Treatment of Autoimmune Diseases with Immune Modulatory Peptides

Tech ID: 25131 / UC Case 2015-050-0

BACKGROUND

Regulatory T cells (Treg) are important to control immune homeostasis and control inflammation. In autoimmunity Tregs play a critical role in downsizing autoreactive T cells and, via interleukin-10 (IL-10) secretion, they regulate not only inflammation but also the fibrotic process that often complicates systemic autoimmune diseases.

IVIG therapy is successfully used in many autoimmune conditions, such as immune-mediated thrombocytopenia, autoimmune hemolytic anemia, autoimmune vasculitides and in neurological conditions including Guillain-Barré syndrome, narcolepsy, Parkinson’s, Alzheimer’s. The expansion of Fc-specific Treg may account as the critical mechanism as the autoimmune pathogenesis in these diseases is now proven and the immunodominant Fc peptides bind HLA molecules strongly associated with these diseases. IVIG treatment is very expensive and is provided as an infusion that requires hospitalization, so alternative treatments are needed.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have identified a set of 16 immunodominant Fc peptides (that were narrowed down to a 3-5 peptide combination of immunodominant, conserved sequences), which induces the expansion of Treg that regulate naive T cell differentiation toward a pro-inflammatory phenotype. This Treg population has been found always detectable in the peripheral blood of healthy adult donors and in Kawasaki disease (KD) patients who responded well to the IVIG treatment; but not in KD patients that develop arterial complications despite IVIG therapy. In vitro studies suggest that these Fc immunodominant peptides can overcome this unresponsiveness, which is due to a defect of the antigen processing of the exogenous soluble Fc.

ADVANTAGES

The use of these immunomodulatory synthetic peptides provide significant advantages over other immune suppressive medications and IVIG. The manufacture is not expensive, the treatment does not require hospitalization; the product is stable and reproducible. As far as safety, short synthetic peptides are in the market approved by the FDA in cancer immunotherapy and have been shown to be safe and well-tolerated.

INTELLECTUAL PROPERTY INFO

A patent has been issued and there is a published application (see below)

STATE OF DEVELOPMENT

Human studies on an expanded group of Rheumatoid Arthritis patients with selected peptides is ongoing together with Kawasaki disease children after IVIG therapy.

PATENT STATUS

<table>
<thead>
<tr>
<th>Country</th>
<th>Type</th>
<th>Number</th>
<th>Dated</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States Of America</td>
<td>Issued Patent</td>
<td>10,428,113</td>
<td>10/01/2019</td>
<td>2015-050</td>
</tr>
<tr>
<td>United States Of America</td>
<td>Issued Patent</td>
<td>10,035,823</td>
<td>07/31/2018</td>
<td>2015-050</td>
</tr>
</tbody>
</table>

Additional Patent Pending

RELATED MATERIALS