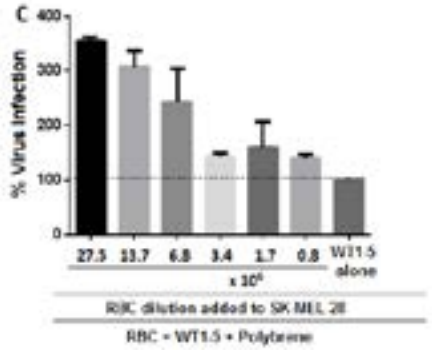
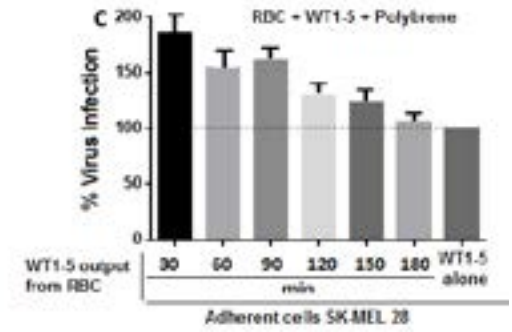
Development of nano-complexes for the controlled delivery of WT1-5 virus with potential application in the treatment of cancer

Angie Andrea Bedoya Rodríguez and **Carlos Arturo Guerrero Fonseca**
National University of Colombia, Colombia

Oncolytic virus therapy is a breakthrough in cancer treatment. Rotavirus is the leading cause of gastroenteritis and a large part of the population has immunological memory against it. Therefore, it is necessary to look for a biomaterial that permits shielding of WT1-5 oncolytic rotavirus in order to elude the antibody recognition and reach the tumor satisfactorily. For this, we used red blood cells (RBC), peripheral blood mononuclear cells (PBMC) or platelets as potential oncolytic rotavirus carriers. To encapsulate or bind virus to these cells, WT1-5 was incubated with cationic polyelectrolytes (hexadimethrine bromide or polybrene, and protamine) or heparin and the formed nano-complex (virus-polymer) was added to RBC, PBMC or platelets. RBC, PBMC or platelets loaded with WT1-5 were co-cultured with tumor cells (SK-MEL 28 or MCF-7) to evaluate the infection. Likewise, the release of rotavirus bound or encapsulated in RBC, PBMC or platelets at different times was evaluated, for this, the loaded cells were incubated every 30 min, centrifuged and the supernatant was recovered, which was added to the tumor cells. RBC loaded with WT1-5, by means of polybrene, increased the infection of tumor cells more than threefold with respect to positive control (WT1-5 incubated directly with tumor cells). With PBMC and platelets, similar results were obtained. We used another method, RBC-derived purified membranes or RAFTs-coated rotavirus WT1-5, which was added to tumor cells to evaluate the infection. Both RBC-derived purified membranes or RAFTs effectively coated rotavirus WT1-5, keep it in suspension (carry), avoid the antibody recognition, and allow the infection of the tumor cells by 80% and 68.3%, respectively; while the control (virus alone) infected 78%. These preliminary results show that peripheral blood cells are promising cell carriers for efficient delivery of WT1-5 oncolytic rotavirus.





Recent Publications

1. Guerrero C A, Guerrero R, Silva E, Acosta O and Barreto E (2016) Experimental adaptation of rotaviruses to tumor cell lines. Plos One. DOI: 10.1371/journal.pone.0147666.
2. Carlos A Guerrero and Orlando Acosta (2016) Inflammatory and oxidative stress in rotavirus infection. World J Virol. 5(2):38–62.

3. Dory Gómez, Natalia Muñoz, Rafael Guerrero, Orlando Acosta and Carlos A Guerrero (2016) PPARγ agonists as an anti-inflammatory treatment inhibiting rotavirus infection of small intestinal villi. PPAR Research Journal Doi.org/10.1155/2016/4049373.

Biography

Angie Andrea Bedoya Rodríguez is a Dentist. She has completed her MSc in Biochemistry. She is pursuing her PhD in Biotechnology at National University of Colombia.

aabedoyar@unal.edu.co

Notes: