Ananda M Chakrabarty, J Infect Dis Ther 2016, 4:7(Suppl)
http://dx.doi.org/10.4172/2332-0877.C1.016

International Conference on

# Infectious Diseases, Diagnostic Microbiology & Dermatologists Summit on Skin Infections

October 03-05, 2016 Vancouver, Canada

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## Proteins and peptides from pathogenic bacteria with anti-viral, anti-parasitic and anti-cancer activity

We have reported that some pathogenic bacteria with long term residence in the human body as biofilms consider the human body as their habitat and try to protect it from outside invaders such as cancers, viruses and parasites through secretion of protein weapons. For example, *Pseudomonas aeruginosa*, an opportunistic pathogen, secretes a protein azurin on contact with HIV/AIDS virus or cancer cells. Upon release, azurin enters preferentially to such cells and interferes in cell growth through multiple mechanisms involving complex formation with various cellular proteins that promote such cell growth. Such complex formation then leads to loss of function of such growth promoting proteins. Thus, azurin is known to induce apoptosis in cancer cells, as well as interfere in rapid cancer cell growth, through stabilization of tumor suppressor protein p53. Azurin also forms complexes with vascular endothelial growth factor receptor (VEGFR) and cell surface associated receptor tyrosine kinases such as EphB2 to inhibit angiogenesis and cell signaling in cancer cells to inhibit their growth. A chemically-synthesized 28 amino acid fragment (Azurin 50-77), termed p28, has completed a phase I trial in 15 stage IV cancer patients with metastatic tumors that were resistant to all conventional drugs and these patients had a life expectancy of about 6 months. P28 not only showed very little toxicity but also significant beneficial effects including partial and complete regression of the tumors in 3 patients, significantly prolonging their lives. P28 has also shown similar lack of toxicity but good efficacy in several pediatric brain tumor patients. The ability of p28 to inhibit the growth of the HIV/AIDS virus or parasites such as *Plasmodium falciparum or Toxoplasma gondii* has not yet been evaluated.

### Biography

Ananda M Chakrabarty is a Distinguished University Professor at the University of Illinois, College of Medicine at Chicago. His research interest involves development of promiscuous bacterial protein/peptide drugs with anticancer, anti-viral and anti-parasitic activities. He is the Co-Founder of two start-up companies, CDG Therapeutics Inc. in Chicago and Amrita Therapeutics in India.

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