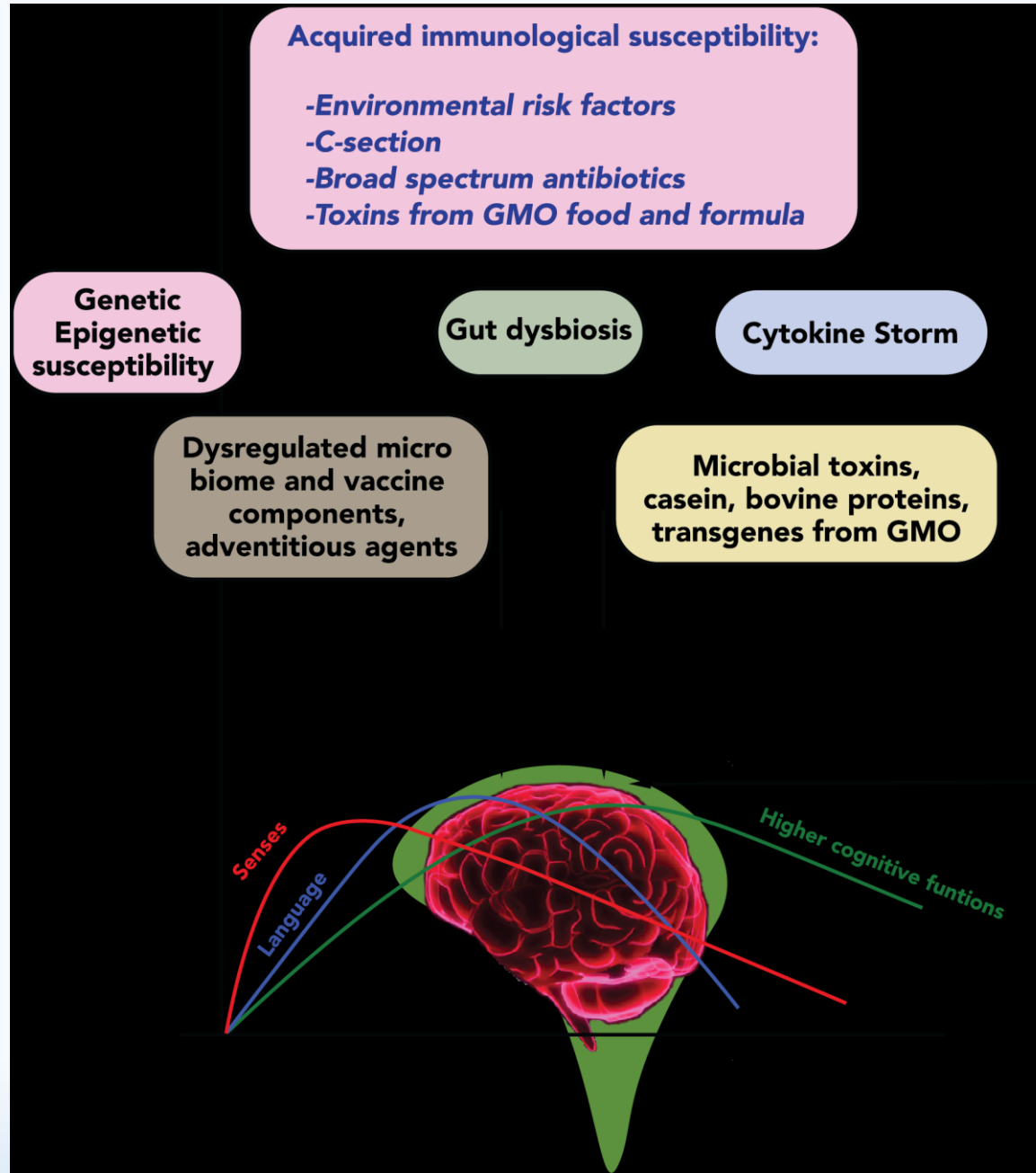


Chronic Diseases Once Rare now Familial Disease

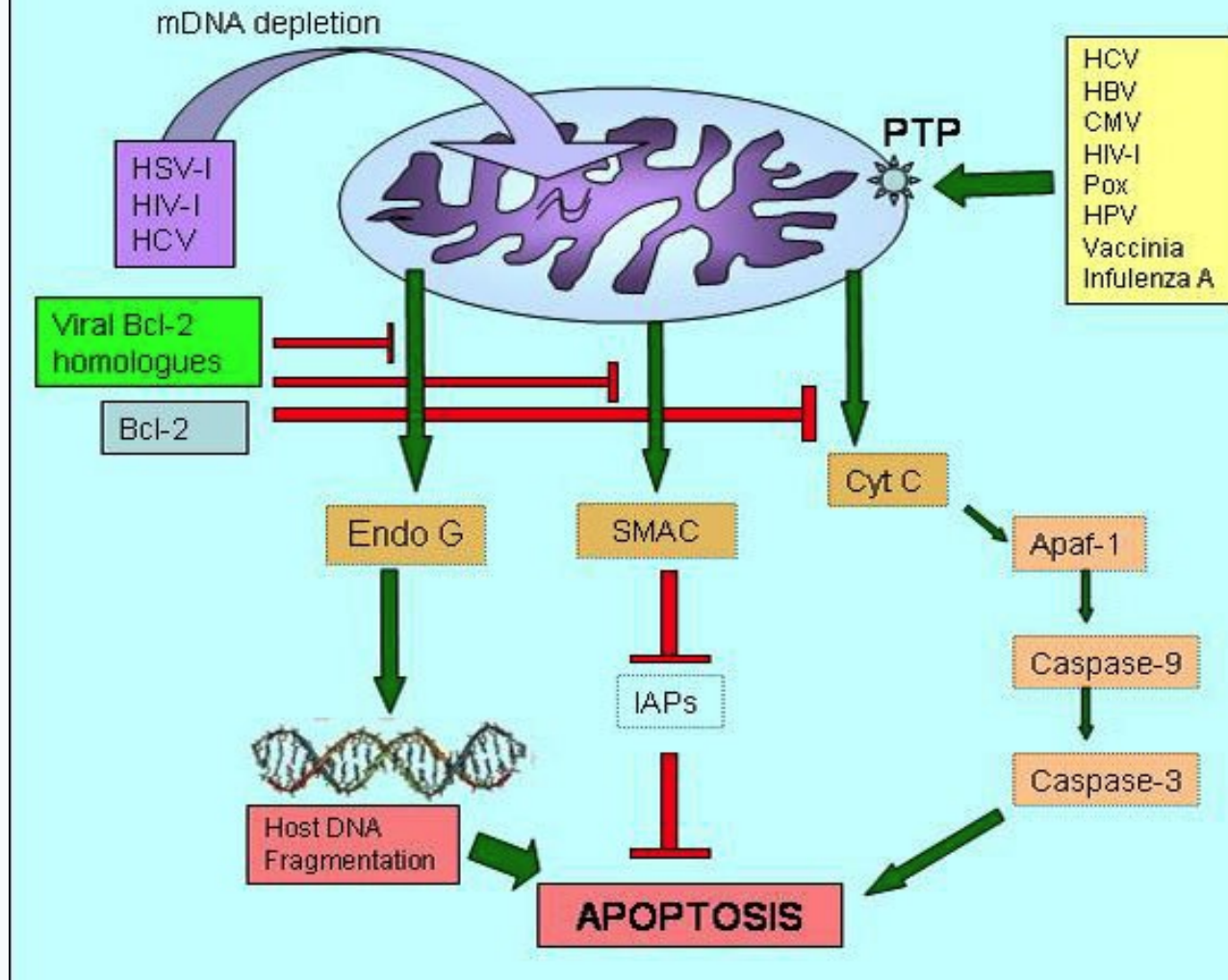
21st Century Acquired Immune Deficiencies (AIDS)

Cancer	Auto-Immune Diseases	CNS
Prostate*	Lupus	ME/CFS*
Breast*	Crohn's*	Gulf War Syndrome*
Multiple Myeloma*	Hashimoto's Thyroiditis*	Autism/ASD*
Non Hodgkin's Lymphoma*	Polymyositis	MS*
Chronic Lymphocytic Leukemia*	Sjogren's syndrome	Parkinson's*
Mantle Cell Lymphoma*	Bechet's Disease*	ALS*
Hairy Cell Leukemia	Primary Biliary Cirrhosis*	Fibromyalgia
Bladder*	IBD*	Chronic Lyme Disease*
Colorectal	Psoriasis, dermatitis	OCD
Kidney*		ADHD
Ovarian*		
* RT Activity, RV sequences or proteins, antibodies to RV proteins		

Acquired Immunological Susceptibility to Chronic Inflammatory diseases



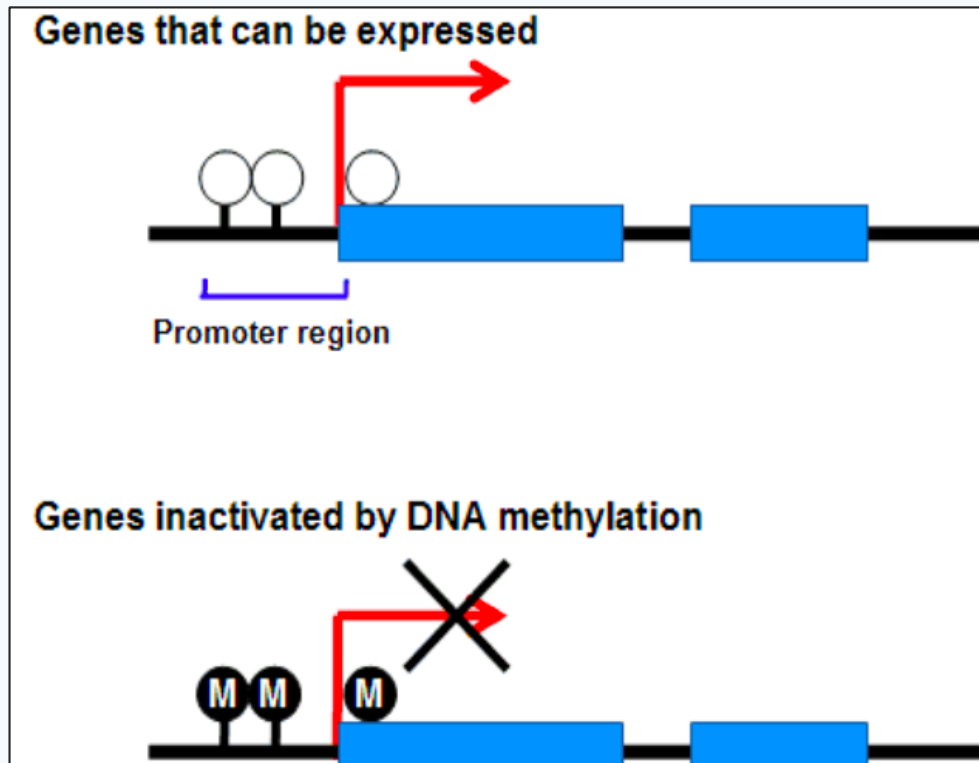
Virus - Mitochondria interactions



Vaccine and Infectious
Disease Organization and
Dept. of Veterinary
Microbiology
University of
Saskatchewan

Recent advance in genomic technologies have identified ~1000 nuclear genes that regulate mitochondrial function ...

The Key IS EPIGENETICS: the Expression of the gene and the Tissue Context



Molecular and Cellular Biology

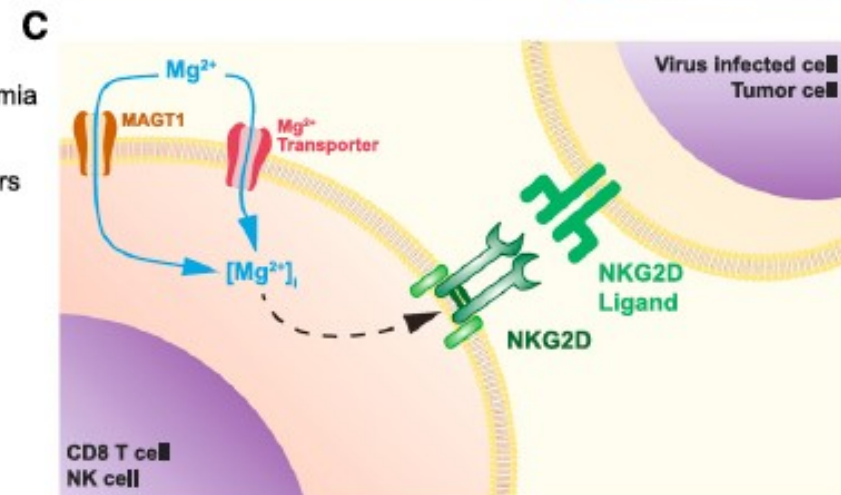
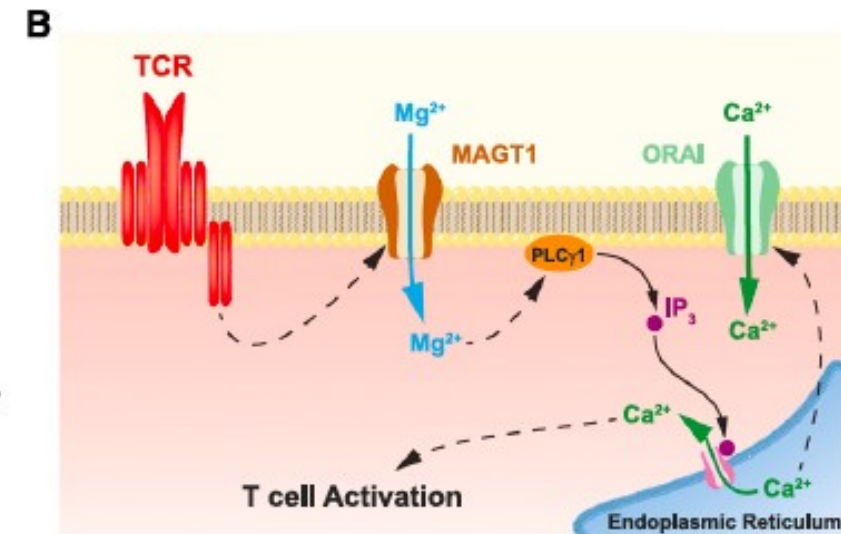
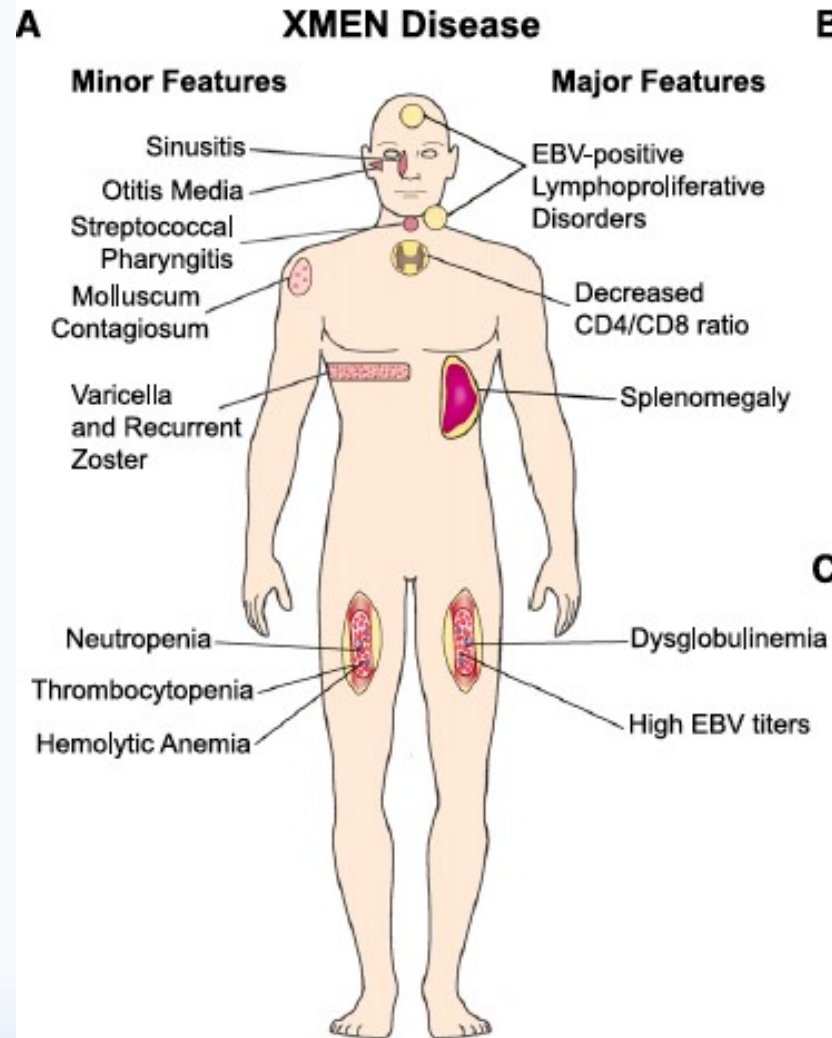
Infection with Human Immunodeficiency Virus Type 1 Upregulates DNA Methyltransferase, Resulting in De Novo Methylation of the Gamma Interferon (IFN- γ) Promoter and Subsequent Downregulation of IFN- γ Production

Judy A. Mikovits, Howard A. Young, Paula Vertino, Jean-Pierre J. Issa, Paula M. Pitha, Susan Turcoski-Corrales, Dennis D. Taub, Cari L. Petrow, Stephen B. Baylin and Francis W. Ruscetti
Mol. Cell. Biol. 1998, 18(9):5166.

Retroviruses, heavy metals, genetically modified organisms, and environmental toxins:
Drivers of Evolution/Devolution by way of alteration DNA Methylation/ Gene Expression

XMEN disease: a new primary immunodeficiency affecting Mg^{2+} regulation of immunity against Epstein-Barr virus

Feng-Yen Li,^{1,2} Benjamin Chaigne-Delalande,¹ Helen Su,³ Gulbu Uzel,⁴ Helen Matthews,¹ and Michael J. Lenardo¹



In Chronic Diseases Viruses Seldom Come Alone

Synergy in Immune Dysregulation

Table 1. Mechanisms of Interactions between HIV-1 and Coinfecting Viruses

Mechanisms	Viruses
Immunoactivation	HCV, HSV-2, CMV, EBV, HTLV-2 ^A
HIV-1 <i>trans</i> -activation	HSV-2, HTLV-1, JCV ^A
Abnormal production of chemokines	HTLV-1, HHV-6, HTLV-2, MV, GBV-C
CD4, CCR5, or CXCR4 downregulation	HHV-7, GBV-C
Expression of virokines and viroceptors	CMV, HHV-6, HHV-7
Blockage of CD4 T cell cycle	MV
Modulation of cytokine signaling	EBV, adenovirus
Inhibition of apoptosis	CMV, EBV
Aberrant activation of autologous complement	HHV-6, HHV-7
MHC downregulation	CMV, HHV-6, HHV-7

War and Peace between Microbes: HIV-1 Interactions with Coinfecting Viruses:
Cell Host & Microbe 6, November 19, 2009 A. Lisco, C Vanpouille, & L Margolis

A Question of Balance

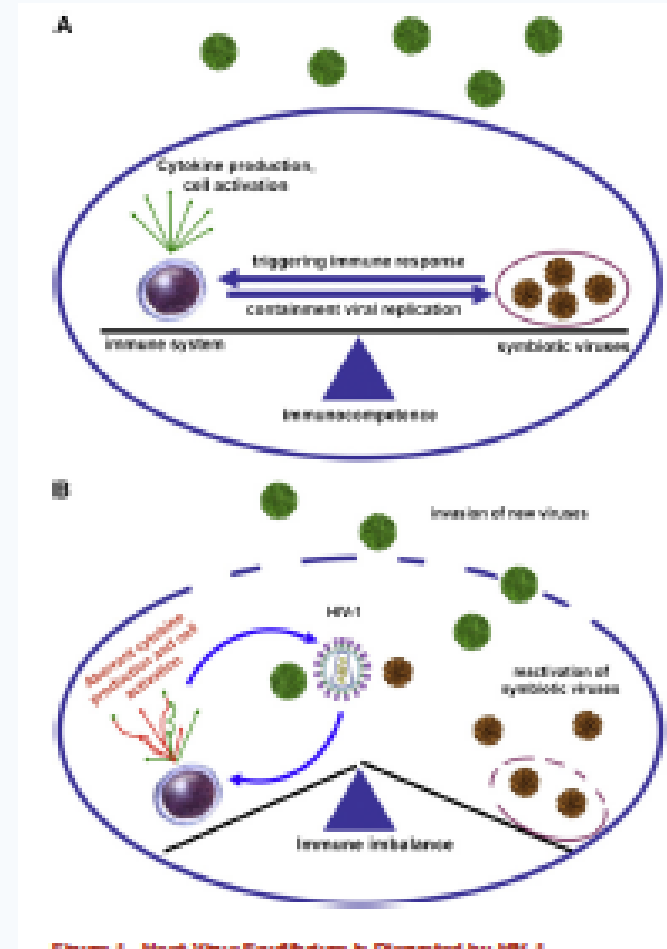


Figure 1. Host-Virus Equilibrium is Disrupted by HIV-1

Gut Dysbiosis Promotes M2 Macrophage Polarization and Allergic Airway Inflammation via Fungi-Induced PGE₂

Yun-Gi Kim,^{1,2,5} Kankanam Gamage Sanath Udayanga,^{1,2} Naoya Totsuka,^{1,2} Jason B. Weinberg,⁴ Gabriel Núñez,⁵ and Akira Shibuya^{1,2,3,*}

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<http://dx.doi.org/10.1016/j.chom.2013.12.010>

Celebrex

Only certain antibiotics promote fungal overgrowth in the gut, suggesting
Specific commensal bacteria have the ability to prevent colonization of Candida

New Technologies provide new opportunities for drug repurposing:

Comprehensive Sequence Analysis of Nuclear mitochondrial genes

- NGS for variants in the nuclear mitochondrial exome that contribute to neurological disorders whose symptoms resemble mitochondrial disease.

Case Reports In CFS patients Results:

- Abnormal autosomal dominant Variant was found in SCN4A gene that is likely a pathological mutation
 - Pathological mutations found in two other patients also with multiple functional conditions (ME/CFS)
-
- Drugs targeting channelopathies (Diamox)
 - mitochondrial targets mTOR (Rapamycin)
 - apoptosis

Toxicity from Chronic Immuno-stimulation

