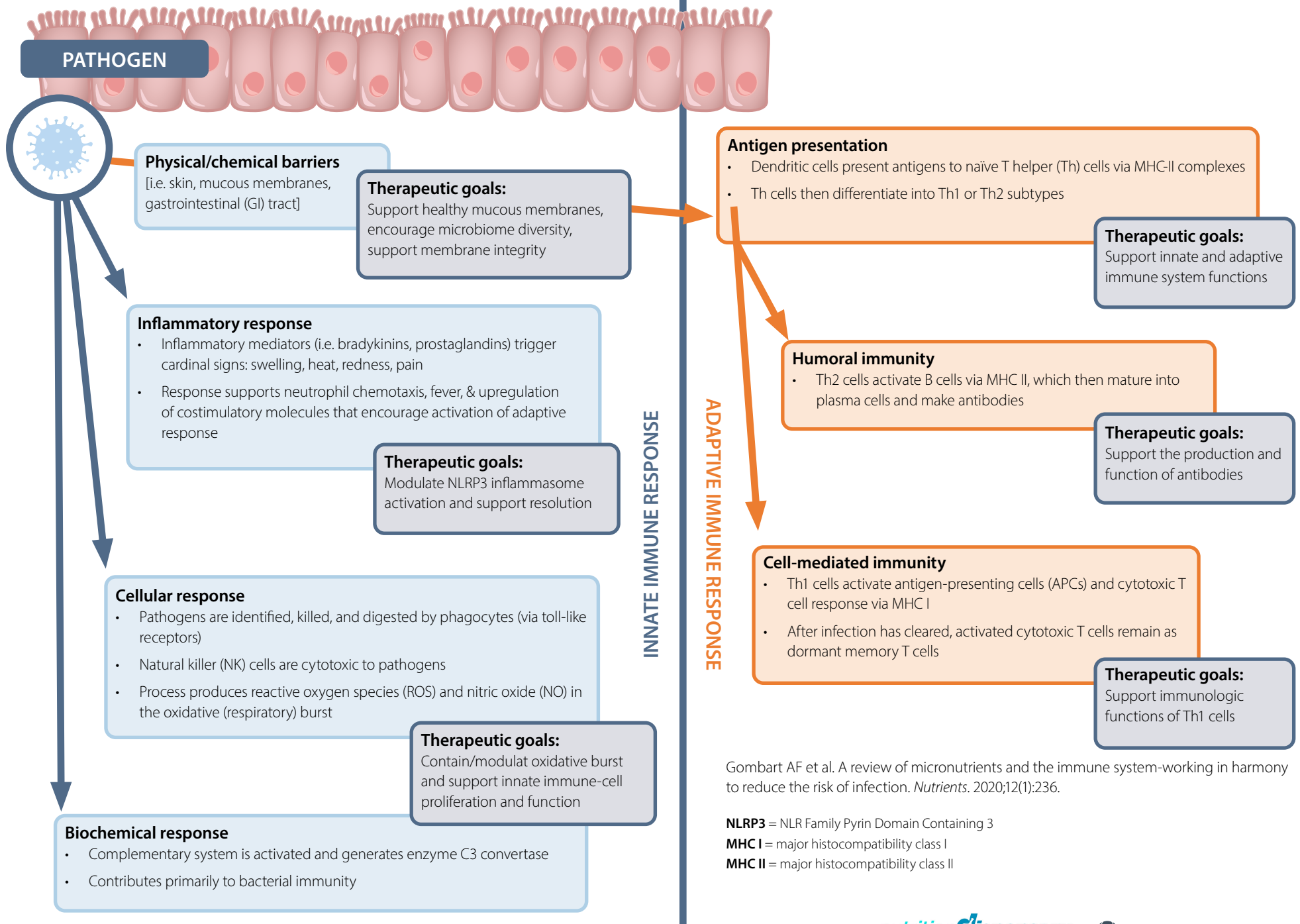


The Immune Response: Therapeutic Application of Micronutrients and Phytonutrients



Gombart AF et al. A review of micronutrients and the immune system-working in harmony to reduce the risk of infection. *Nutrients*. 2020;12(1):236.

NLRP3 = NLR Family Pyrin Domain Containing 3

MHC I = major histocompatibility class I

MHC II = major histocompatibility class II

Therapeutic Goal

Suggested Nutritional Bioactive¹⁻⁹

Prevention/maintenance

Support pillars of health (nutrition, stress management, sleep, movement) with lifestyle strategies and essential nutrients to promote immune health.

Essential bioactives to support immune health in the prevention and management of acute infections include:

- Vitamins A, C, D

- Selenium
- Zinc
- Probiotics
- Omega-3 fatty acids

Note: Therapeutic doses of vitamins A, C, and D as well as minerals, selenium and zinc, may be achieved from a good-quality multivitamin.

Support membrane integrity

Membranes (i.e. skin, mucous membranes, GI tract) of the external and internal surfaces of the body are the immune system's first lines of defense. Providing essential and targeted nutrients may help optimize barrier structure and function.

- N-acetyl cysteine (NAC)
- Quercetin

- Vitamins A, C, D
- Zinc

Promote microbiome health

A diverse microbiome may enhance and support a balanced immune response.

- Fiber
- Probiotics

Modulate inflammatory response

An exaggerated inflammatory response may contribute to a dysregulated immune response. Targeted nutrients may help modulate the NLRP3 inflammasome activation, enhance repair mechanisms, and support resolution.

- Curcumin
- Epigallocatechin gallate (EGCG)
- Melatonin
- NAC
- Omega-3 fatty acids

- Palmitoylethanolamide (PEA)
- Quercetin
- Specialized pro-resolving mediators (SPMs)
- Vitamin D

Reduce oxidative stress

Nutrients may support antioxidant capacity, contributing to a reduced oxidative burst and support for innate immune-cell proliferation and function.

- EGCG
- Medicinal mushrooms
- NAC

- PEA
- Vitamins A, C

Support innate immune cells

Provide supportive nutrients for the proliferation and function of innate immune cells (i.e. NK cells, macrophages, neutrophils).

- *Andrographis paniculata*
- Medicinal mushrooms

- Vitamins A, C, D

Support humoral immunity

Consider nutrients that support the production and function of antibodies.

- Vitamins A, C, D
- Zinc

Support cell-mediated immunity

Enhance the immunologic functions of Th1 cells and provide antimicrobial action with targeted nutrients.

- Berberine
- *Echinacea purpurea*
- *Perilla frutescens*
- Selenium

- *Thymus vulgaris*
- Vitamins A, C, D
- Zinc

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