#### STUDY OF RH BLOOD GROUP ALLOIMMUNIZATION IN EGYPTIAN **NEONATES WHO SUFFER FROM HEMOLYTIC** DISEASE OF THE NEWBORN

#### **Thesis**

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#### **Abstract**

The Rh blood group system is one of the most polymorphic and immunogenic systems known in humans. In the past decade, intense investigation has yielded considerable knowledge of the molecular background of this system. The genes encoding 2 distinct Rh proteins that carry C or c together with either E or e antigens, and the D antigen, have been cloned, and the molecular bases of many of the antigens and of the phenotypes have been determined. A related protein, the Rh glycoprotein is essential for assembly of the Rh protein complex in the erythrocyte membrane and for expression of Rh antigens. The purpose of this review is to provide an overview of several aspects of the Rh blood group system, including the confusing terminology, progress in molecular understanding, and how this developing knowledge can be used in the clinical setting. Extensive documentation is provided to enable the interested reader to obtain further information. The Rh blood group system is the most polymorphic of the human blood groups, consisting of at least 45 independent antigens and, next to ABO, is the most clinically significant in transfusion medicine. The ability to clone complementary DNA (cDNA) and sequence genes encoding the Rh proteins has led to an understanding of the molecular bases associated with some of the Rh antigens. Serologic detection of polymorphic blood group antigens and of phenotypes provides a valuable source of appropriate blood samples for study at the molecular level. This review summarizes our present understanding of the complexities of Rh blood group expression and how this knowledge impacts on clinical situations that arise through Rh blood group incompatibility.

#### Key words:

- 1-Rh incompatibility
- 2- HDN
- **3-Jaundice**

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### List of Abbreviation

2,3- DPG 2, 3 Diphosphoglycerate.

AE1 Anion exchanger member 1.

AHG Antihuman globulin.

AS-1 Adesol-1 (Dextrose, Adenine, Mannitol and Sodium

Chloride).

Amts Ammonia Transporters.

ATP Adenosine Tri-Phosphate.

CDC The Centers for Disease Control and Prevention.

CMV Cytomegalovirus.

CP Cerebral Palsy.

CPDA-1 Citric Acid, Sodium Citrate, Monobasic Sodium

Phosphate, Dextrose, Adenine.

**CUPH** Cairo University Pediatric Hospital.

**ECMO** ExtraCorporeal Membrane Oxygenation.

**ELBW** Extremely Low Birth Weight.

EPO Erythropoietin.

**ETCO** End Tidal Carbon Monoxide.

FBS Fetal Blood Sampling.

FMH FetoMaternal Hemorrhage.

G6PD Glucose-6-Phosphate Dehydrogenase.

GPA Glycophorin A.

GPB Glycophorin B.

Hb Hemoglobin.

HDFN Hemolytic disease of fetus and newborn.

HDN Hemolytic disease of newborn.

HHy Hereditary Stomatocytosis /Hydrocytosis.

HIDA Hepatoiminodiacetic acid.

HIV Human Immunodeficiency Virus.

HPP Hereditary PyroPoikilocytosis.

IAP Integrin-associated protein.

IAT Indirect Antiglobulin Test.

ICAMs Intercellular adhesion molecules.

IPT Intraperitoneal transfusion.

IQR Interquartile range.

**IUT** Intrauterine transfusion.

IVIG Intravenous Immunoglobulin.

IVT Intravascular transfusion.

L/S ratio Lecithin/Sphingomyelin ratio.

MCA Middle cerebral artery.

MEP Methyl-Amine Permease.

MEPs Methyl-Ammonia Permeases.

NBTC National Blood Transfusion Center.

NH<sub>3</sub> Ammonia.

NH<sub>4</sub><sup>+</sup> Ammonium ion.

NICU Neonatal Intensive Care Unit.

PUBS Percutaneous Umbilical Blood Sampling.

RBCs Red Blood Cells.

RCRL Red Cell Reference Lab.

Rh AG Rh Associated Glycoprotein.

RhCG Rh C glycoprotein.

RhoGAM Anti-D immunoglobulin.

rHuEPO Recombinant Human Erythropoietin.

SAO Southeast Asian Ovalocytosis.

SnMP Tin-mesoporphyrin.

TA-GVHD Transfusion-Associated Graft-vs-Host Disease.

TCB Trans- Cutaneous Bilirubin.

TSB Total serum bilirubin.

US Ultrasound.

VLBW Very Low Birth Weight.

WHO The World Health Organization.

# Introduction «I. Aim of Work.