

Adaptive Responses of Natural Killer Cells Exhibit Distinct Requirements Among Members of the Ly49 Receptor Family

Gayani S Gamage¹, Daniel Medina-Luna¹, Michal Scur¹, Hagaag S Zein¹, Mir Munir A. Rahim² Brendon D Parsons¹, Andrew P Makrigiannis¹

¹Department of Microbiology and Immunology, Faculty of Medicine, Dalhousie University, 5850 College Street, Halifax, B3H 4H7, NS, Canada. ²Biological Sciences Department, University of Windsor, 450 Patricia Road, Windsor, N9B 3B9, ON, Canada

Introduction

Natural Killer (NK) Cell

- Innate lymphocytes that can rapidly mediate cytotoxicity and secrete cytokines when activated by infected, transformed or "stressed" cells

Ly49 Receptors

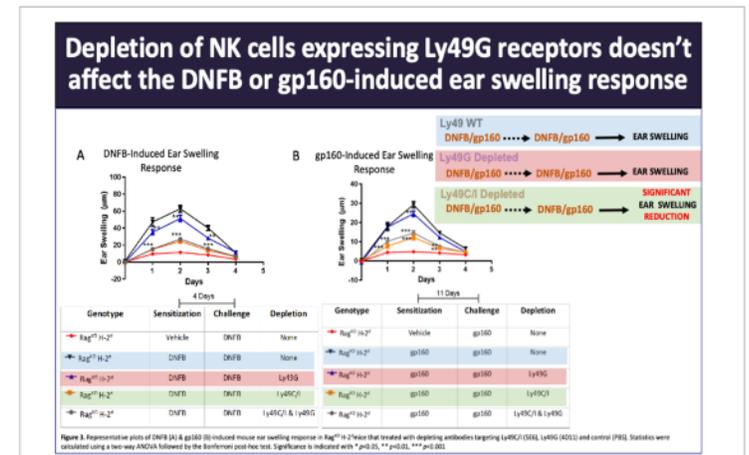
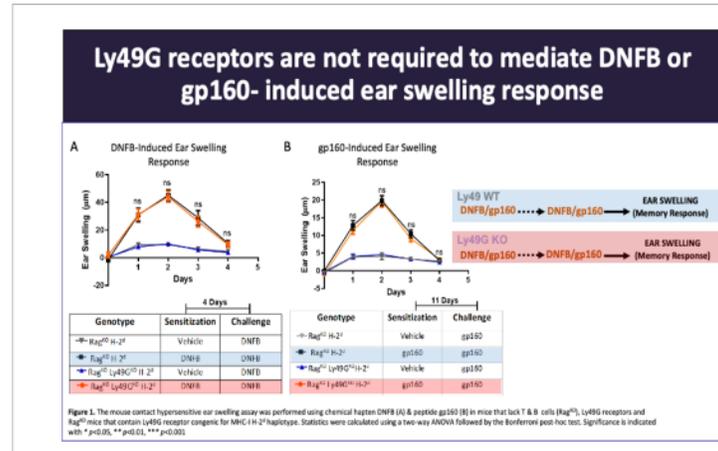
- MHC class-I specific receptors
- Highly polygenic & polymorphic receptor family
- Key regulators in NK cell functions & NK cell education

New Facet of NK cells: NK Cell Memory

- Immune memory is a hallmark of adaptive T & B cells
- Memory cells are
 - long-lived
 - antigen-specific
 - respond rapidly & robustly
- NK cells display characteristics of memory cells
- Ly49C/I are important for NK cell memory

Main Research Question

Are Ly49 receptor-mediated NK memory responses restricted to Ly49C and/or Ly49I or can other receptors of the Ly49 family contribute to the formation of NK memory?



Methods- Mouse Ear Swelling Assay

Research question: **What is the role of Ly49G receptors in mediating NK cell memory responses?**

Sensitization Phase

Haptens
Cutaneous D0 and D1

Peptides
Hock Inj D0 and D7

Rest Phase

4 or 11 days as indicated in each graph

Challenge Phase

Challenge Ear: Antigen in vehicle

Control Ear: Vehicle alone

Measure Ear Swelling

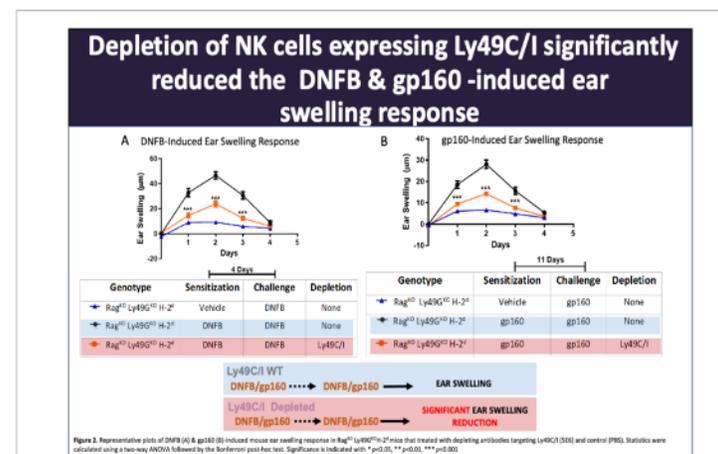
Ear swelling = [challenge ear thickness] - [control ear thickness]

Mouse Strains:

- Rag^{ko} H-2^d
- Rag^{ko} Ly49G^{ko} H-2^d

Expected results:

- If Ly49G mediates NK cell memory responses:
 - Ear swelling in Rag^{ko} H-2^d
 - No ear swelling in Rag^{ko} Ly49G^{ko} H-2^d



Conclusions & Future Directions

Conclusions

- Immune response strength
- Ly49G depleted
- Ly49C/I depleted

Chemical Hapten: DNFB, DNFB, DNFB

Peptide: gp160, gp160

Future Directions

- Determine the antigen-specificity of the Ly49 receptor-mediated NK cell memory
- Characterize the phenotypical features of the adaptive innate memory cells
- Analyze the pathway of the Ly49 receptor-mediated NK cell memory

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CIHR IRSC Canadian Institutes of Health Research
I3V