# Creating A Medical School-Oriented Map of Immunologic Concepts

Autumn Leggins and Jennifer Grier, PhD

University of South Carolina School of Medicine Greenville



#### Introduction

- Immunology is an important part of medical school curriculum
- Contextual mapping can aid in retention
- Commercial immune map resources are not helpful for medical students due to differences in focus of content
- As a result, students need to spend significant time sifting through the presented information and determine what is relevant for their studies and what is outside the scope

# Objective

 Create a novel mind map/concept map of immunologic processes with a focus on medically relevant information

## Methods: Immunology Map Creation

- 1.Test various mapping programs/apps for suitability in producing the immunology map.
- a. Platform Availability
- b. Easy of use w/ creating and customizing nodes, branches, and relationship arrows
- c. Formats available for map export, and presence of watermarks
- d. Fee for access to needed features on
- e. Regulations on commercial use.
- 2. Create a concise and useful key/legend to incorporate onto map.
- 3. Transfer and edit first draft of immunology map into chosen mapping program

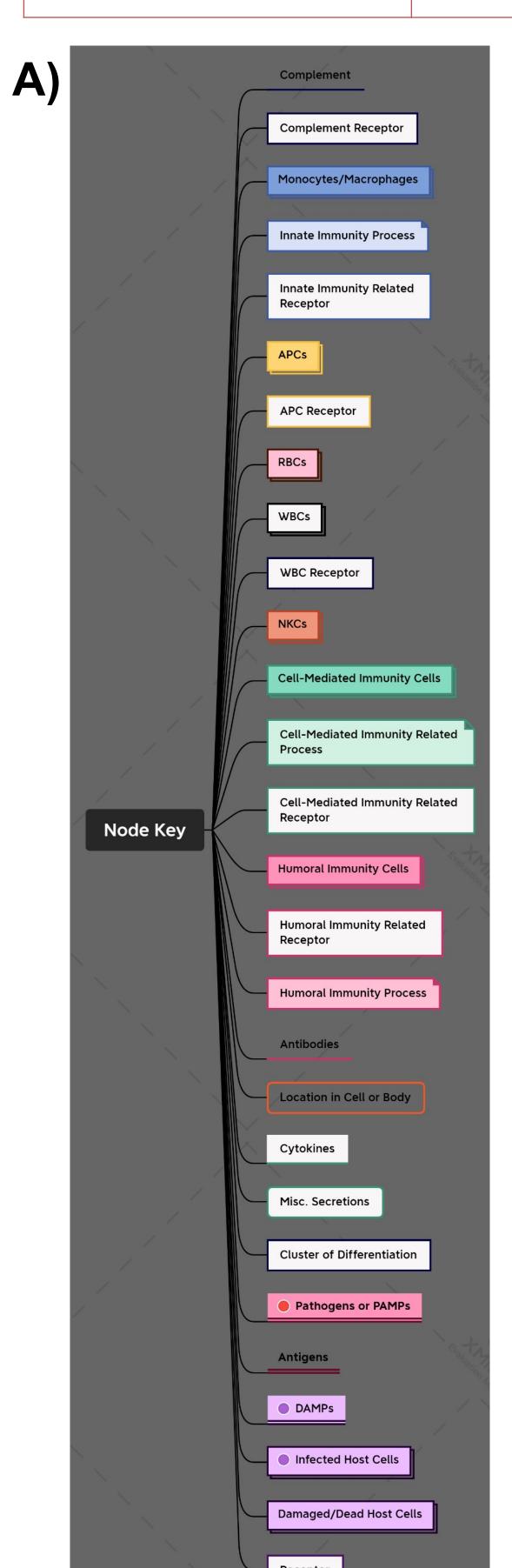
## Methods continued: Assessing the Immunology Map

- 4. Survey medical students on the effectiveness of the immunology map thus far.
  - a. Ease of use and effectiveness
  - b. Alignment of information to school and STEP 1 learning objectives
  - c. Visual presentation of the map
- 5. Optimize map based on student feedback.
- 6. Make immunology map available to medical students on a broad scale.

#### Results

## Table 1. Programs and apps tested, ranked highest to lowest in suitability

#1: ThinkSpace	#4: MiMind	#7: GitMind
#2: SimpleMind	#5: Mindomo	#8: MindNode, Mindly, MindMeister, Flowdia,
#3: XMind	#6: Miro	Mind Vector, MindMapX, WriteMapper



B) Branch Key: • Red Solid Line = [Parental Node] Kills/Destroys [Child Node] • Red Dotted Line = [Parental Node] Inhibits/Blocks [Child Node] • Orange Solid Line = [Parental Node] Moves to/ Recruited to [Child Node] Orange Dotted Line =[Parental Node] Located in/Within [Child Node] Yellow Solid Line = [Parental Node] Presents [Child Node] Yellow Dotted Line = [Parental Node] is Presented to [Child Node] Light Green Solid Line = [Parental Node] Enhances/Upregulates [Child Node] • Light Green Dotted Line = [Parental Node] Increases Affinity of [Child Node] • Dark Green Solid Line = [Parental Node] Activates/Initiates/Stimulates [Child Node • Mint Solid Line = [Parental Node] Begins Process of [Child Node] Mint Dotted Line = [Parental Node] Assists w/ Process of [Child Node] Light Blue Solid Line = [Parental Node] Recognizes [Child Node] • Light Blue Dotted Line = [Parental Node] Is Recognized by [Child Node] Cyan Solid Line = [Parental Node] Ingests/Phagocytizes [Child Node] • Dark Blue Solid Line = [Parental Node] Recruits [Child Node] • Navy Blue Solid Line = [Parental Node] Differentiates into [Child Node] • Light Purple Solid Line = [Parental Node] Contains [Child Node] Outside of it • Dark Purple Solid Line = [Parental Node] Contains [Child Node] Inside of it • Light Pink Solid Line = [Parental Node] Produces/Secretes [Child Node] • Light Pink Dotted Line = [Parental Node] Releases [Child Node] • Dark Pink Solid Line = [Parental Node] Includes [Child Node] as an Example Dark Pink Dotted Line = [Parental Node] Can be Described as [Child Node] Gray Solid Line = [Parental Node] Binds to [Child Node] Gray Dotted Line = [Parental Node] is Broken Down into [Child Node] Black Solid Line = [Parental Node] Causes/Leads to [Child Node] Black Dotted Line = [Parental Node] Weakly Causes/Leads to [Child Node]

Fig. 1. Nodes and
Branch
Characteristics
A) Key used to
designate node
coloration and
shape
B) Key used to
designate branch
and relationship
arrow coloration and
characteristic

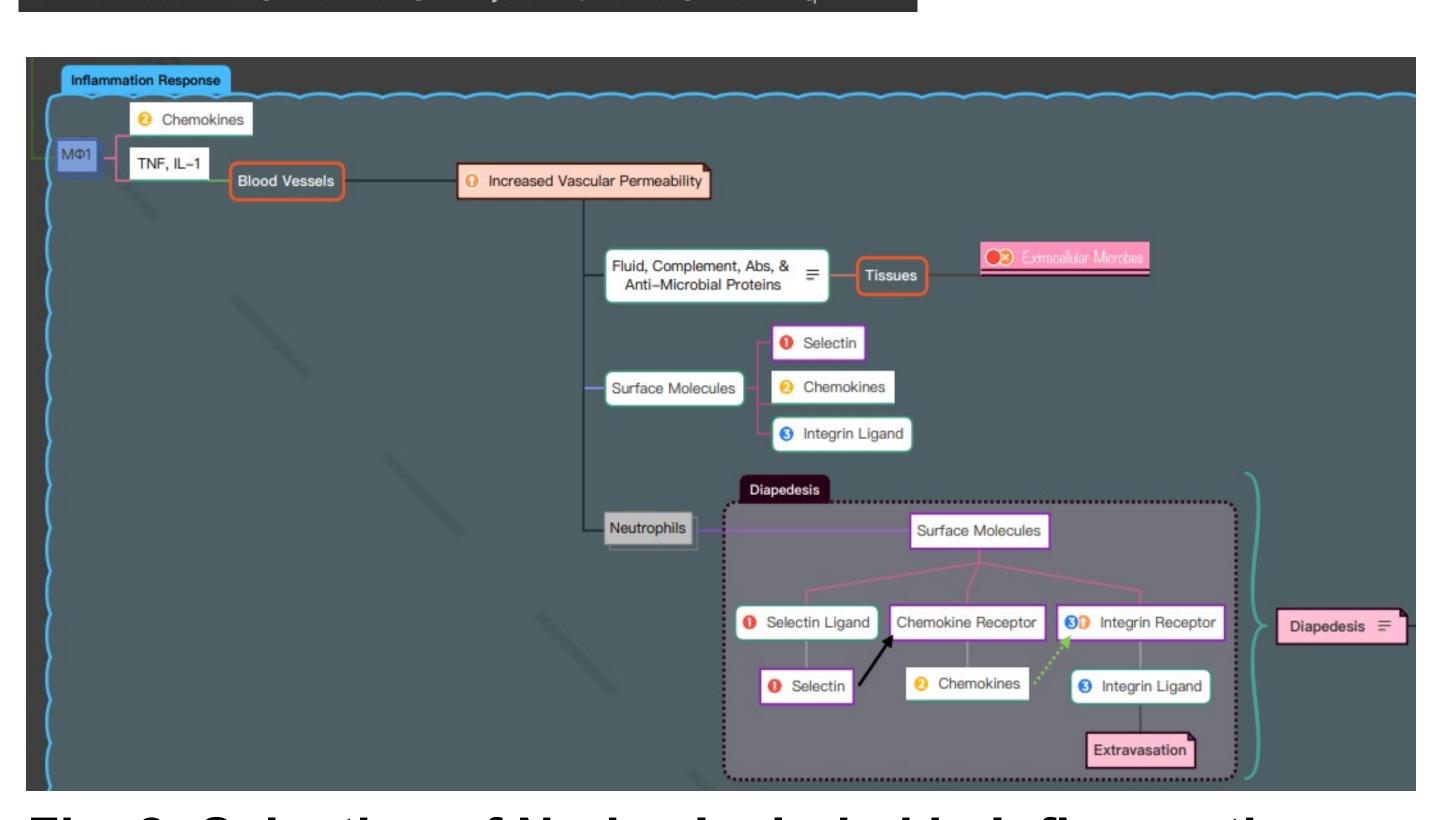


Fig. 2: Selection of Nodes Included in Inflammation Response Pathway in Innate Immunity Section

#### **Future Directions**

### Continue assessing programs

- First draft completed through XMind
- Why not use XMind app for continuation of project?
  - Not much freedom in spatial placement of child nodes around parental nodes
  - High annual subscription fee
  - Subscription needed to:
    - Export files with high enough image quality for detail
    - Export without watermark
    - Incorporate images
- Confirm commercial use regulations

## Optimize the Immune Map

- Streamline introductory details on immune cell functions
- Merge Innate, cell-mediated, and humoral immunity maps into a single map
- Reduce overlaps and repetitions in process descriptions
- Simplify color-designated meanings for node, branch, and arrow coloration and format

#### References

