The materials are for the course BPH-605 Pharmaceutical Biotechnology of VI semester B.Pharm. The materials belong to Unit-3

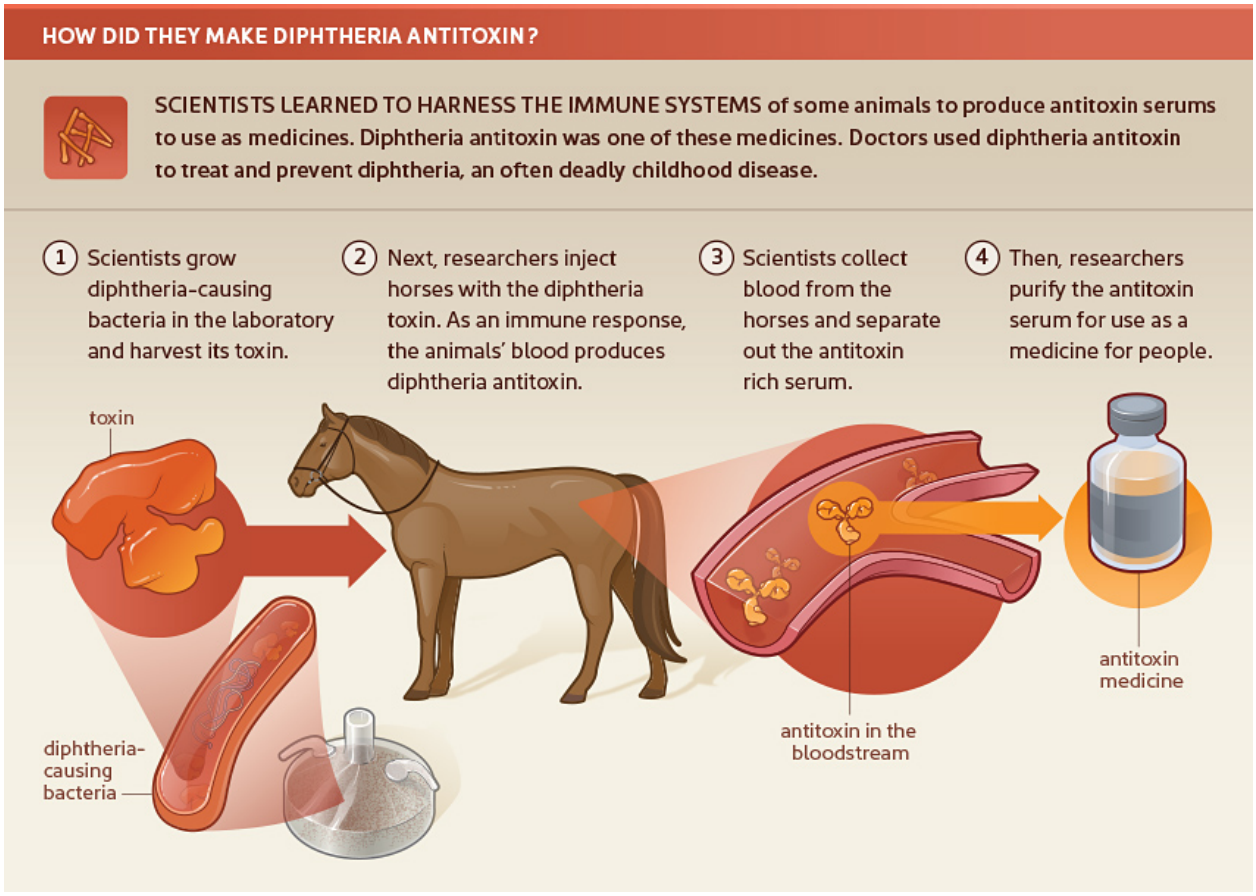
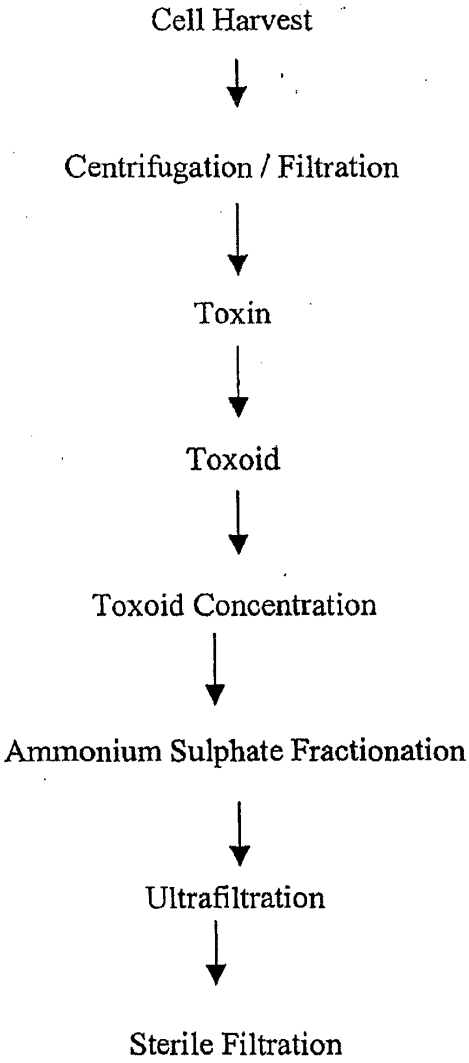


TABLE 43.1. A comparison among the different types of hypersensitivity

Feature	*Hypersensitivity Type*			
	Type I	***Type II***	***Type III***	***Type IV***
Nature of antigen	Soluble	Cell surface-bound	Soluble	Soluble
Antibody (Ab) involved	IgE	IgG	IgM	Nil
Type of immune response	Humoral	Humoral	Humoral	Cellular
Effector molecules	Histamine and other biologically active molecules	Membrane-attack complex, complements C3a, C4a and C5a	Neutrophils	Various cytokines secreted by activated Tc cells
Mechanism	**B cells** ↓ Activated by allergen Secrete IgE ↓ IgE binds to Fc receptors on mast cells and blood basophils ↓ ***Second exposure to allergen*** Allergen cross-links IgE ↓ Activated mast cells and blood basophils secrete vasoactive amines ↓ • Smooth muscle contraction • Increased vascular permeability • Vasodialation	**B cells** ↓ Activated by antigen Secrete IgG ↓ IgG binds cell surface-bound antigen ↓ • Activation of Tc cells or • Activation of complement system ↓ • Tc cells secrete various cytokines leading ultimately to cell death • Activated complement system leads to cell death	**B cells** ↓ Antigen activation Secret IgM ↓ IgM interacts with antigen to form immune complex ↓ Activation of complement system ↓ Inflammatory response; massive infiltration by neutrophils	**T_H1 cells** ↓ Antigen activation Secrete cytokines ↓ Activation of macrophages and Tc cells ↓ • Phagocytosis by macrophages • Various cytokines secreted by Tc cells ↓ Cellular damage
Examples	Systemic anaphylaxis; localized anaphylaxis; *e.g.*, hay fever, asthma, hives, food allergies	Blood transfusion reactions, erythroblastosis foetalis, autoimmune haemolytic anaemia	Serum sickness, rheumatoid arthritis, systemic lupus erythmatus	Contact dermatitis, graft rejection, tubercular lesions

METHOD OF PREPARATION OF TOXOIDS

A **toxoid** is an inactivated toxin (usually an exotoxin) whose toxicity has been suppressed either by chemical (formalin) or heat treatment, while other properties, typically immunogenicity, are maintained. Toxins are secreted by bacteria, whereas toxoids are altered form of toxins; toxoids are *not* secreted by bacteria. Thus, when used during vaccination, an immune response is mounted and immunological memory is formed against the molecular markers of the toxoid without resulting in toxin-induced illness. Such a preparation is also known as an **anatoxin**. There are toxoids for prevention of diphtheria, tetanus and botulism. The following flow chart outlines the preparation of Toxoids.



IMMUNE STIMULATION AND IMMUNE SUPPRESSION

1.IMMUNE STIMULATION

Immune stimulation refers to stimulation of Immune system by an external source. The stimulation offers protection against infections and cancer. Our Immune system can be stimulated by administration of Antigens, Adjuvants and Endogenous substances like Female Sex Hormones. The Antigens are administered in the form of a Vaccine. Antigens produce specific Immune stimulation, while Adjuvants and endogenous substances produce non specific Immune stimulation. Apart from these substances some chemicals (e.g. Deoxy Cholic Acid), Probiotics like certain Lactobacillus bacteria and some herbs possess Immuno stimulant property.

2.IMMUNE SUPPRESSION

Immune suppression orImmunosuppression is a reduction of the activation or efficacy of the immune system. Some portions of the immune system itself have immunosuppressive effects on other parts of the immune system, and immunosuppression may occur as an adverse reaction to treatment of other conditions.

In general, deliberately induced immunosuppression is performed to prevent the body from rejecting an organ transplant. Additionally, it is used for treating graft-versus-host disease after a bone marrow transplant, or for the treatment of auto-immune diseases such as systemic lupus erythematosus, rheumatoid arthritis, Sjögren's syndrome, or Crohn's disease. This is typically done using medications, but may involve surgery plasmapheresis or radiation. A person who is undergoing immunosuppression, or whose immune system is weak for some other reasons (chemotherapy or HIV), is said to be immunocompromised.