## Iranian Quarterly Journal of Breast Disease 2013; 6(3).

## Production of Herceptin- Nanoparticles by chemical conjugation of Herceptin to Potato virus X

**Neda Esfandiari:** PhD student, Department of Plant Protection collage of Agriculture & Natural Resources University of Tehran.

**Mina Kohi Habibi:** Associate Professor, Department of Plant Protection collage of Agriculture & Natural Resources University of Tehran.

Masoud Soleimani: Associate Professor, faculty of Medical Science University of Tarbiat Modares

**Mohsen Karimi Arzanani:** Assistant Professor Department of Molecular Medicine, Pasteur Institute of Iran. **Gholam Hossein Mosahebi:** Professor, Department of Plant Protection collage of Agriculture & Natural Resources University of Tehran.

Corresponding Author: Neda Esfandiari, neda.esfandiari@yahoo.com

**Background**: In recent years, there has been a re-orientation of virus studies toward the beneficial use of virus in nanotechnology. Application of viral nanoparticles (VNPs) in nanotechnology is in the nascent stage. VNPs are biocompatible and biodegradable; self-assembly systems and they can be purified inexpensively on a large scale. Herceptin is currently used as a targeted therapy in (HER2+) breast cancer patients. We demonstrate that nanoparticles formed from the Filamentous plant virus potato virus x (PVX) can conjugate to a herceptin (trastuzumab) as a monoclonal antibody.

**Methodes:** Bioconjugation was performed by EDC/Sulfo-NHS in a two step protocol. Particle formation and conjugation were investigated by different techniques, including SDS-PAGE, Western-Blot, ELISA, Zeta-Sizer and Electron Microscopy.

**Results:** SDS-PAGE and Western-Blot confirmed the formation of 82 KDa proteins which are 27 add 56 KDa. Sandwich ELISA using two antibodies against Herceptin and PVX, respectively confirmed the Herceptin-PVX conjugation. Analysis by zeta-sizer based on charge showed that the Herceptin-PVX charge is -7.05 which -1.48 Herceptin is between 21.4 and PVX.

**Conclution:** Based on our data, we have confirmed the conjugation of PVX and Herceptin. In this study we focus on the use of the capsid of Potato Virus X as a Filamentous virus in nanotechnology. Applying bioconjugation of herceptin to PVX reduce the dose of drug and cost of treatment in breast cancer patients.

**Keywords:** Nanoparticles, Viral nanoparticles (VNPs), Potato virus X (PVX), Herceptin, crosslinker.