is also associated with significant mortality.

It is estimated that around 100 cases of primary HLH are diagnosed each year in the US, but this is believed to represent an under-diagnosis. Primary HLH is difficult to diagnose because of the variability in signs and symptoms, which may include fevers, swelling of the liver and spleen, severe low red and white blood cell counts, bleeding disorders, infections, neurological symptoms, organ dysfunction and organ failure.

The immediate goal of treatment is to bring the hyperinflammation under control quickly to make the patient eligible for a haematopoietic stem-cell transplant.

[i] http://autoinflammatory.org/nomid.php