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## Area of Expertise

The general research area of Dr. Mathew's laboratory is Cancer Immunology. His research focuses on the Cellular and Molecular Biology of human natural killer (NK) cells and their recognition by cancer cells. NK cells are a subpopulation of lymphocytes that play an important role against cancer and various viral and bacterial infections.

Dr. Mathew is one of the pioneers who identified, cloned, and characterized several receptors expressed on human NK cells including 2B4 (CD244, SLAMF4), CS1 (CD319, SLAMF7) and LLT1 (CLEC-2D). Research in his laboratory has identified their ligands, elucidated the signaling pathways, and also determined the transcriptional regulation of these genes in health and disease conditions. Dr. Mathew has shown that anti-CS1 antibody activates NK cell cytotoxicity against various cancer cells. The FDA has approved a humanized anti-CS1 mAb, Empliciti, as a breakthrough drug for multiple myeloma treatment. Thus, his research has led to the development of novel NK cell based immunotherapy for cancer. Current focus is identification of markers for cancer stem cells (CSCs) and targeting CSCs to NK cell mediated killing.

## Qualifications

BS in Physics, University of Kerala

MS in Biochemistry, University of Poona

PhD in Biochemistry, University of Poona

## Recent Publications

### **Differential Expression of LLT1, SLAM Receptors CS1 and 2B4 and NCR Receptors NKp46 and NKp30 in Pediatric Acute Lymphoblastic Leukemia (ALL)**

Powers, S. B., Ahmed, N. G., Jose, R., Brezgiel, M., Aryal, S., Bowman, W. P., Mathew, P. A. & Mathew, S. O., Feb 2023, In: International journal of molecular sciences. 24, 4, 3860.

### **Blocking PCNA interaction with NKp44 enhances primary natural killer cell-mediated lysis of triple-negative breast cancer cells**

Marrufo, A. M., Mathew, S., Chaudhary, P., Malaer, J., Ahmed, N. G., Vishwanatha, J. & Mathew, P., 2023, In: American Journal of Cancer Research. 14, 3, p. 1082-1090 9 p.

### **Role of LLT1 and PCNA as Natural Killer Cell Immune Evasion Strategies of HCT 116 Cells**

Malaer, J. D. & Mathew, P. A., Dec 2020, In: Anticancer Research. 40, 12, p. 6613-6621 9 p.

### **Roles of nk cell receptors 2b4 (Cd244), cs1 (cd319), and llt1 (clec2d) in cancer**

Buller, C. W., Mathew, P. A. & Mathew, S. O., Jul 2020, In: Cancers. 12, 7, p. 1-15 15 p., 1755.

### **2B4 (CD244, SLAMF4) and CS1 (CD319, SLAMF7) in systemic lupus erythematosus and cancer**

Malaer, J. D., Marrufo, A. M. & Mathew, P. A., Jul 2019, In: Clinical Immunology. 204, p. 50-56 7 p.

### **Lectin-like transcript 1 as a natural killer cell-mediated immunotherapeutic target for triple negative breast cancer and prostate cancer**

Sun, Y., Malaer, J. D. & Mathew, P. A., 2019, In: Journal of Cancer Metastasis and Treatment. 5, 80.

### **A novel ligand on astrocytes interacts with natural cytotoxicity receptor NKp44 regulating immune response mediated by NK cells**

Bowen, K. E., Mathew, S. O., Borgmann, K., Ghorpade, A. & Mathew, P. A., Feb 2018, In: PLoS ONE. 13, 2, e0193008.

**Blocking LLT1 (CLEC2D, OCIL)-NKR1A (CD161) interaction enhances natural killer cell mediated lysis of triple-negative breast cancer cells**

Marrufo, A. M., Mathew, S., Chaudhary, P., Malaer, J., Vishwanatha, J. & Mathew, P., 2018, In: American Journal of Cancer Research. 8, 6, p. 1050-1063 14 p.

**CS1 (SLAMF7, CD319) is an effective immunotherapeutic target for multiple myeloma**

Malaer, J. D. & Mathew, P. A., 2017, In: American Journal of Cancer Research. 7, 8, p. 1637-1641 5 p.

**Blimp-1/PRDM1 regulates the transcription of human CS1 (SLAMF7) gene in NK and B cells**

Kim, J. R., Mathew, S. O. & Mathew, P. A., Jan 2016, In: Immunobiology. 221, 1, p. 31-39 9 p.

## **Sponsored Projects**

**Blocking Inhibitory Signal to Natural Killer Cells to Eliminate Breast Cancer**

Mathew, P.  
Intramural Research(UNTHSC)  
15/01/12 → 14/01/13

**Cell Surface Exosomal PCNA is a Novel Marker for Cancer Stem Cells and Enables Escape from Natural Killer Cell Effector Function (For: Nathan Horton)**

Mathew, P.  
Intramural Research(UNTHSC)  
1/09/13 → 31/08/14

**CHARACTERIZATION OF HUMAN 2B4 AND 2B4 GENE KNOCKOUT MICE**

Mathew, P. & MATHEW, P. A.  
National Cancer Institute  
17/01/01 → 31/12/06

**CHARACTERIZATION OF HUMAN 2B4 AND 2B4 GENE KNOCKOUT MICE**

Mathew, P.  
17/01/01 → 31/12/03

**CHARACTERIZATION OF HUMAN 2B4 AND 2B4 GENE KNOCKOUT MICE**

Mathew, P.  
1/10/98 → 30/09/02

**CS1-Targeted Immunotherapy for Acute Lymphoblastic Leukemia (ALL) in Children**

Mathew, S., Mathew, P. & Bowman, P.  
Intramural Research(UNTHSC)  
1/09/13 → 31/08/15

**Emerging role of tumor-derived exosomes in immune modulation and breast cancer health disparity.**

Chaudhary, P., Mathew, P. & Nandy, R.  
NCI: National Cancer Institute  
1/08/23 → 31/07/25

**Exosomal-Annexin A2 Promotes Metastasis in Triple-negative Breast Cancer**

Chaudhary, P. & Mathew, P.  
Intramural Research(UNTHSC)  
1/06/17 → 31/05/18

**Ligand for Natural Cytotoxicity Receptor NKp44**

Mathew, P. & MATHEW, P. A.

National Institute of Allergy and Infectious Diseases  
1/03/07 → 28/02/09

**Ligand for Natural Cytotoxicity Receptor NKp44**  
Mathew, P.  
1/03/07 → 28/02/09

**MOLECULAR BASIS OF NK CELL RECOGNITION AND ACTIVATION**  
Mathew, P., YUAN, D., KUMAR, V., Bennett, M., Mathew, P., YUAN, D., KUMAR, V., Bennett, M., YUAN, D., Kumar, V. & SCHATZLE, J.  
National Institute of Allergy and Infectious Diseases  
1/01/01 → 31/08/04

**MOLECULAR BASIS OF NK CELL RECOGNITION AND ACTIVATION**  
Mathew, P. & MATHEW, P.  
1/10/95 → 30/09/98

**Molecular Characterization of NKp44 Ligand on Astrocytes**  
Mathew, P. & Mathew, S.  
NINDS: Neurological Disorders & Stroke  
1/02/17 → 31/01/19

**Molecular Characterization of NKp44 Ligand on Astrocytes**  
Mathew, P.  
National Institute of Neurological Disorders and Stroke  
1/02/17 → 31/01/20

**Molecular Characterization of NKp44 Ligand on Astrocytes**  
Mathew, P.  
1/02/17 → 31/01/20

**NK CELLS: RECEPTORS, REPERTOIRE AND FUNCTION**  
YUAN, D., Bennett, M., Kumar, V., KUMAR, V., SCHATZLE, J., Bennett, M., KUMAR, V., YUAN, D., YUAN, D., Mathew, P. & MATHEW, P.  
30/09/95 → 31/08/04

**NKp44 Regulates Natural Killer Cell Effector Function through Recognition of Cell Surface PCNA(For: Nathan Horton)**  
Mathew, P.  
Intramural Research(UNTHSC)  
3/12/12 → 2/12/13