

# Detergent Enzyme Hygiene and Medical Surveillance – What We Have Learned over the past 40 years

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## HISTORY OF ENZYMES IN DETERGENTS

### 1931

- \* Otto Rohm uses pancreatic enzyme for laundry presoak
- \* “Burnus” first enzymatic detergent

### 1963

- “Biotex” first successful detergent containing bacterial
- Protease- Alcalase

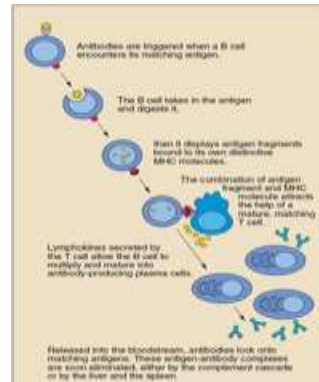
### 1963-1970

- \* Rapid growth of enzyme detergent

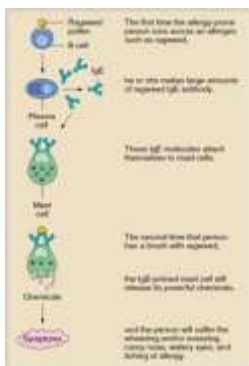
## HISTORY OF ENZYMES IN DETERGENTS

### LATE 1960's

- \* Enzymes were introduced in the detergent industry
- \* Dust products and high exposure
- \* Development of allergic symptoms among exposed people
- \* Public relation issues



United States of America-National Institute of Allergy and Infectious Diseases



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## HISTORY OF DETERGENTS

### 1970'S & 1980's

- \* Development of industrial hygiene practices and dust control measures
- \* Less dusty material
- \* Enzymes were withdrawn from all U.S. Detergents
- \* Enzyme containing detergents continued to be manufactured in Europe safely.
- \* In 1985, enzymes were reintroduced in U.S. detergents

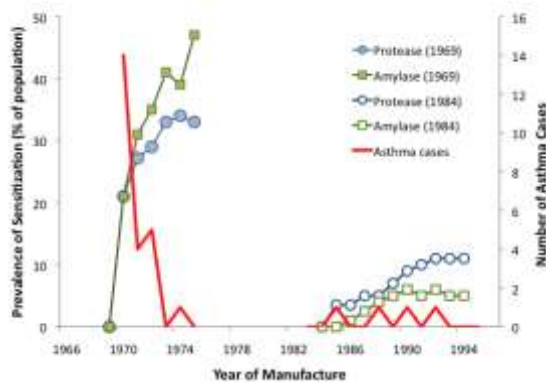
## HISTORY OF ENZYMES IN DETERGENTS

### LATE 1980 to Now

- \* Multiple enzyme classes are used in the detergent industry.
- \* Less dust and much lower exposure – sound industrial hygiene practices are implemented in our plants.
- \* <3% of sensitizations to the existing enzymes - no asthma.
- \* No public relations issues

## WHAT ENZYMES IN P&G DETERGENTS ?

- **Proteases** → Remove grass, blood, egg and human sweat  
ex. Savinase, FN4, FNA-Base, ...
- **Lipases** → Remove oily and fatty stains  
ex. Lipolase, Lipex, ...
- **Amylases** → Remove residues of starchy foods  
ex. Natalase, Termamyl, ...
- **Cellulases** → Modify structure of cotton cellulose fibrils  
ex. Carezyme, Celluclean
- **Hemicellulase** → Degrades guar gums (food thickeners) ex. Mannanase
- **Carbohydrase** → Degrades pectins and pectates (stains of fresh-fruits, tomatoes and fruit type baby foods) ex. Pectate Lyase



### Current Status

- Tested – 12,000
- Sensitized - ~ 180
- Allergic Rhinitis  $\pm$  1 every 2 years
- Asthma 4 cases over 18 years

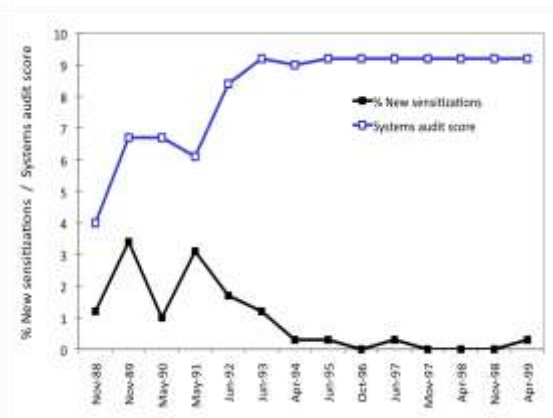
### What Factors Contributed to Success?

#### 1. Prilling of Granular Enzymes



### What Factors Contributed to Success?

2. Institution of an Enzyme Hygiene Program
  - Engineering design for enzyme handling systems, and ventilation
  - Globalized Risk Assessment Process
  - Condition Monitoring
  - Air monitoring
  - Ventilation System Monitoring
  - Behaviors/Personal Protective Equipment
  - Audits



## What Factors Contributed to Success?

- 3. Globally standardized medical monitoring program:
  - Skin Prick Testing
  - Respiratory Questionnaire
  - Pulmonary Function Tests
  - Medical Program Audits

## Today's Presentations

- “Prevention of Enzyme Allergy in the Manufacturing of Detergent Enzymes “- Dr Larsen
- **Break**
- “The Current State of Enzyme Hygiene Practice to Control Allergy in a Detergent Manufacturer” – Mr. Panepinto
- “ Enzyme Medical Monitoring Systems in Detergent Manufacturing” – Dr. Kirchner