Combinations of Osteopontin and 2'-Fucosyllactose for use as medicaments

Background of the Invention

Osteopontin (OPN), which can be highly concentrated in human breast milk, is an extensively phosphorylated acidic glycoprotein that has been associated with the initiation of inflammation, affecting cell adhesion, chemotaxis, immune regulation, and protection against apoptosis, depending on its intracellular or extracellular localization (2-6). Interestingly, OPN has been found to be involved in a number of immune mediated diseases, including multiple sclerosis (7, 8), rheumatoid arthritis (2), systemic lupus erythematosus (3), inflammatory bowel disease (4, 9), asthma (5) and liver disease (10).

Human milk oligosaccharides (HMO) are a family of glycans and the third most abundant fraction in human breast milk (1). The most prevalent HMO, 2'-fucosyllactose (2FL), can account for 30% of all HMOs in the breast milk. This highly bioactive HMO has been associated with immunomodulatory activity, protection against pathogenic bacteria and viruses and improved cognitive function (1).

WO 2015/001092 discloses the use of oral mammalian osteopontin (OPN) for enhancing resistance to an infectious disease in mammals.

WO 2018/009647 discloses a complex nutritional formulation comprising osteopontin in addition to enriched fractions of whey proteins, fatty acids, lactose, polydextrose, etc. This formulation promotes postnatal development of infant's gastrointestinal functions, nutrient absorption, immune system development, etc.

EP 2453902 refer to 2'-fucosyllactose (2'-FL) for use in treating allergies or atopic dermatitis or asthma, allergic conjunctivitis or allergic rhinitis.

None of the above cited papers, however, provides any incentive or mere suggestion to combine both OPN and 2'-FL for use in either preventing or treating allergic diseases, atopic dermatitis in particular. None of both provides any indication that combining OPN and 2'-FL would interact positively when tested in suitable models or would interact negatively i.e., leading to a lack of effectiveness or, worse, to the expression of negative side effects.

It has been discovered that these two human breast milk components, that are now commercially available, could positively impact upon immunological disorders which could

be due to, but not limited to, modulation of inflammatory cytokine secretion, in particular when used in the form of a combination of OPN and 2-FL wherein the OPN and the 2-FL contents are distinct from the ratio that would be present in any relevant natural source.

Surprisingly, it has been further discovered that OPN and 2-FL, when used in the form of such a combination of OPN and 2-FL could act synergistically to modulate the immune response using a BALB/c murine model of inflammation. It was observed, in particular, that OPN and 2-FL when used in combination could act synergistically to reduce inflammation and regulate immune parameters such as T cell function and cytokine secretion.

These achievements are enabling an unexpected widening of the potential applications of these two components, either as medicaments or in the form of food or nutritional or dietary supplements suited for treating or preventing disorders and diseases initiated by a dysfunction of the immune system of humans or of animals, in particular diseases or disorders due to inflammatory factors secretion.

The invention is defined in the claims as well in the specification appearing below.

The invention

A first object of the invention is a combination of osteopontin (OPN) and 2'-fucosyllactose (2-FL) for use in the prevention or the treatment of immunological diseases or disorders due to inflammatory factors secretion affecting a human or an animal subject.

Another object of the invention is a combination of osteopontin OPN and 2'-fucosyllactose (2-FL) for use in the prevention or the treatment of immunological diseases or disorders due to inflammatory cytokine secretion such as IL-17 and IL-4 secretion, or due to immunoglobulin secretion such as IgE secretion affecting a human or an animal subject.

A further object of the invention is a composition ~~method for preventing or treating immunological diseases or disorders due to inflammatory factors secretion affecting a human or an animal subject,~~ which comprises ~~administering to the subject in need thereof~~ a combination of osteopontin OPN and 2'-fucosyllactose (2-FL), optionally combined with or embedded in a food or nutritional or dietary supplement.

~~A further object of the invention is a method for preventing or treating immunological disorders due to inflammatory cytokine secretion such as IL-17 and IL-4 secretion, or immunoglobulin secretion such as IgE secretion affecting a human or an animal subject, which comprises administering to the subject in need thereof a combination of osteopontin OPN and 2'-fucosyllactose (2-FL), optionally combined with or embedded in a food or nutritional or dietary supplement.~~