# A STUDY ON RETINOL-BINDING PROTIEN IN THE SERUM OF PREMATURE INFANTS

Thesis
Submitted for partial fulfilment of
Master Degree in Pediatrics

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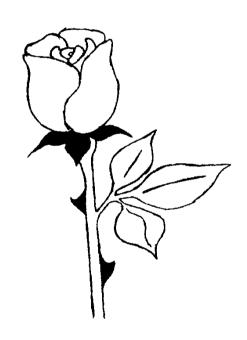
Mwaheb M. H. Awad



To My Father

To My Mother

To My Husband



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### LIST OF ABBREVIATIONS

BPD Broncho Pulmonary Dysplasia

CAT Catalase

CRABP Cellular Retinoic Acid Binding Protein

CRBP Cellular Retinol-Binding Protein

GP Glutathione Peroxidase

O2 Oxygen

RBP Retinol-Binding Protein

RDA Recommended Dietary Allowance

RDR Relative Dose Response

RDS Respiratory Distress Syndrome

SOD Super-Oxide Dismutase

TPA Total Parenteral Alimentation

VLBW Very Low Birth Weight

Zn Zinc

## INTRODUCTION & AIM OF THE WORK

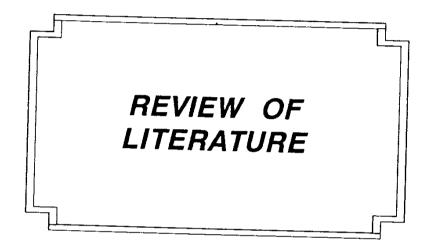
### INTRODUCTION

Retinol (vitamin A) is a fat soluble vitamin which is essential for epithelial cell function. Retinol stores accumulate in fetal tissue during gestation. Thus the preterm infant faces extrauterine adaptation with less total reserves of retinol than does the term infant. Serum retinol binding protein (RBP) is also lower in premature than full term infants. Nearly about 40% of lung cells are of epithelial origin, thus the premature infant's lung is often the initial site of difficulties during extrauterine adaptation [Zachmen, 1989].

The deficiency state of vitamin A, is characterized by loss of cilia and development of squamous metaplasia in the respiratory tract [Anzano et al., 1980]. These changes are similar to those found in bronchopulmonary dysplasia (BPD) [Waible, 1971], a chronic lung disease frequently seen in the preterm infant.

### AIM OF THE WORK

The aim of the work is to study and to measure the retinol binding protein (RBP) in premature infants in an attempt to assess the needs of the preterm newborn for supplementation with retinol.



### Retinol (Vitamin A)

#### Nomenclature:

Vitamin A is a generic term used for all compounds that exhibit qualitatively the biological activity of retinol. The term retinoids has been adapted recently as a general term that includes both the natural forms of vitamin A and synthetic analogus with or without biological activity of retinol [Goodman, 1984].

Vitamin A is a polyisoprenoid compound containing a cyclohexenyl ring. It includes retinol, retinoic acid and retinal. Only retinol has full vitamin A activity, the others fulfill some but not all of vitamin A functions [Mayes, 1990].

One international unit of vitamin A is defined as 0.3 µ g of all-trans-retinol. For nutritional purposes, a better term is "retinol equivalents" which is used to convert all sources of vitamin A and carotenoids in the diet into a single unit. Thus, 1µg of all-trans-retinol equals 1 retinol equivalent.

Generally, 1µg of retinol is assumed to be biologically equivalent to 6µg of β-carotene or to 12µg of mixed dietary carotenoids [Moore. 1957], (Fig. 1, page 17).

### Functions of Vitamin A

The only clearly defined physiological role for retinol is its role in vision. Retinol is oxidized in the rods of the eye to retinal which, when complexed with opsin, forms rhodopsin allowing dim light vision [Skaln, 1987].

When rhodopsin is exposed to light, it dissociates as it bleaches and forms all-trans-retinol and opsin. This reaction is accompanied by a change that induces a calcium ion channel in the membrane of the rod cell. The rapid influx of calcium ions triggers a nerve impulse allowing light to be perceived by the brain [Mayes, 1990].

Vitamin A is also essential for reproduction growth, maintenance of differentiated epithelia, and mucus secretion. The exact nature of the role of vitamin A in these functions has not been defined at the molecular level, except for its well documented role in vision [Wald, 1968].