

## A Novel Family of Cytokines: IFN $\lambda$

### Background

Interferons are a group of cytokines produced in response to viral infections. There are three main types of well characterized interferons: IFN $\alpha$ , IFN $\beta$ , and IFN $\gamma$ . Interferons  $\alpha$  and  $\beta$  are produced mainly by white blood cells and IFN $\gamma$  mainly by activated T cells and natural killer cells in response to other cytokines such as IL-2 and IL-12. The induction of interferon production results in the expression of many antiviral proteins such as double-stranded RNA-activated protein kinase (PKR), 2'5'-oligoadenylate synthetase and Mx proteins that function to block viral replication. Despite extensive research in this field the functional activities of many cytokines remain unknown. **The present invention relates to the identification and characterization of a novel class of interferons as well as their cognate receptor complexes. These novel interferons have been shown to mediate antiviral responses.**

### Description of the Technology

UMDNJ researchers have cloned and characterized a novel family of cytokines which are capable of inducing antiviral protection in a broad variety of human cell lines against different viruses through apparently IFN  $\alpha/\beta$  independent ligand-receptor mechanism. The new class of interferons, named IFN $\lambda$  family of cytokines, is comprised of three homologous proteins termed IFN $\lambda$ 1, IFN $\lambda$ 2, and IFN $\lambda$ 3. These proteins are encoded by three closely placed genes on human chromosome 19. These interferons were expressed in response to viral infections indicating their role in the antiviral responses.

The functional receptor complex for this new family of cytokines has also been cloned and characterized. The IFN $\lambda$ s mediate their antiviral activity through a novel receptor complex composed of two subunits, a novel subunit termed CRF2-12 and a second subunit, IL-10R2, which is also a component of the IL-10 and IL-22 receptor complexes. Initial characterization of their mode of action has demonstrated that IFN $\lambda$ s induce signaling through the Jak-Stat signal transduction pathway. While the IFN $\lambda$ s were inducible in response to viral infection, the receptor complexes were found to be constitutively expressed in many different cell lines and human tissues examined.

**Thus, a new class of receptor-ligand system that contributes to antiviral defense via an IFN  $\alpha/\beta$  independent mechanism has been identified.**

### Applications

For the treatment of viral infections  
In the induction of apoptosis in virus infected cells and in cancer  
For the treatment of hyperproliferative diseases  
In gene therapy  
As a research tool to advance the current level of knowledge of IFNs

### Deliverables

Sequences of IFN $\lambda$ 1, IFN $\lambda$ 2, and IFN $\lambda$ 3  
Sequences of CRF2/12  
Expression vectors

**Patent Status**

- PCT application filed
- Application published on August 14, 2003 (Publication Number WO 03/066002)

**Licensing Opportunity**

- This technology is available for licensing non-exclusively for research tools and exclusively for therapeutics.

**Contact**

Peter Golikov, MS, MBA  
Director, Ventures and Licensing  
University of Medicine and Dentistry of New Jersey  
335 George Street  
New Brunswick, NJ 08901  
Direct Phone: (732)-235-9355  
Main Office Phone: (732)-235-9350  
Facsimile: (732)-235-9358  
golikope@umdnj.edu