B16F10 tumor model mice.

Description of Embodiments

[0020] “Cytokine(s)” used herein is a polypeptide(s)/glycoprotein(s) derived from a natural lymphokine (cytokines made by lymphocytes), monokine (cytokines made by monocytes), chemokine (cytokines with chemotactic activities), an interleukin (cytokines made by one leukocyte and acting on other leukocytes), or modification thereof. The modified cytokine may be a fragment of the naturally occurring cytokine. In one embodiment, the modified cytokine has at least 70%, 75%, 80%, 85%, 90%, 95% or 98% amino acid sequence identity to a naturally occurring cytokine. In one embodiment, the modified cytokine is a mutant where at most 10% of the amino acids are deleted, substituted, and/or added based on a naturally occurring cytokine.

[0021] Examples of cytokines include, but are not limited to, interleukin (IL) including over 30 type such as IL-1α, IL-1β, IL-2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13 to -37; interferon (IFN) such as IFN-α, IFN-5 β and IFN-γ; tumor necrosis factor (TNF) such as TNF-α and TNF-β; transforming growth factor (TGF) such as TGF-α and TGF-β; colony stimulating factor (CSF) such as granulocyte-colony stimulating factor (G-CSF), granulocyte-macrophage-colony stimulating factor (GM-CSF), macrophage-colony Stimulating factor (M-CSF), erythropoietin (EPO), stem cell factor (SCF) and monocyte chemotactic and activating factor (MCAF); growth factor (GF) such as epidermal growth factor (EGF), fibroblast growth factor (FGF), insulin like growth factor (IGF), nerve growth factor (NGF), Brain-derived neurotrophic factor (BDNF), platelet derived growth factor (PDGF), vascular endothelial growth factor (VEGF), hepatocyte growth factor (HGF), keratinocyte growth factor (KGF), thrombopoietin (TPO), and bone morphogenic protein (BMP); and other polypeptide factors including LIF, kit ligand (KL), MPO (Myeloperoxidase) and CRP (C-reactive protein) ; COX (Cyclooxygenase) such as COX-1, COX-2 and COX-3, NOS (Nitric oxide synthase) such as NOS-1, NOS-2 and NOS-3; and modified thereof.

[0022] Cytokines also includes chemokines which are cytokines that induce chemotaxis. There are two major classes of chemokines, CXC and CC. The CXC chemokines, such as neutrophil-activating protein-2 (NAP-2) and melanoma growth stimulatory activity protein (MGSA) are chemotactic primarily for neutrophils and T lymphocytes, whereas the CC chemokines, such as RANTES, Macrophage inflammatory protein (MIP) including MIP-lα and MIP-lβ, keratinocyte-derived chemokine (KC), the monocyte chemotactic proteins (MCP-1, MCP-2, MCP-3, MCP-4, and MCP-5) and the eotaxins (-1 and -2) are chemotactic for, among other cell types, macrophages, T lymphocytes, eosinophils, neutrophils, dendritic cells, and basophils. There also exist the chemokines lymphotactin-1, lymphotactin-2 (both C15 chemokines), and fractalkine (a CX3C chemokine) that do not fall into either of the major chemokine subfamilies.