

## Tobacco vaccine

### A new life from the dead end ...

**Language:** English

**Authors:**

Dr Smriti Goswami, PG student, Dr Manisha Sharma, PG student, Prof. Dr Umesh Chandra Prasad G, Dr Pankaj Agrawal, Dr Ram Ballabh Upadhyay,  
KD Dental college, BR Ambedkar University, Department of oral & maxillofacial pathology, Chattikara, Mathura ( U.P.), India

**Date/Event/Venue:**

27th-29th November 2009

XVIIIth National Conference of Indian Association of Oral and Maxillofacial Pathologist  
Indian habitat centre, New Delhi

### Introduction

The harm that tobacco use does to health is irrefutable. The evidence of careful scientific articles testifies that its use, smoke or smokeless and inhaling side stream smoke from cigarettes increases risk of many serious diseases particularly ORAL CANCER. However tobacco use is one of the major preventable causes of disease and premature death. In an ironic twist to the relationship between tobacco and human health, it would seem that the future of the tobacco plant may lie in growing vaccines against cancer. It is observed that the vaccine derived from tobacco plant can be used for treatment of various cancers like lymphoma, epidemic infections like norovirus infection, and as therapy against tobacco addiction.



Fig. 1: tobacco plant



Fig. 2: tobacco plant

### Material and Methods

Searched the articles of pub med, Advances in Dental Research, medline (Sep 1997 - March 2011) for researches, reviews, clinical trials. Main search involved mesh terms associated with for tobacco effects and tobacco vaccines. Additional search involved systemic effects of tobacco, effectiveness of vaccine against addiction as well as relevant searching of references of all retrieved articles for possible inclusion.

### Results

Tobacco is available in various forms : Tobacco powder, cigar, cigrattes.Use in various forms have resulted many harmful effects like Oral cancer, addiction, infections.On the other hand tobacco plant itself yields many beneficial effects : Cancer vaccine, vaccine against addiction, vaccine against infection. many clinical trials have been done, still more to do.

Tobacco is available in various forms. Use in various forms have resulted many harmful effects:

#### **Oral cancer**

Exposure to smokeless tobacco results in loss of anti-inflammatory activity of anoxein I and upregulation of proinflammatory cox 2 in oral cells, and this dual effects leads the cells down the carcinogenic activity.

#### **Addiction**

Nicotine is a stimulant and one of the major cause of addiction, nicotine doesn't appear to present as a direct carcinogen activity itself but it enables the formation of tobacco specific nitrosamines which are potent carcinogens.

#### **Infections**

Carbon mono oxide tyramide causes pulmonary damage and loss of elasticity in alveoli leading to COPD and emphysema.

Various other systemic effects are also present. On the other hand tobacco plant itself yields many beneficial effects:

#### **Cancer vaccine**

These are protein based tumour specific vaccine, cheap carry low risk to pt and work as Ab chemical specific to tumour cells.

#### **Vaccine against addiction**

Derived from nicotine containing hapten carrier conjugate as a result nicotine reaching brain decreases to 64%.

#### **Vaccine against infection**

Tobacco derived antigen prompted an immune response that was 4-20 times higher than that from other engineered antigen. Clinical trials in mice have been successful for vaccine against norovirus infection.

Other uses in different disorders: Parkinson's disease, Tourtte's disease, Alzheimer's disease, ulcerative colitis, sleep apnea.



Fig. 3: oral cancer

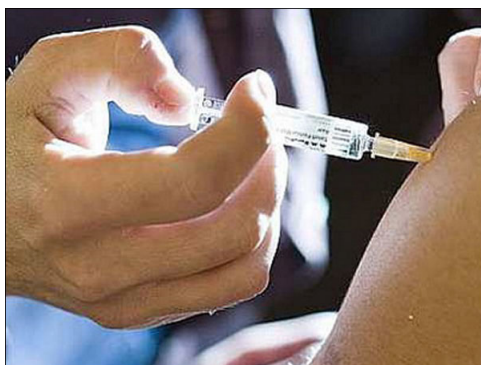


Fig. 4: addiction



Fig. 5: addiction of smoke



Fig. 6: vaccine against infection



Fig. 7: form of tobacco - cigar

Fig. 8: dead end



Fig. 9: infections - TB Pt

Fig. 10: vaccine against infection

## Conclusions

Tobacco use is one of the major preventable cause of disease and premature death. The same plant which is responsible for causing cancer may offer a way to treat the disease. However, government still hesitate to act progressively to reduce tobacco use as it may affect the economic benefits that a country derives from growing, processing, manufacturing, exporting and taxing tobacco.

## Literature

1. N. L. Benowitz, Systemic Absorption and Effects of Nicotine from Smokeless Tobacco, *Adv Dent Res* 11(3)336-340, September, 1997.
2. Nicotine conjugate vaccine: is there a right to a smoking future? A Hasman, Søren Holm, *J Med Ethics* 2004;30:344-345
3. Good and Evil: A Cancer Vaccine from Tobacco Plants, July 22, 2008, *Scientific American*.
4. David Biello , Tobacco Plant Transformed Into Plague Vaccine Factory, *Scientific journal*, January 10, 2006.
5. Graeme Stemp-Morlock ,PLANT vs. PATHOGEN: Enlisting Tobacco in the Fight Against Anthrax , *Environ Health Perspect.* 2006 June; 114(6): A364-A367.
6. Jacques Comuz et al, Vaccine against Nicotine for Smoking Cessation: A Randomized Controlled Trial, *PLoS ONE.* 2008; 3(6): e254
7. Alison A. McCormick, Tobacco derived cancer vaccines for non-Hodgkin's lymphoma: Perspectives and progress, Volume 7, Issue 3, March 2011, Pages 305 - 312, *human vaccines*.

*This Poster was submitted by Dr Smriti Goswami.*

## Correspondence address:

Dr Smriti Goswami  
BR Ambedkar University  
Department of oral & maxillofacial pathology  
KD Dental college NH-2  
Chattikara, Mathura ( U.P.) 281001  
India



# TOBACCO VACCINE : A NEW LIFE FROM THE DEAD END

## Dead End

Exposure to smokeless tobacco results in loss of anti-inflammatory activity of annexin I and upregulation of the pro-inflammatory  $cox-2$  in oral cells, this dual effect leads the cells down the carcinogenic activity.

Nicotine is a stimulant and one of the major causes of addiction. It takes 11 seconds to reach brain and 1 month for addiction after smoking.

Nicotine does not cause cancer but carcinogenic activity itself. It breaks the barrier of tobacco-specific nitrosamines, which are potent carcinogens.

Nicotine causes level of dopamine and thus increases the sense of pleasure in smoking.

Cancer metastasis: cigarette causes pulmonary damage & loss of elasticity in arterial history in COPD, emphysema & CVD which are the major causes of death.

Emphysema: Cilia which breaks collagenase, produce mucus which blocks airway.

Bronchitis: Cilia mucus glands, in the airway causes which leads to increased secretion that causes secondary infection and chronic, acute and severe.

COPD: In bronchiolitis, gland cells hypertrophy and hyperplasia, mucus and debris of airway wall.

All other major causes of patient having a, asthma, chronic bronchitis.

## New Life

Protein based tumour specific vaccine for treatment of malignancies via plant based transient expression system.

Cheap and carry less risk to patient.

Work as antibody chemical specific to tumour cells (b cell lymphoma).

Detail from vaccine, comprising of target cancer antigens.

Reason: as oral vaccine provides a conjugate with appropriate cancer antigens which undergoes the process of vaccine large enough, thus preventing to enter the brain reaching a barrier to tobacco.

Result: Nicotine receptors decrease 5%.

Tobacco derived antigen prompted an immune response that was 4-20 times higher than that from other engineered antigen.

# TOBACCO VACCINE

### Oral Cancer

### Tobacco Addiction

### Infections

- **Mouth**: Oral cancer, Pre-cancerous lesion, Salivary changes, gingival recession, Halitosis.
- **Eye**: Damage to macula, Functional changes to lens & retina.
- **Skin**: Deep wrinkles due to damage to collagen, thinning & grayish hairs.
- **Cancer**: Cancer of lung, Kidney, Larynx, Head & Neck, Breast, Bladder, Oesophagus, Pancreas, Stomach.
- **CVS**: Heart attack, Strokes, Atherosclerosis, Burger's disease.
- **Respiratory**: Pulmonary damage.
- **Reproductive**: AIDS (Sudden infantile death syndrome), Miscarriage, Impotency in males.
- **Endocrinal effects**: (a) Increased risk of Grave's hyperthyroidism osteoporosis. (b) Negative impact on pregnancy outcome.

### Cancer vaccine

### Vaccine against addiction

### Vaccine against infections

(a) Vaccine against noro virus.

- Norovirus is a dreaded cause of diarrhoea and vomiting.
- Noroviruses are always mutating, it is a moving target for vaccine developers.
- Experiments are successful in mice, trying to do in humans in future. Vaccine could be administered every 12 to 18 months by a nasal-delivery system.

(b) Benefits of Nicotine: Parkinson's disease, Tourette's disease, Alzheimer's disease, Ulcerative colitis, Sleep apnea.

## CONCLUSION

The harm that tobacco use does to health is irrefutable. Tobacco use is one of the major preventable cause of disease and premature death. The same plant which is responsible for causing cancer may offer a way to treat the disease. However, government still hesitate to act progressively to reduce tobacco use as it is believed that it may affect the economic benefits that a country derives from growing, processing, manufacturing, exporting and taxing tobacco. This poster aims at gaining the benefits from the disastrous tobacco, by highlighting the use of tobacco plant in developing viable vaccine. Keeping in mind the economy of country, tobacco plant cultivation can be used for derivation of useful tobacco vaccine rather than harmful tobacco products.

**Guided By :** DR. UMESH CHANDRA PRASAD G., DR. PANKAJ AGARWAL, DR. RAM BALLABH UPADHYAY

**Presented By :** Dr. Smriti Goswami, Dr. Manisha Sharma  
Post Graduate, K.D. DENTAL COLLEGE & HOSPITAL, MATHURA