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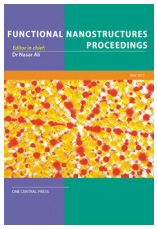

Bidirectional Targeted Killing approach of Genetically Engineered Escherichia coli surface antigen (fimbriae) BNT (Bionanotube) to tumor cell : A Molecular and Engineering Design Concept of Cancer Therapy

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ABSTRACT

A bidirectional immune response and chemotherapeutic approach is designed on microbial surface antigen, a genetically Engineered Escherichia coli K-12, in which A tumor cell associated immune response will be triggered through GE Escherichia coli K-12 Surface antigen (fimbriae). This fimbriae (pili) is derived through cloning of the said tumor gene into bacteria and BNT derived by the isolated GE fimbriae can be isolated and purified. This BNT(Fimbriae), their nanotube will carry tumor cell killing therapeutic anticancer drugs, cytotoxically will kill the tumor cells growth. In the recent years we have seen that the trends of microbial engineering emphasizing more towards immune response. We have observed the importance of biological evolution has been shifted to immune responses in ensuring the generations of cancer diversified by various organ specific activities and finally we have observed the functions of stem cells in curing cancer as regenerative medicines, where the questions of regenerations and repairing are still in debate. These repairing mechanisms are confined and are being transferred to microbial engineering. Ten time more bacterial population (10: 1 trillion) cells are existing in a healthy body and same would have been changed due to cancer, where the specific bacterial population will predominate the others to support tumor growth. The author will attempt to change the mode and motivations of bacterial population to a cancer patient, by application of GE E,coli K-12 surface antigen as BNT, immobilized with cancer drugs. In this process a bidirectional approach is proposed to be involved, one is to trigger the immune response (i.e. Lymphocytes T,-B- and Macrophage activities) through BNT and will be specific to kill tumor cells, since the GE bacteria is made by cloning of the specific tumor cells), where immune response is positive but pathogenesis of tumor cells are nil. Second is, since it is genetically engineered, the BNT of the specific E,coli will be more specific to identify the target tumor cell and will deliver the drug. BNT will act both as nanotube to immobilize cancer drug as drug carrier and immune response. The author proposes that this BNT might be more biocompatible compared to CNT (Carbon Nanotube) to prevent side effects Immune response of BNT is identified. However many more work is need to be completed to validate the concepts.

I. INTRODUCTION

A bidirectional immune response and chemotherapeutic approach is designed on microbial surface antigen, a genetically Engineered **Escherichia coli K-12**. In this process A tumor cell associated immune response will be triggered through GE **Escherichia coli K-12** Surface antigen (fimbriae). [1-3] This fimbriae (pili) is derived through cloning of the said tumor gene into bacteria and BNT derived by the isolated GE fimbriae can be isolated and purified. This BNT (Fimbriae), their nanotube will carry tumor cell killing therapeutic anticancer drugs, cytotoxically will kill the tumor cells growth. In the recent years we have seen that the trends of microbial engineering emphasizing more towards immune response. The importance of biological evolution has been shifted to immune responses in ensuring the generations of cancer diversified by various organ specific activities. Finally we have observed the functions of stem cells in curing cancer as a part of regenerative medicines. However the questions of regenerations and repairing are still in debate, [4-10]. Nano is 10-9 m, BNT is Bionanotube and has been conceptualized on the basis of extracted surface antigen of bacteria and is reproduced in figures of SEM (Scanning Electron Microscopy). It is an extract of the GE bacteria of **Eschericia coli K-12** Bacterial protein could be infectious and regenerative. BNT is conceptualized for repairing and bidirectional application in cancer therapy. The mechanisms are confined and are being transferred to microbial engineering. Ten times more bacterial population (10: 1 trillion) cells are exiting in a healthy body of human cells in trillions. 10 -6 cells could be changed due to mutation into a benign and or in a malignant tumor. In cancer the specific bacterial population will predominate the others to support tumor growth and to manage/intensify the opportunistic infections.

Through GE-Fimbriae, and by triggering the immune response the metabolic activities of the major good bacterial population will help to protect the opportunistic infective bacterial population to a cancer patient. GE **E.coli K-12** surface antigen as BNT, immobilized with cancer drugs is proposed for specific bidirectional killing of cancer cell instead of multidirectional random cytotoxic effects of gold, platin, silver nanoparticles based Chemotherapeutic drugs, [11-20].

II. BIDIRECTIONAL APPROACH

A bidirectional approach is proposed to be involved in triggering immune cells (i.e. Lymphocytes T,-B- and Macrophage) Since a BNT was isolated from GE microbes, which was engineered by cloning of tumor cell DNA and therefore it would be automatically specific to move surrounding tumor cells It will trigger the immune response against the growth of tumor cells. Immobilized drugs inside BNT will release the drug as specific application to tumor and the malignant nature of tumor. Bidirectional (i.e. it will target the surface antigen of the tumor to bring the drug on the surface of the tumor and at the same time it will generate immune response of the body against said cancer/ tumor. The reason is that the fimbriae (pili) GE**- E.coli K-12** is made through cloning of tumor gene into **E.coli K-12**. According to immunological reaction, this bidirectional approach is unique, compare to any nanoparticle based chemotherapeutic drugs, since they attack not only the tumor cell but also the body surrounding cells.

III. MATERIALS AND METHOD

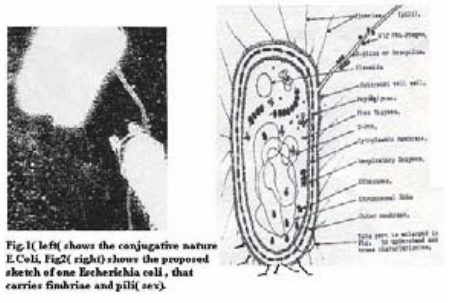


Fig.1(left(shows the conjugative nature E.Coli, Fig2(right() shows the proposed sketch of one Escherichia coli , that carries fimbriae and pili(sex).

Figure 1

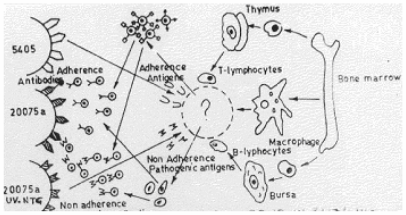
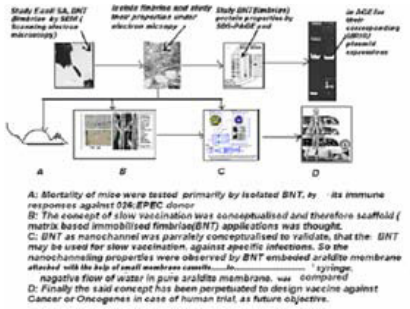


Fig.6. The proposed immune mechanism, which was observed in Bab/C mice by peritonial innoculum of donor, mutant and hybrid GE fimbriae, carried donor adherent gene in vector plasm id cloning and isolation.

Figure 2



A: Mortality of mice were tested primarily by isolated BNT, by its immune responses against 026:EPEC donor
B: The concept of slow vaccination was conceptualised and therefore scaffold (matrix based immobilised fimbriae(BNT) applications was thought.
C: BNT as nanochannel was parrallely conceptualised to validate, that the BNT may be used for slow vaccination, against specific infections. So the nanochanneling properties were observed by BNT embeded araldite membrane attached with the help of small membrane cassette to syringe; negative flow of water in pure araldite membrane. was compared
D: Finally the said concept has been perpetuated to design vaccine against Cancer or Oncogenes in case of human trial, as future objective.

Figure 3

Steps involved in approaching the model of Bidirectional. Fig.1 represents the SEM view of Escherichia coli and its gene transfer in natural conjugation sex pili, fimbriae (pili) is reproduced, as shown in right, Fig.1. Fig.2, shows the immune response model and Fig.3 describes the steps involved Nanlchanneling Design in given below Fig 4.

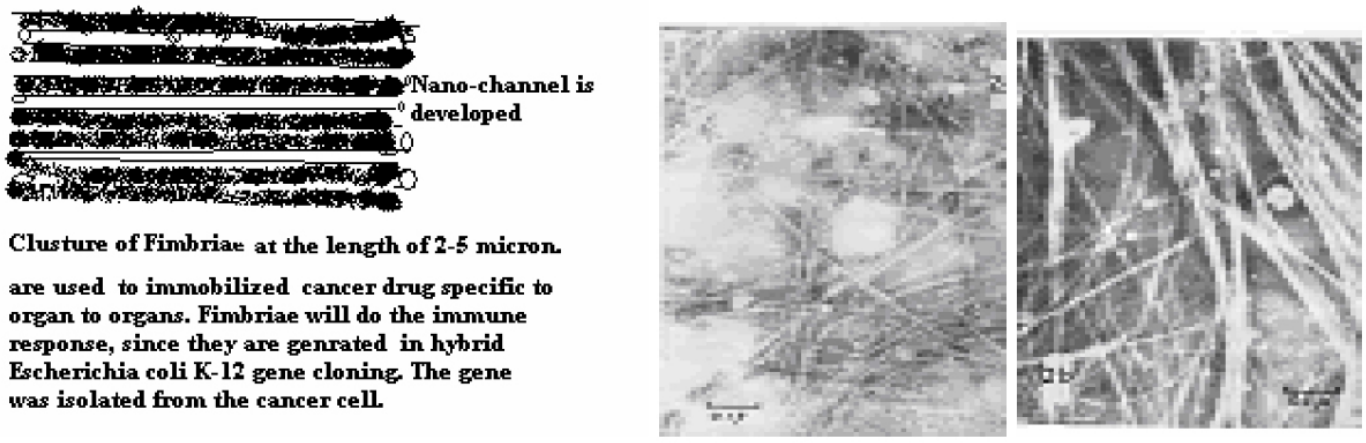


Figure 4

IV. CONCLUSION

The Cancer treatments should be carried out through vaccination process, through genetically engineered microbes, carrying the Genes of that particular cancer cells in the form of BNT. BNT would be more compatible to the human bosy compared to CNT (SWNT and or DWCNT).

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