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## Antitumor and cytotoxic properties of a humanized antibody specific for the GM3 (Neu5Gc) ganglioside

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Gangliosides are sialic acid-containing glycosphingolipids that are found on the cell surface of many mammalian cells, and participate in several important cellular processes. Some gangliosides have been reported to be tumor-associated antigens. Of particular interest are the Neu5Gc-gangliosides, which are absent from human normal tissues, due to an exon deletion in the gene encoding the enzyme cytidine monophospho-*N*-acetyl-neuraminic acid hydroxylase, responsible for the conversion of Neu5Ac to Neu5Gc. However, gangliosides bearing the Neu5Gc variant have been detected in human malignancies, in particular GM3(Neu5Gc) ganglioside has been found in numerous human tumors but not limited to melanoma, breast cancer, hepatocellular carcinoma, renal, ovarian and prostate tumors, etc., and it is considered one of the few tumor specific antigen. 14F7 Mab is a mouse IgG1 that has high specificity for GM3 (Neu5Gc) and does not react with the Neu5Ac counterpart or other related *N*-glycolyl gangliosides. This Mab has the interesting ability to kill tumor cells expressing the ganglioside in a complement-independent manner and by a non-apoptotic cell death mechanism. The humanized version of 14F7 retained the binding and cytotoxic properties of the mouse counterpart and has the additional ability to trigger ADCC. This antibody has shown antitumor response in different mouse and human tumor models from different histological origins. In this work, we will summarize the unique properties of 14F7 as a potential drug for the therapy and diagnostic of human cancer.

### Recent Publications

1. Jang BZ, Zhamu A (2008) Processing of nanographene platelets (NGPs) and NGP nanocomposites: a review. *J Mater Sci* 43:5092-5101.
2. Kaiser AB, Gómez-Navarro C, Sundaram RS, Burghard M, Kern K (2009) Electrical conduction mechanism in chemically derived grapheme monolayers. *Nano Letters* 9:1787-1792.
3. Ramirez C, Miranzo P, Belmonte M, Osendi MI, Poza P, Vega-Diaz SM, Terrones M (2014) Extraordinary toughening enhancement and flexural strength in Si3N4 composites using graphene sheets. *Journal of the European Ceramic Society* 34:161-169.
4. Román-Manso B, Domingues E, Figueiredo FM, Belmonte M, Miranzo P (2015) Enhanced electrical conductivity of silicon carbide ceramics by addition of graphene nanoplatelets. *Journal of the European Ceramic Society* 35: 2723–2731.
5. Gallardo-López A, Márquez-Abril I, Morales-Rodríguez A, Muñoz A, Poyato R (2017) Dense graphene nanoplatelet/yttria tetragonal zirconia composites: Processing, hardness and electrical conductivity. *Ceramics International* 43: 11743–11752.

### Biography

Circe Mesa is the Head of the Immuno-Biology Direction and President of the Scientific Council at the Center of Molecular Immunology (CIM). She is the leader of several scientific projects aimed to the discovery of novel approaches for cancer immunotherapy and regulation of the immune system. She has joined CIM in 1997, after completing her BSc in Biochemistry at the University of Havana. She has completed her PhD in Biological Sciences in 2005. She also carried out Pre and Post-doctoral research at Edward Jenner Institute for Vaccine Research, UK and Istituto Oncologico Veneto, Italy. She has been honored with six Annual Award of the Cuban Academy of Science and has published more than 30 peer-reviewed manuscripts and has five patents.

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