

PROCESS TECHNOLOGY FOR PRODUCTION AND PURIFICATION OF gp 120 TARGETING, ANTI HIV-1 ACTIVE GLYCOPROTEIN, Epap-1

Biotech Consortium of India (BCIL) is seeking companies interested in commercializing a technology used for production of recombinant, and purification of native anti HIV-1 active glycoprotein Epap-1. Scientists at the University of Hyderabad (UoH), India have developed and patented a process for production of bacterial and baculovirus recombinant Epap-1. The scientists have also patented the process for purification of the native protein from human placenta.

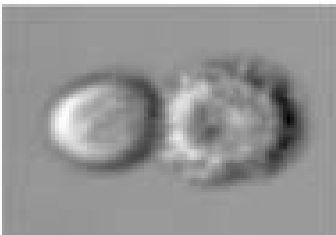
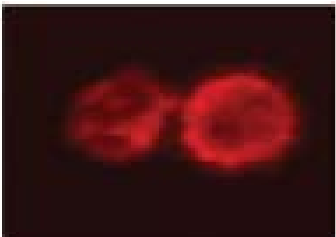
Introduction

A number of anti retroviral drugs are available in the market for the treatment of HIV. However, these drugs become ineffective after some time (1 - 1.5 years) of treatment due to mutations that occur in the HIV virus making the virus resistant to these drugs. Viral strains that become resistant make whole classes of drugs ineffective leaving patients with little alternatives. Moreover, many of the newly infected people carry infections with already resistant strains of the virus. Scientists are now trying to develop a vaccine that targets stable regions of the virus to address this problem.

gp 120 is well established as a virulent region of the HIV virus with stable and variable regions. The glycoprotein Epap-1 developed at UoH targets stable and multiple regions of the virus and has been shown to inhibit gp120 mediated viral entry. Epap-1 is thus a potential candidate for a vaccine that is not susceptible to viral mutations.

Technology

The technology relates to production of an anti HIV-1 active bacterial and baculovirus recombinant glycoprotein Epap-1. Recombinant Epap-1 has been expressed in E.coli BL21 cells by bacterial pET 32 HTa vector and also in SF9 insect cells by pFastBac HTa vector. Technology for single step lectin affinity chromatography purification of native Epap-1 expressed in human placental tissue has also been patented in India. Native as well as recombinant glycoprotein Epap-1 has been shown to inhibit gp 120 mediated viral entries. Epap-1 binds to gp120 at the region containing V3 loop and C5 region in the ratio of two gp120 molecules per Epap-1 molecule and inhibits post-CD 4 binding associated conformational transition of gp120 and blocks fusion and viral entry.



**Epap-1 binds HL2/3 cell
surface expressed gp120**

Patents & Publications

A process for production of Epap-1 using recombinant route. (PCT Patent Publication No. WO/2007/074471).

A process for purification of anti HIV glycoprotein Epap-1 from human placenta. (Indian Patent No. 191075, 21/Del/1999).

K. P. Roda Rani, D. Pelluru and Anand K. Kondapi: A conserved molecular action of native and recombinant Epap-1 in inhibition of gp 120 mediated viral entry. Archives of Biochemistry and Biophysics 2006; 456:79-92. (*The research paper can be provided by the BCIL upon request*)



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Salient Features

- Targets stable and multiple regions of the virus reducing the possibility of development of viral resistance.
- Epap-1 is a natural protein that does not cause any complication associated with immunological responses
- Purification of the native protein is done from discarded placental tissue making the technology economically viable

Marketplace

It is estimated that close to 30 million people in the world are living with HIV. Annual casualty due to AIDS stands at 2 million. Close to 4 million new infections occur every year. Approximately 8% of the newly diagnosed patients carry strains that are already resistant to drugs available in the market. A similar percentage of patients receiving antiretroviral treatment have become resistant to these drugs. Currently only two groups of inhibitors, HIV-1 Reverse Transcriptase and HIV-1 protease inhibitors are approved for the treatment of HIV. However, due to an increasing number of patients with developed resistance, there is an urgent need for a vaccine that targets a stable region of the virus. The technology developed by UoH has the potential to address this problem faced by the global health care industry.

About The Inventors

Dr. A.K Kondapi is Professor and Head at the Department of Biotechnology, University of Hyderabad. His work for more than 15 years is focused on the development of molecular therapeutics for HIV and Cancer. Dr. Kondapi has 2 patents under his name and has published more than 30 papers in peer reviewed journals of high impact. His group identified new lead anti-HIV and anti-cancer molecule and novel targets involved in HIV replication. Dr. Kondapi received his PhD from the College of Science & Technology, Andhra University in the year 1990.

About BCIL

BCIL was incorporated as public limited company in the year 1990 under the Indian Companies Act 1956. It is promoted by the Department of Biotechnology, Government of India and is financed by several all India financial institutions, venture capital funds and the corporate sector. BCIL has been actively involved in technology transfer, project consultancy, fund syndication, information dissemination, and manpower training & placement related to biotechnology over the last decade and half. It has assisted hundreds of clients including scientists, technologies, research institutions, universities, first entrepreneurs, the corporate sector, national and international organizations, central government, various state governments, banks and financial institutions.

BCIL uses its expertise in facilitating licensing agreements that allow healthy and productive cooperation between the inventor and the licensee. The technologies offered by the BCIL are selected after meticulous examination of their innovativeness and their scientific as well as commercial potential. Till now, BCIL has licensed 15 technologies developed at government funded research institutions for commercialization by the private sector.