The Characterization and Diagnosis of Bare Lymphocyte Syndrome Type II: A Case Study

Nicole Barclay, Brianna Cervantes and Stephanie Willis

INITIAL PRESENTATION

Patient name: Susie
Age: 6 month-old
Symptoms:

- Pneumonia in both lungs
- Fever
- Cough
- Difficulty breathing
- Chest pain
- Chills

TESTING

1

FLOW CYTOMETRY

Blood sample was taken to look at concentrations of various cell types

2

ELISA

Analyzed presence of different antibodies and performed lymph node biopsy

3

MHC CLASS II EXPRESSION

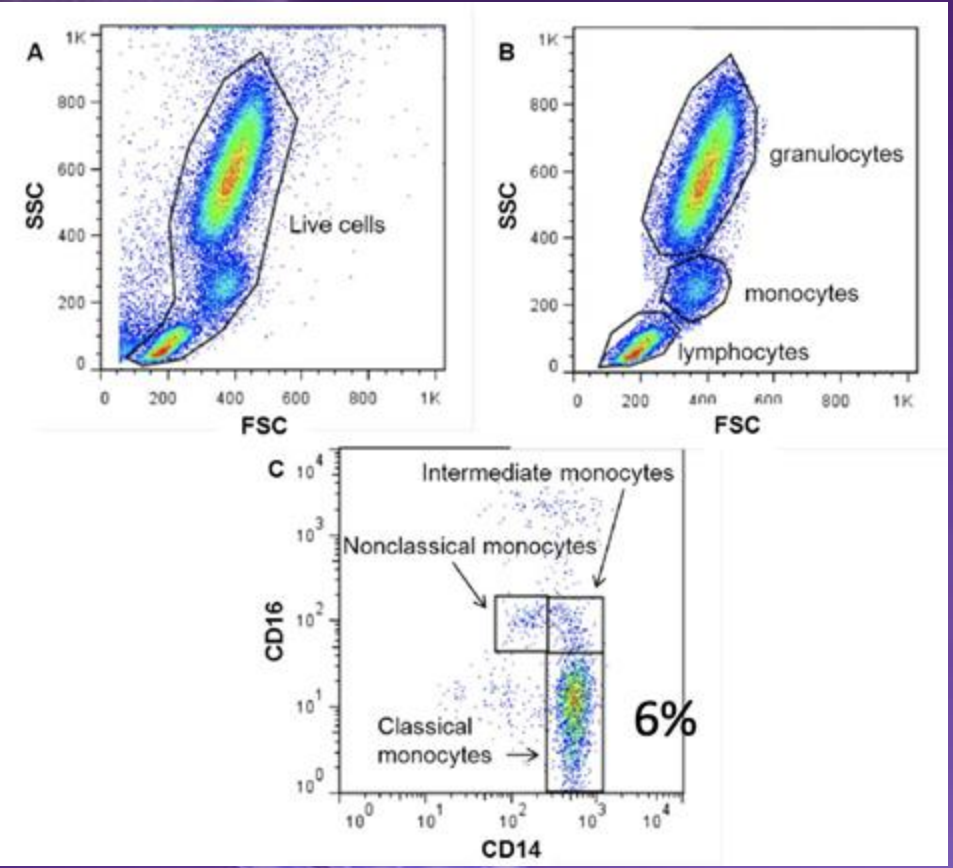
Another flow cytometry was performed to look at the expression of MHC Class II receptors

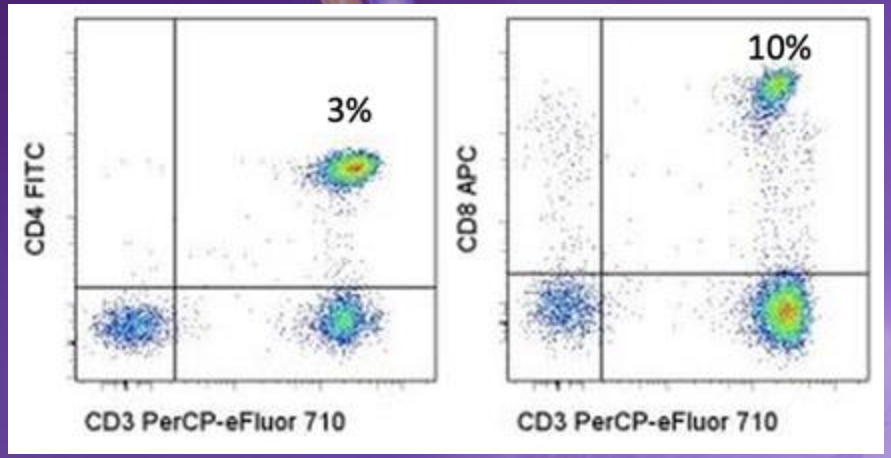
4

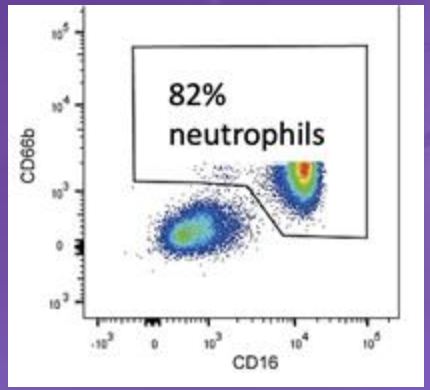
DNA SEQUENCE ANALYSIS

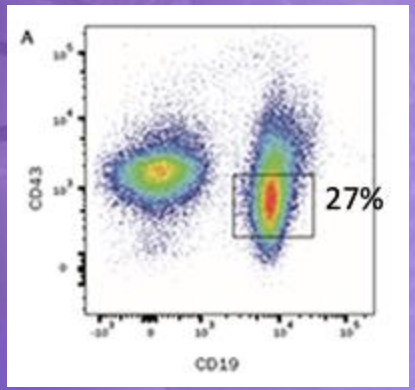
Analyzed five genes to confirm suspected diagnosis

FLOW CYTOMETRY ON IMMUNE CELLS IN BLOOD









FLOW CYTOMETRY ON IMMUNE CELLS IN BLOOD

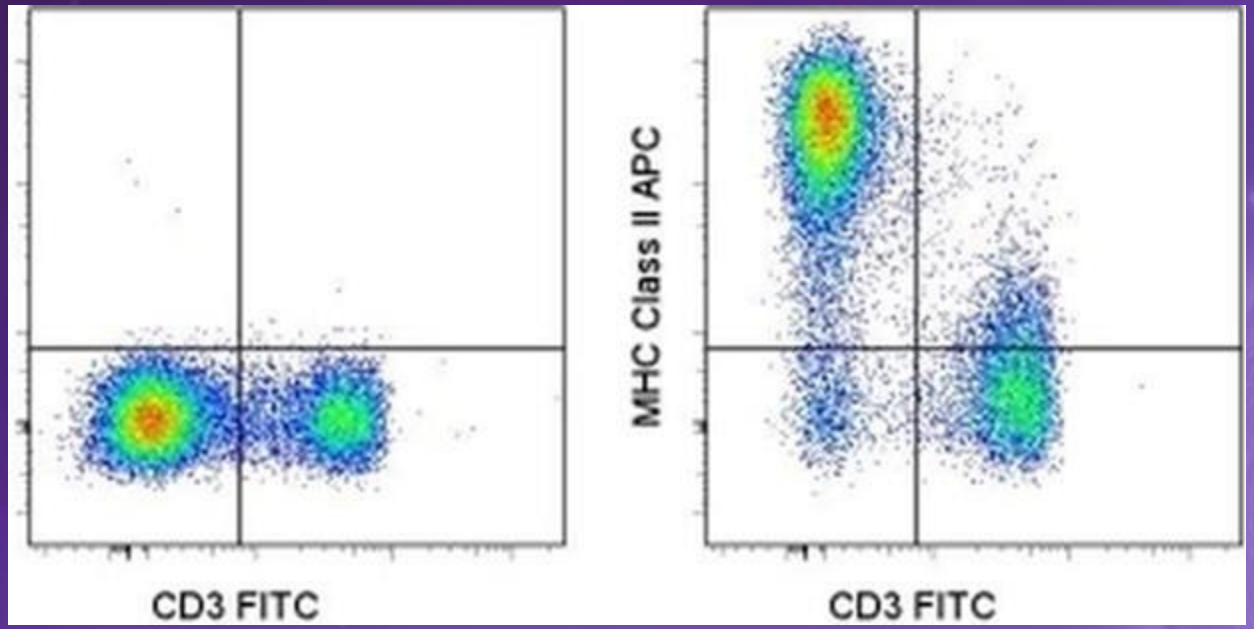
		NORMAL RANGE	OUR RESULTS
WHITE BLOOD CELL	HIGH	5,000-9,000 UL-1	20,000 UL-1
LYMPHOCYTES	LOW	>2,500 UL-1	2,000 UL-1
CD4 T CELLS	LOW	10-20%	3%
CD8 T CELLS	NORMAL	3-10%	10%
B CELLS	HIGH	3-10%	27%
NEUTROPHILS	HIGH	40-65%	82%
MONOCYTES	NORMAL	3-10%	6%

ELISA TEST ON BLOOD

	RANGE FOR NORMAL SERUM ANTIBODY LEVELS (MG/DL)	PATIENT SERUM ANTIBODY LEVELS (MG/DL)
IgM	40-345	30
IgA	60-380	6
IgG	600-1400	96

A LYMPH NODE BIOPSY REVEALED THAT T CELL REGIONS OF THE LYMPH NODES WERE REDUCED IN SIZE AND THERE WERE FEW GERMINAL CENTERS PRESENT.

FLOW CYTOMETRY ON MHC II EXPRESSION ON PBMC'S



NORMAL PBMC'S

PATIENT PBMC'S

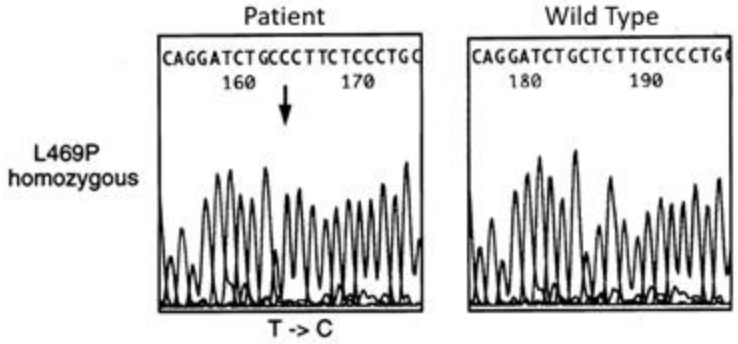
DNA SEQUENCE ANALYSIS OF *CITTA* GENE

DNA Sequence Analysis of *CIITA* gene

Q D L L F S

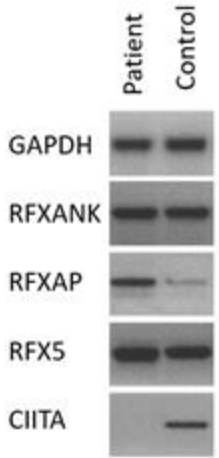
Wild Type CAGGATCTGCTCTTCTCC

Patient CCC



DNA Sequence Analysis of *RFXANK, RFXAP, RFX5* gene- all sequences were wild-type

Protein levels of *RFXANK, RFXAP, RFX5, CIITA* by Western Blot

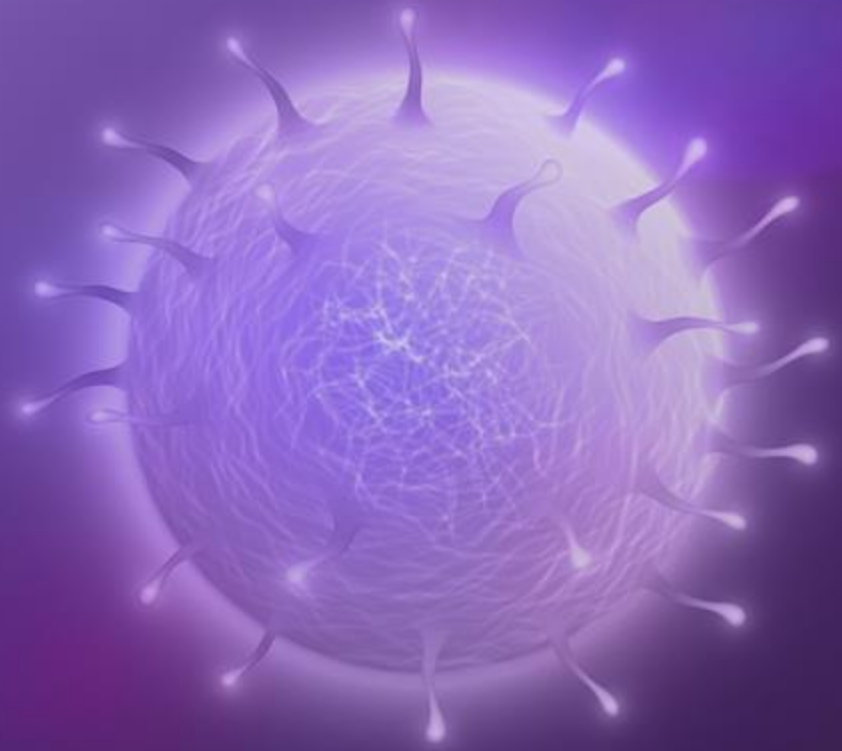


DIAGNOSIS

MHC Class II Deficiency (Bare Lymphocyte Syndrome type II)

WHY THIS DIAGNOSIS

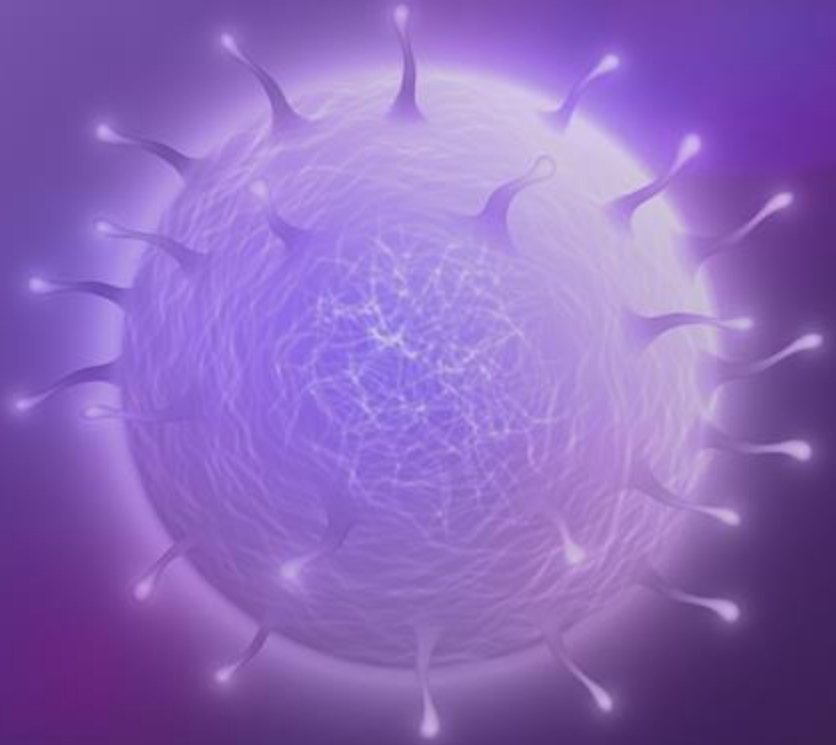
- Fungal infections ruled out MHC class I deficiency
- Flow cytometry revealed numerous abnormalities in immune cell counts
- T cell regions of lymph node were reduced in size & few germinal centers
- Low MHC class II expression
- Single point mutation on *CIITA* gene confirmed our diagnosis



BACKGROUND ON MHC CLASS II DEFICIENCY

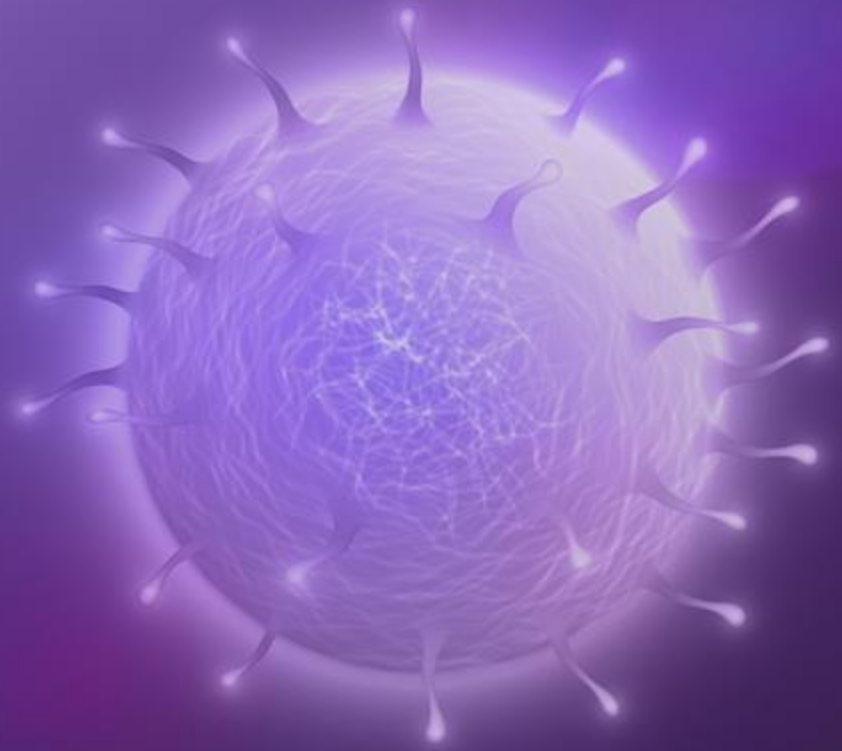
WHAT IS THIS DEFICIENCY?

- A rare autosomal recessive disorder
- Symptoms usually occur 1 year in life and most patients don't survive past 10 years of life
- Recurrent bacterial, fungal, and viral infections
- MHC II presentation on APCs is decreased



WHAT IS THIS DEFICIENCY?

- Impaired MHC function
- Defective CD4=low T helper function=low B cell antibody levels
- Four molecular causes



PREVALENCE

- Not many cases have been reported (~100)
- Classified as rare

SIMILAR DIAGNOSES

- Bare lymphocyte Syndrome
  - I
  - III
- Severe combined immunodeficiency (SCID)
- HIV/AIDS

THERAPEUTIC OPTIONS

MANAGEMENT OF BLS II

- Avoid all viral vaccines
- Usage of irradiated, CMV negative blood products
- Usage of antibiotics to treat recurrent fungal infections

https://www.chp.edu/our-services/rare-disease-therapy/conditions-we-treat/bare-lymphocyte-syndrome

TYPES OF TREATMENTS

- IVIG Replacement Therapy
- Gene therapy
  - Hematopoietic Stem Cell Transplantation (HSCT)
- Severe health problems may cause a need for an organ transplant

https://www.immunodeficiencysearch.com/mhc-class-ii-deficiency