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Recombinant immunotoxin as targeted therapeutic protein for cancer therapy

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Abstract

Targeted therapy of cancer is getting more traction over the traditional chemotherapy to overcome the unavoidable side effects from the chemotherapeutic drugs. As scientists began to understand more about the molecular mechanism that distinguishes the cancer cells from its normal counterpart, they began to design new approach to attack the cancer cells more precisely. One of such successful approach is the development of monoclonal antibody against a cancer specific surface antigen that can be used as a delivery vehicle of toxic material selectively to the cancer cells. Our laboratory is involved in generating recombinant immunotoxin (RIT) as targeted therapeutic protein to treat cancer. Recombinant immunotoxins are chimeric proteins composed of the Fv portion of an antibody fused to a portion a lethal toxin. The immunotoxin binds to a surface antigen on a cancer cell, enters the cell by endocytosis where it inactivates the cellular machinery and eventually kills the cell. These proteins are expressed in *E. coli*, purified as clinical grade material and are being tested in patients with various types of cancer in clinical trials. Modern molecular biological techniques were used to improve the efficacy of these agents *in vitro* and test them in the preclinical model system. Many immunotoxins have been tested in clinical trials but most success has been achieved in patients with hematologic tumors. Poor response against solid tumor for these agents is likely due to poor penetration into tumor masses as well as the neutralizing immune response to the toxin component of the immunotoxin. Studies are in progress in the laboratory to overcome those issues and eventually test them in clinical trials.

Biography

Tapan K. Bera has completed his Ph.D. from Calcutta University, India and postdoctoral studies from the University of California, Berkeley. He is currently an Associate Scientist at the National Cancer Institute, NIH. He has published more than 70 papers in reputed journals and serving as an editorial board member of Chemotherapy.