

## INTERFERON-BETA (IFN- $\beta$ )

### Its role as an antiviral

#### What is IFN- $\beta$ and what does it do?

IFN- $\beta$  is a naturally occurring protein that orchestrates the body's immune response to viruses.

- IFN- $\beta$  production and release are triggered by receptors inside the cell which alert the cell to the presence of a virus.<sup>1-3</sup>
- It is produced as an immediate local response to viral infection which has the following effects:<sup>4-6</sup>
  - › Production of antiviral proteins;
  - › Limitation of viral replication by controlled cell death (known as apoptosis); and
  - › Local induction of antiviral state in uninfected cells.
- Type I interferons (such as IFN- $\beta$ ) have an essential role in maintaining a balanced immune response by:<sup>7-8</sup>
  - › Promoting antigen presentation and natural killer cell functions;
  - › Restraining pro-inflammatory pathways and cytokine production; and
  - › Activating the adaptive immune system, promoting development of high-affinity antigen-specific T- and B-cell responses and immunological memory.

#### What role does IFN- $\beta$ play in fighting viruses?

- IFN- $\beta$  has been shown to have antiviral activity against a broad range of respiratory viruses *in vitro* including:
  - RSV
  - Rhinovirus
  - Various influenza strains including H5N1
  - MERS-CoV
  - SARS-CoV-2 including Alpha, Beta, Gamma, Delta and Omicron variants of concern.<sup>9</sup>
- Viruses have been shown to suppress the production and release of IFN- $\beta$ <sup>10-12</sup> before they have the opportunity to trigger the body's natural immune response.
- Some people may have deficiencies in IFN- $\beta$  production or its antiviral signaling due to:
  - Genetic errors, which have been identified in patients with severe COVID-19<sup>13</sup>; and
  - Age, smoking, obesity, medications, autoantibodies and other factors.<sup>14-20</sup>
- IFN- $\beta$  suppression or deficiency puts patients at greater risk of developing severe lower respiratory tract viral infections that may lead to pneumonia, respiratory failure and death.<sup>21-23</sup>
- Administering inhaled IFN- $\beta$  directly into the airways is designed to restore IFN- $\beta$  levels at the site of infection in the linings of the lungs and 'switch on' antiviral defences. This is being investigated as a potential treatment for people with severe respiratory viral infections.



For more information about IFN- $\beta$  research programmes, please visit:  
**[www.synairgen.com/science](http://www.synairgen.com/science)**

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