Sericulture, the production of silk is an important industry in India. Persons engaged in the process of silk manufacture are at high risk to develop bronchial asthma believed to be allergic in nature. Sustained silk production cannot be achieved without maximum involvement of people, sound in body and in mind. The well being of silk industry workers is of paramount relevant in the practice of silk production because healthy industrial community is more likely to sustain silk production because healthy industrial community is more likely to sustain silk production than one weakened by infections and preoccupied with ill health due to occupational health problems.

*Bombyx mori* L. is commonly known as silk moth is a economically important insect. Wings and abdominal cuticles of this silk moth are also develops potential allergic scales. Preliminary experiments carried out in marine model system shown that crude silk moth scales have the potentiality to alter immune function, resulting hypersensitivity response in lungs (Table 2). Mast cells are also believed to have a central role in the inflammatory process. Mediators released from this cell type can cause bronchial smooth muscle contraction and induce migration of neutrophils to site of degranulation (Karol, 1992).

Genetic transmission has been suggested for allergin skin test reactivity, levels of total serum Ig E, Pulmonary function measurements and asthma (Lebowitz et al., 1984).
Murine models have provided fundamental information regarding certain features of asthma. Identification of particular lymphocyte subpopulations associated with asthma has been obtained using mice. Lymphocytes in the bronchoalveolar lavage of mice were investigated using flow cytometry (Curtis and Kaltreider, 1989). Involvement of T. lymphocytes in airway hyperreactivity was concluded from studies in mice (Garssen et al., 1991). A murine model of airway hypersensitivity has been described, in which measurement of Ig E is used as determinant factor (Kimber and Dearman, 1992).

The purpose of present study has also extended to assess the change in phagocytic macrophage cell number in a group of allergic patients during active phase of their illness and following recovery. Monocytes and lymphocyte cell number was reduced however white blood cell count and neutrophil cell number was increased over control (Table 3).

Several parameters of cell mediated and humoral activities, including changes in spleen, thymus and liver weights were recorded. The changes in this parameters were also determined haematocrit values in a positively selected group of patients from sericulture grainage industry (Table 4).

There is a growing conviction among toxicologists that the discipline of immunotoxicology will have an increasingly important role to play in the risk assessment
of pharmaceutical, industrial and biological products in the 1990s and beyond. Preliminary results from our laboratory indicate that silk moth scale (*Bombyx mori* L.) have potential proteinaseous allergens. Sericulture the production of silk is an important industry in India persons engaged in the process of silk manufacture are at high risk to develop bronchial asthma to be allergic in nature. Clinical studies from our laboratory established that 22% of the total subjects suffered from occupational asthma due to exposure to silk moth scales.

Our essential hypothesis is that human exposure to this type of biological agents can in some cases exert a toxic effect on the immune system causing it's disfunction. However, some times the consequences are likely to be secondary, in that impairment of immune function may leads to an increased susceptibility to infection and perhaps to certain forms of cancer. Generally speaking the influence if any of insect scales on the immune response has been nearly totally ignored despite obvious health implications.

On the basis of clinical manifestations the silk moth scales are thought to be immunologically mediated. The subjected persons in series (Table 1) satisfy the clinical criteria for hypersensitivity with the adverse reaction occurring associated with a fever and rash in all patients. These results are readily satisfy the clinical characters of hypersensitivity (Pohl et al., 1988, Shear et al., 1988).
The unique susceptibility of certain sericulture grainage industrial workers to develop such reactions (Table 1) may be due to a critical imbalance between the activation of silk moth scales to its reactive metabolite and its detoxification.

It has been suggested that a deficiency of specific enzymes in lung system would lead to inadequate detoxification of the toxic metabolite and hence the adverse reaction. (Gerson et al., 1983, Riley et al., 1988).

Our investigations here also extended further to see any specificity of silk moth scales in vitro test system—using white albino mice. In preliminary investigations several parameters of cell mediated, humoral and haematological activities including changes in spleen, thymus and liver weights were recorded. Differential white blood cell counts revealed that the neutrophil number was increased and the monocytes decreased (Table 3).

The significantly lower p values among subjected persons (Silk moth scales affected persons) seem to indicate a defensive reaction of their respiratory system towards silk moth (Bombyx mori L.) scales. The same holds for the more frequent cough and sputum (Table 2) among subjected persons symptoms which are the normal physiological response of the respiratory tract towards silk moth (Bombyx mori L.) scales.
With in the limitations of present study designed to show a higher prevalence of respiratory conditions in subjected persons trend of higher prevalence of reported respiratory symptoms characterizes in among workers from grainage industry (Table 2). Sputum with cold and attacks of cough accompanied by sputum are significantly more common (P=0.019-0.010) (Table 2).

Present data show a trend of higher prevalence of respiratory symptomology. These findings are in accord with other studies indicating higher prevalence of respiratory conditions (Colley and Brasser, 1980, French et al., 1973, Hammer et al., 1976, Love et al., 1981). Factors other than silk moth (Bombyx mori L.) scales or with combination of scales might have influenced included occupational exposure, socio- economic status, ethnic origin and pulmonary diseases in the family. Generally in the presence of high relative humidity associated with silk moth scales might be leads to respiratory symptoms.

Bronchial epithelial cells are in an activated state in occupational asthma increased release of inflammatory mediators such as fibronectoin (Campbell et al., 1992) or endothelin (Vittori, et al., 1992) and expression of surface markers (Vignola et al.,1993) present results, has suggests that bronchial epithelial cells may play a direct role in the response to allergin (Bombyx mori L.) scales inhalation. No eosinophils were detect during haematological experiments in mice exposed to silk moth scales (Table 4). The number
of contaminating cells were very low. After observation of haematological data (Table 4) of treated mice but not normal subjects suggests that these do interact with the immunoglobulin and are likely to be activated by an Ig E, mediated mechanism.

Eosinophils are thought to be major leucocyte effector cells. The respiratory symptoms and other clinical features of patients during active phase of illness to silk moth scales is believed to develop as a result of eosinophil derived protein together with relative oxygen radicals damaging the bronchial tissue. Based on present results future experiments are aimed regulation of T cells in bronchoalveolar lavage (BAL) and studies on prevention of the antigen induced infiltration of eosinophils into the lung of sensitized persons in Sericulture grainage Industry.

Further Murine models have an excellent tools for future research regarding certain features of occupational asthma.

(a) Identification of particular lymphocyte subpopulation associated with asthma.

(b) Characterization of bronchoalveolar lymphocytes during a specific antibody forming cell response in the lung of mice using flow cytometry.

(c) Studies on uncertainty in occupational asthma by the environmental factors both on development of sensitivity and on progression from episodic occurrence to chronic diseases.
(d) The present studies also open up the exciting possibility of developing synthetic peptides corresponding to the highly conserved Ig E binding regions of allergins for the diagnosis and effective desensitization of individuals sensitive to silk moth scales (*Bombyx mori* L.) in particular and atopic allergins in general.

The abdominal cuticle of silk moth (*Bombyx mori* L.) is made up of proteins with wider range of sizes and isoelectric points (Sridhara, 1994). Monospecific and monoclonal antibodies that recognize unique epitopes would be useful for studies comparing the individual proteins present in the abdominal cuticular scales which are responsible of occupational asthma in Sericulture grainage industries.

The insect cuticle is composed of mainly protein and chitin and product of underlying epidermal cells. Several studies indicate that the polypeptide composition of these cuticles is different (Moine and Sridhara, 1994). Although the mechanisms by which insect hormones regulate the expression of cuticular proteins are not known. But Apple and Fristrom, 1991 and Hiruma et al., 1991 has showed that Isolation and characterization of cuticular protein (CP) genes expressed at different developmental stages and different species of insects. The major polypeptides that make up these two kinds of cuticle (pupal and adult) in the
Occupational asthma appears to be under the influence of both genetic and environmental factors. A plan depicting the possible role of these factors is presented.

I. Family studies have provided evidence for a genetic component in development of allergy.

II. Environmental exposure to the offending allergin is necessary for the expression of genes to the allergin.

III. Sensitization appears to be favoured when allergin is presented in the presence of irritants, such as insect scales, other pollutants or with upper respirator viral infections.
FIG. 9
IRRITANT FUMES AND SMOKE
•<----
-AIRWAY INFLAMMATION
'REPEATED
LOW LEVEL
OF EXPOSURE
VIRUS INFECTIONS
VIRUS INFECTION
AIR POLLUTION
PASSIVE SMOKING
CAT ALLERGIN
HOUSE DUST MITE
GENETIC SUSCEPTIBILITY + EARLY ALLERG EXPOSURE
ALLERGIN SENSITIZATION
ALLERGENS
ASTHMA ATTACK
IRRITANT FUMES AND SMOKE
VIRUS INFECTION
AN INFORMATIVE PLAN OF PATHOGENIC MECHANISMS IN OCCUPATIONAL ASTHMA
(GENETIC AND ENVIRONMENTAL FACTORS)
polyphemus silk moth are different although a small number may be common (Sridhara, 1994).

The WBC count, a decrease in the percentage of lymphocytes and increase in the neutrophyls were found in the subjected patients. However, in silk moth scales treated mice significantly increased eosinophil percentage and there was no significant improvement in WBC count (Table 4). Therefore silk moth scales may act on haematopoietic stem cells. The changes in WBC count may result from in the increase of quantity of scales concentration (Table 4). The other possible reason may be involved with histaminergic system. It has been reported that histamine receptors which can change the composition of white cell counts in bone marrow and blood (Tasaka et al., 1992).

Results of immune function studies in mice, rats, and guinea pigs indicate that dioxin suppresses cell mediated immunity in a dose related fassion (Exon et al., 1987; Vos and Luster, 1989). Besides suppression of the cell mediated immunity, dioxin can also impair humoral immunity.