



www.rahct.org.uk

Role of nutrition and infection strategies in HSCT

Mrs Laura Miller, RD

Haemato-oncology clinical lead dietitian

Nottingham University Hospitals NHS Trust, UK

Laura.miller@nuh.nhs.uk

Immune system

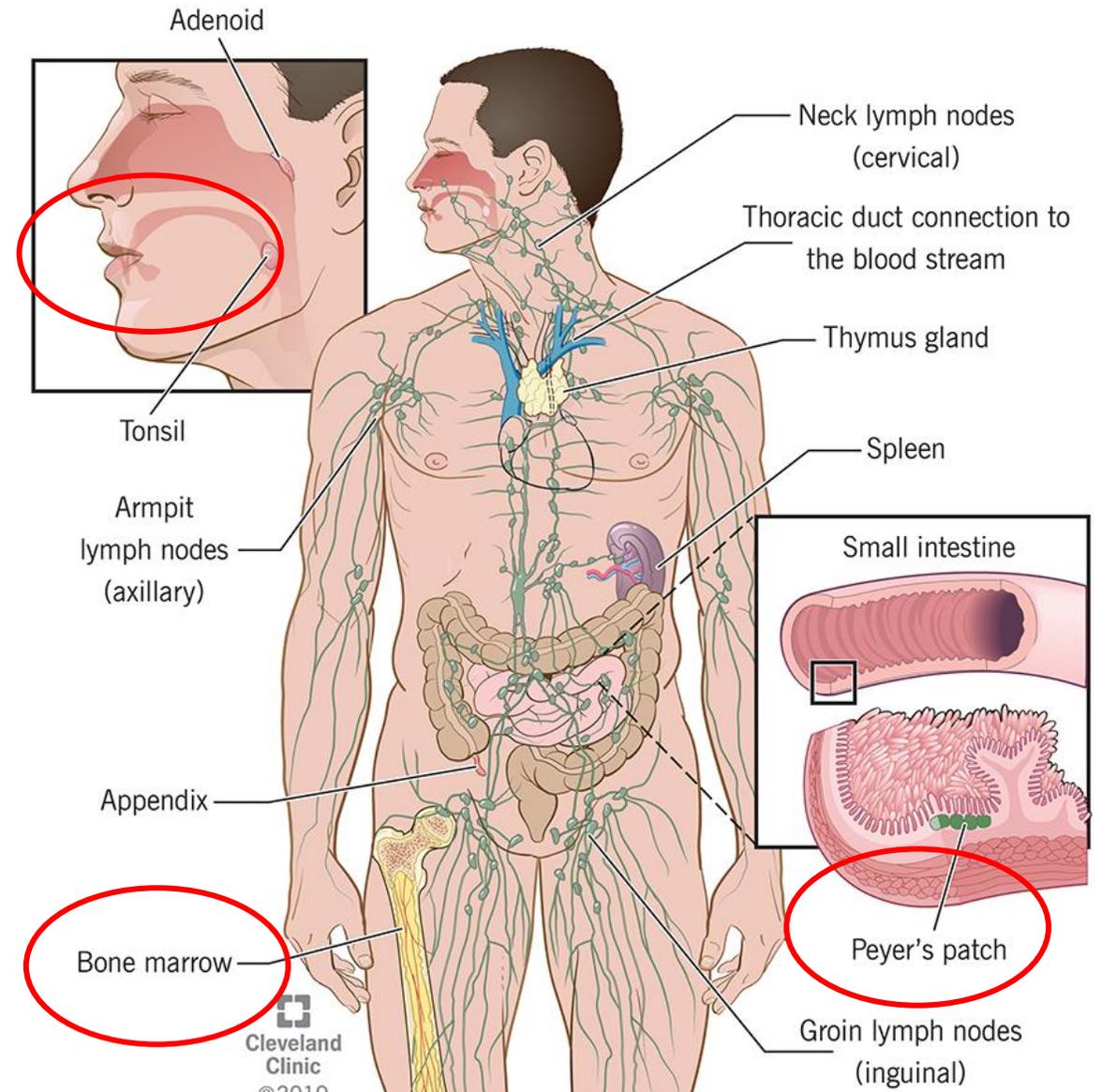


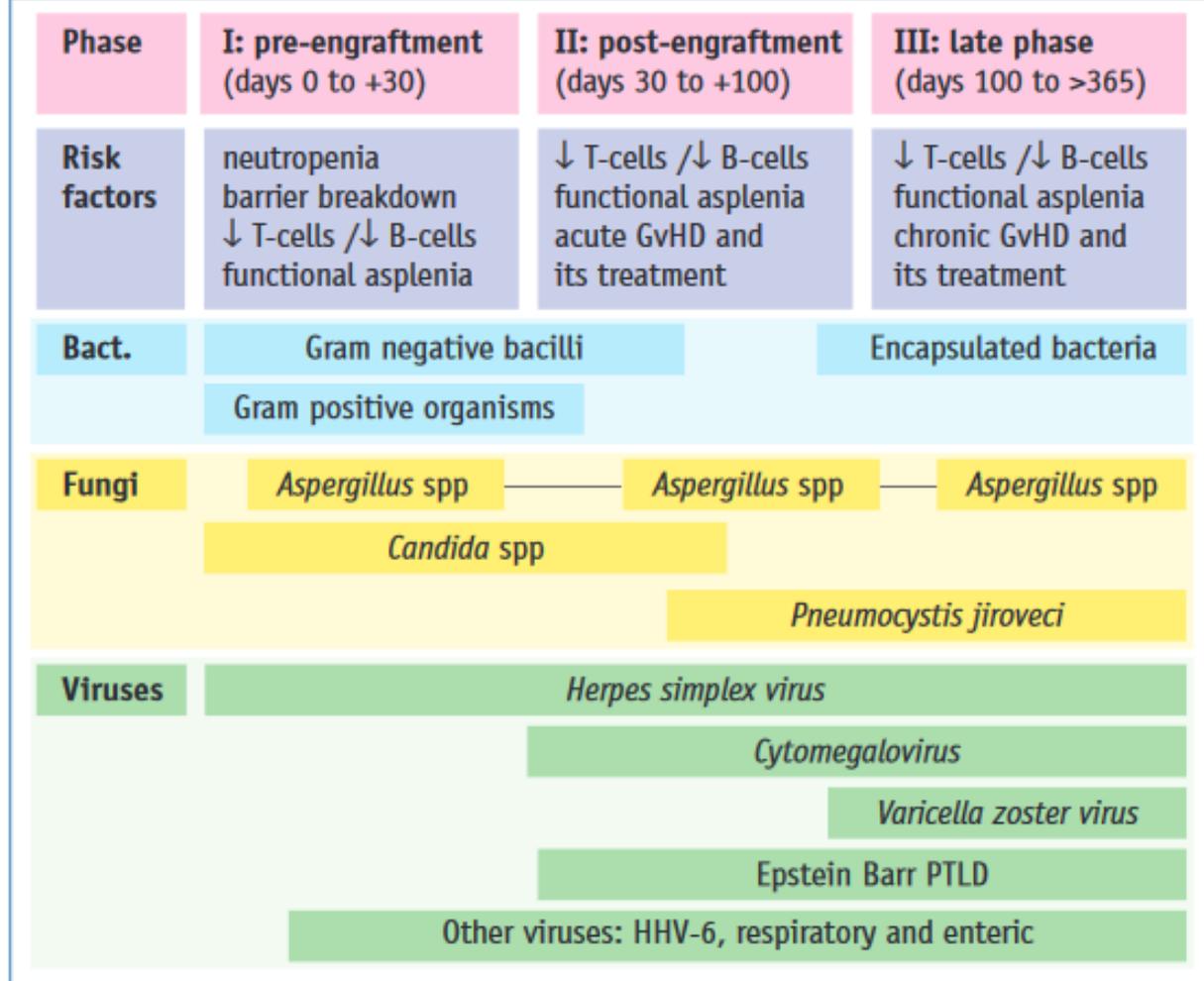
Image source

<https://my.clevelandclinic.org/health/articles/21196-immune-system>

Infections remain a main cause of morbidity and mortality in HSCT

Image source: EBMT handbook – Infection and HSCT

Figure 1: Chronology of predominant infections after HSCT



CORONAVIRUS

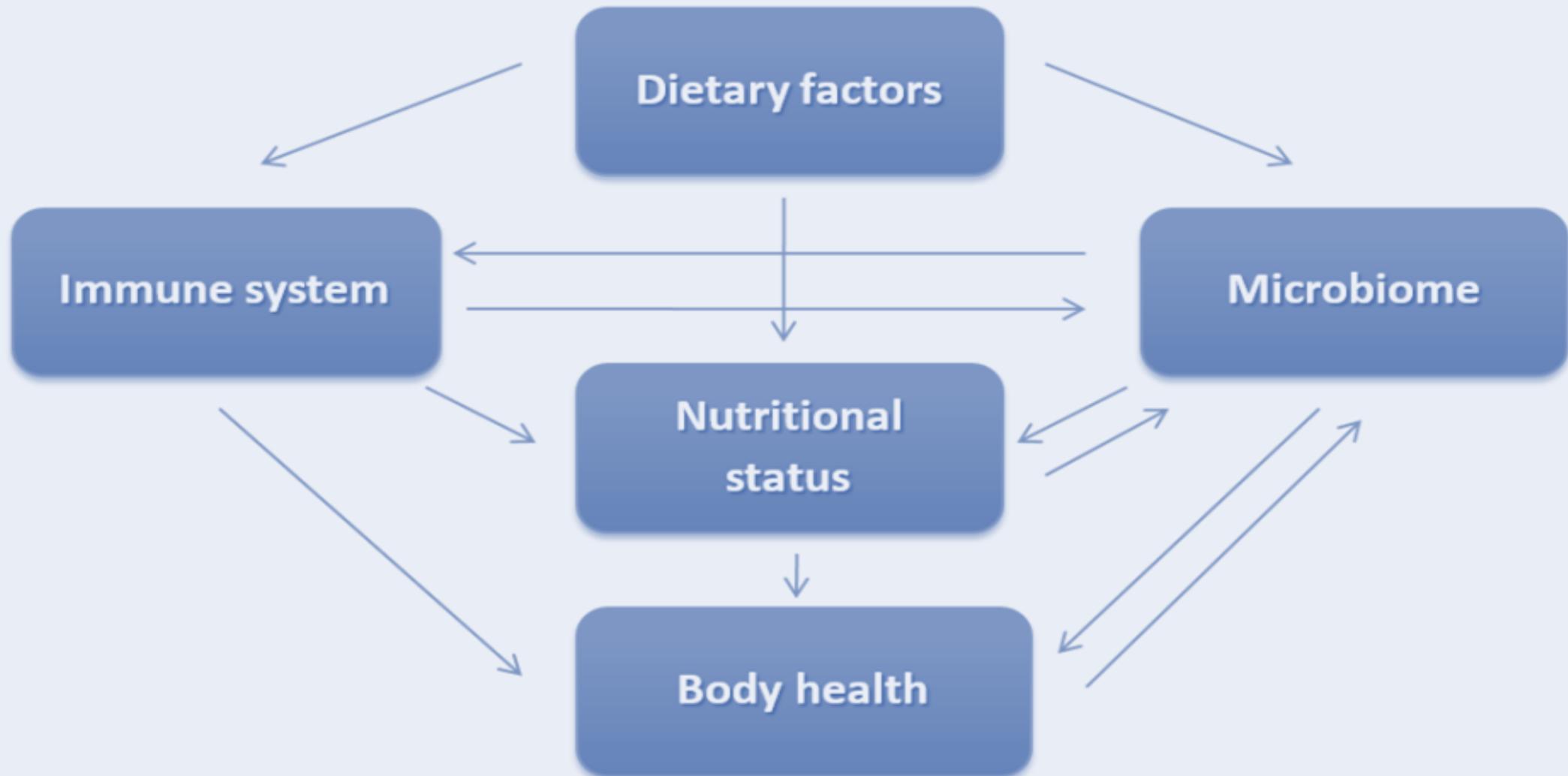
What increases risk?

- Haematological dx at HSCT
- Comorbidities i.e. diabetes
- Neutropenia
- Damage to physiological barriers i.e. severity of GvHD
- Immunosuppressive medications
- Variants: Type of HSCT, conditioning regimen, cell source, histocompatibility.



Image adapted from: https://www.hlbenefits.com/wp-content/uploads/2016/05/immune_system_food_nutrition_660x330.jpg

ImmunoNutrition



What is immunonutrition?

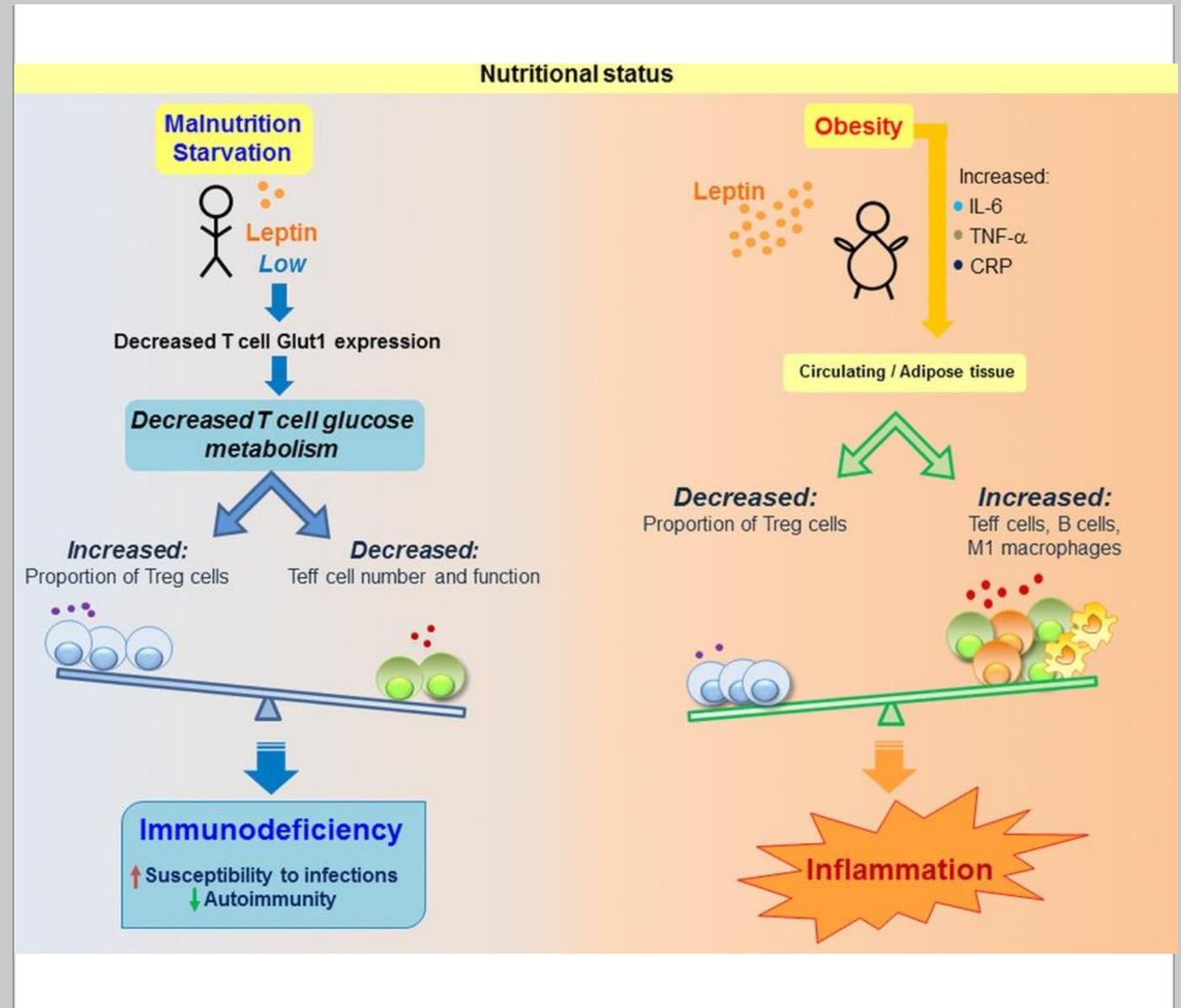
“Modulation of immune system activity, or the consequences of its activation, by nutrients or specific foods given in amounts above those normally encountered in the diet.”

- Delivered as single or multi-nutrient mixes; various delivery routes.
- “Immunonutrient mixes” include combinations of Vitamin A, D, E, zinc, arginine, glutamine, nucleotides, and omega 3 fatty acids (EPA).

Nutritional phenotype

- Higher fat to fat free mass – proinflammatory state
- High body fat, high fat diet and age influence adiposity of bone marrow altering bone marrow composition
- Dietary quality – affects immune cell synthesis & efficacy
- Malnutrition associated with increased infection risk

S. Cohen, K. Danzaki, N. J. Maciver. (2017).
European Journal of Immunology



Microbiota and HSCT

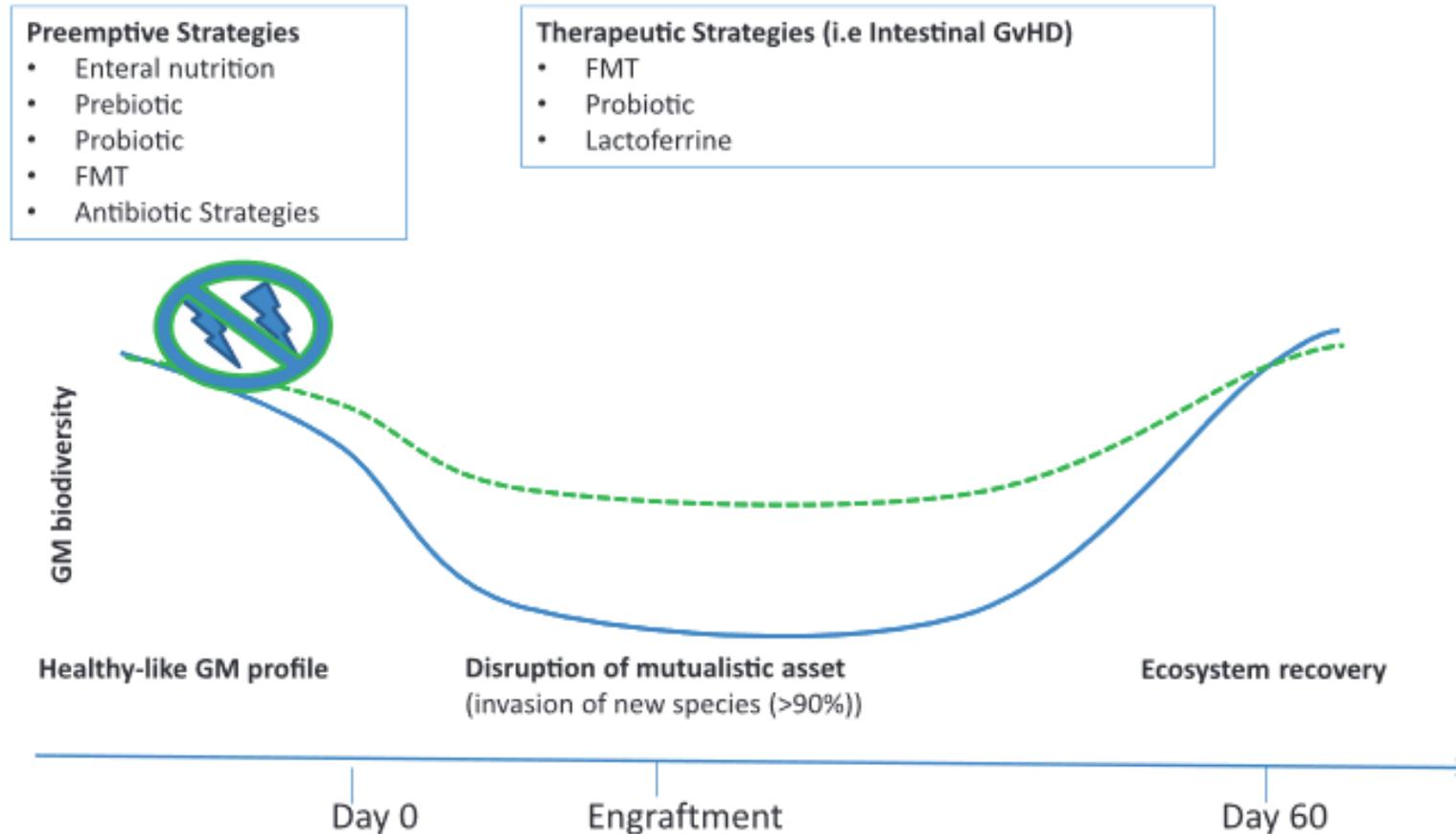


Figure 2. Potential strategies, preemptive and therapeutic, used for preventing or treating GM dysbiosis during HSCT are summarized.

GM, gut microbiota; HSCT, hematopoietic stem-cell transplantation. FMT – faecal microbiota transplant

Zama et al.,2020
[Ther Adv Hematol](#)

Other nutrition interventions and immune function in HSCT

- **Omega 3** – reduce severity of GvHD and vascular endothelial damage.(Takatsuka et al.,2002).
- **Glutamine** – swish and swill techniques of reconstituted glutamine powder has been shown to decrease severity of oral mucositis in autologous transplant (Anderson et al.,1998; Cockerham., 2000). In conclusive impact on infectious outcomes
- **Low bacterial diets** – inconclusive due to study design, ensure good food hygiene (Van Dalen, 2016)

Fish oils and inflammation

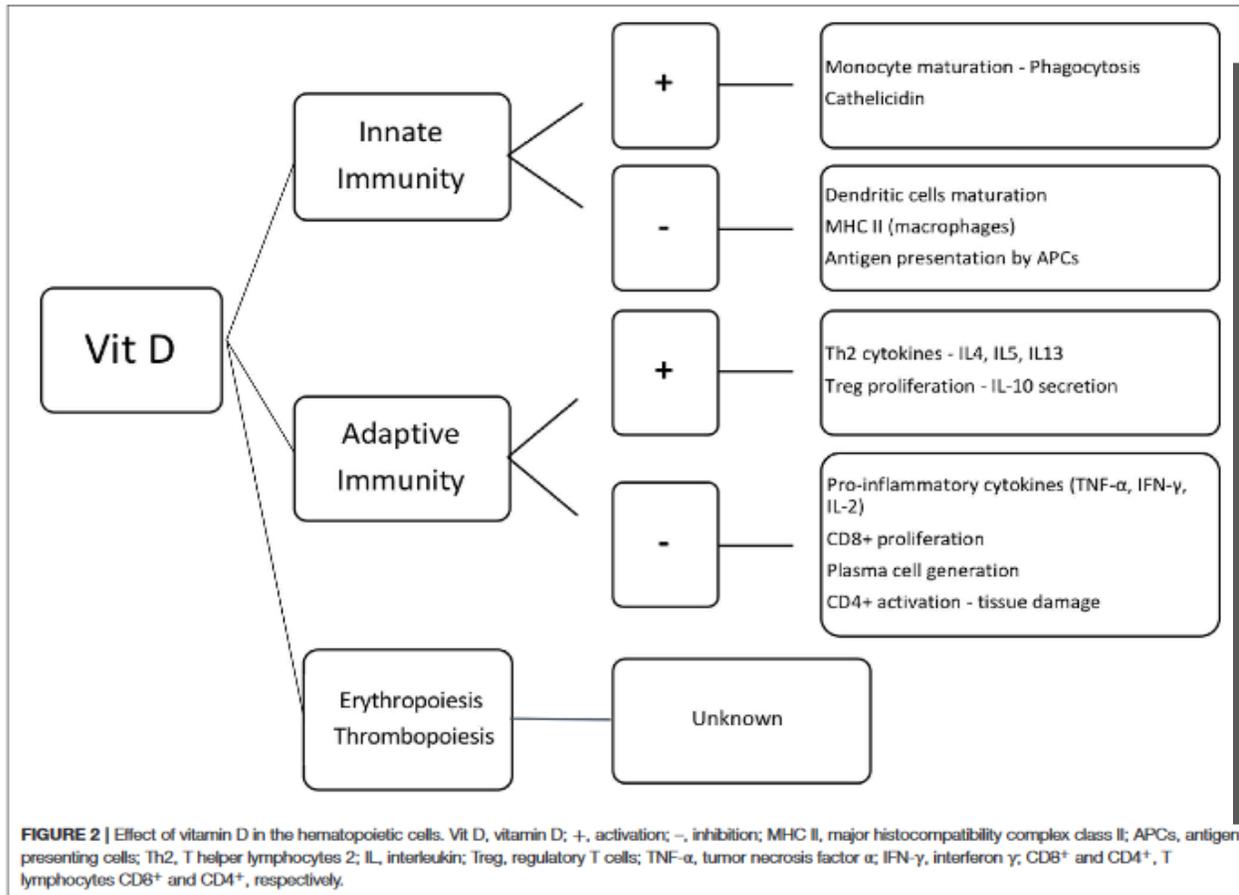
Omega-3 fatty acids: Docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA) have been shown to influence inflammatory responses but are poorly synthesised by the body.

Found in oily fish or fish oil derivatives

- Cell membranes have 10x more Aracadonic acid (Omega-6) than Omega-3 and can be higher with diets high in meat, offal and eggs
- Phospholipid breakdown during inflammation releases Aracadonic acid which is a precursor of potent proinflammatory mediators i.e. prostaglandins
- Eating more DHA/EPA, changes cell membrane composition, increasing Omega-3: Omega-6 ratio which is less anti-inflammatory state

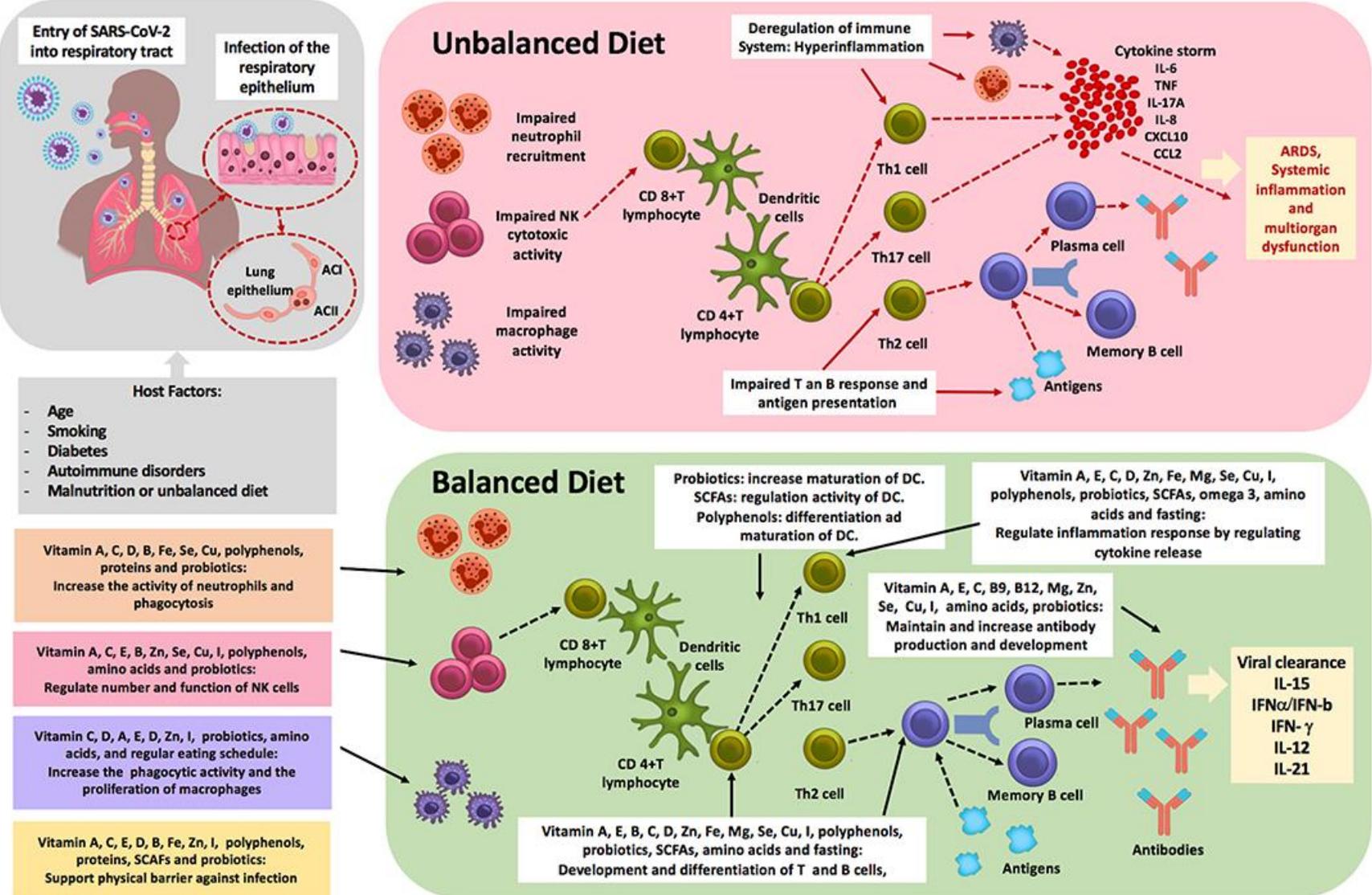
Vitamin D and HSCT

J. R. Soto et al. *Frontiers in Immunology* (2020)



- HSCT patients shown to have low Vitamin D levels
- Evidence for role of Vitamin D in immunity requires further investigation.

Nutrition, infection and COVID-19 (Chari et al., 2020)



Take Home Messages

- Being over or undernourished can affect your immune function
- Nutritional status is more than weight its body composition
- Fish oils may improve GvHD outcomes
- Glutamine – may help improve mucositis
- Hypovitaminosis may affect HSCT outcomes.
- Low bacterial diets – evidence is poor – good food hygiene is important but do not implement over-restrictive practices
- Improved dietary quality – may support microbiota diversity and immunity