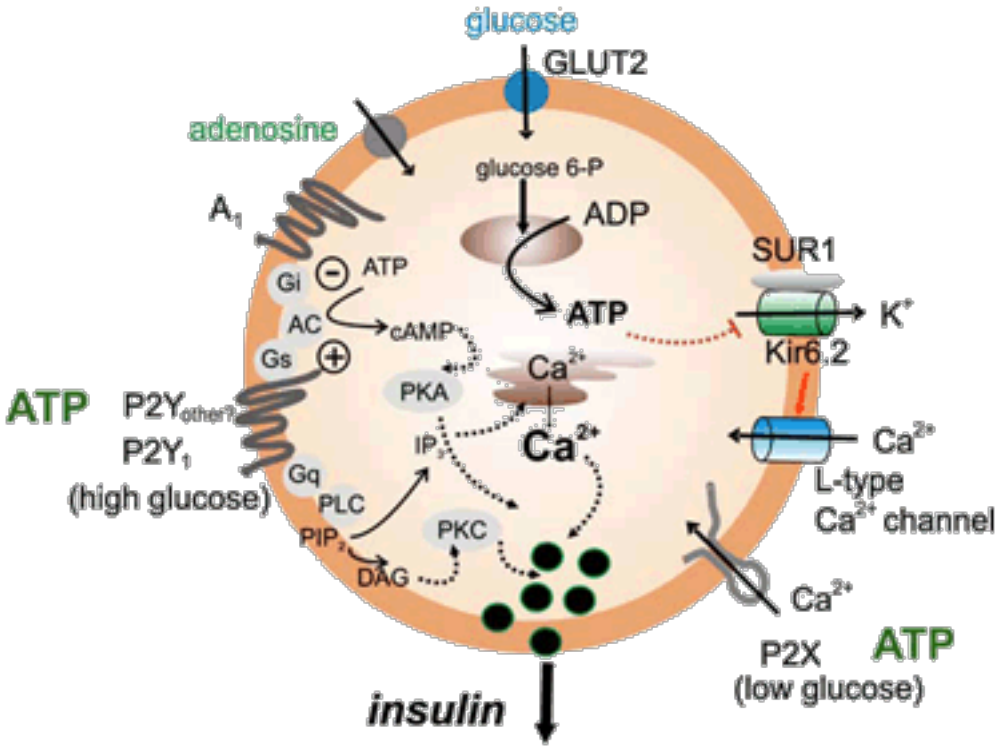
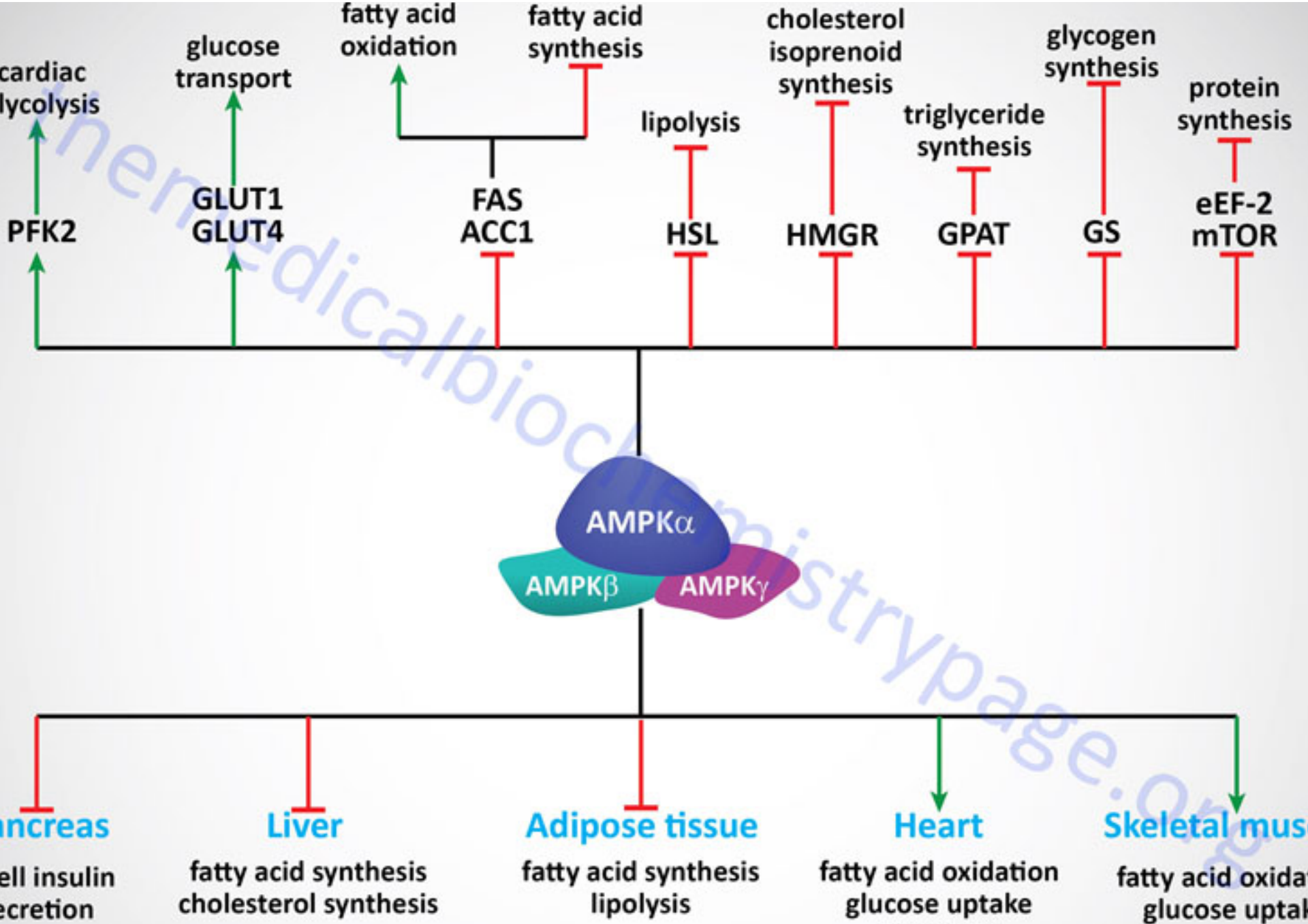
TYPE 1 DIABETES

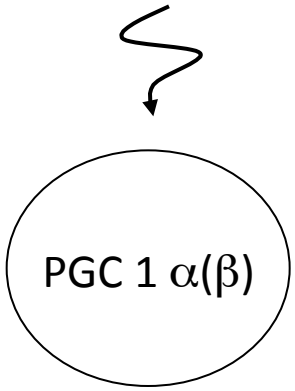
A disease of mitochondrial dysfunction?

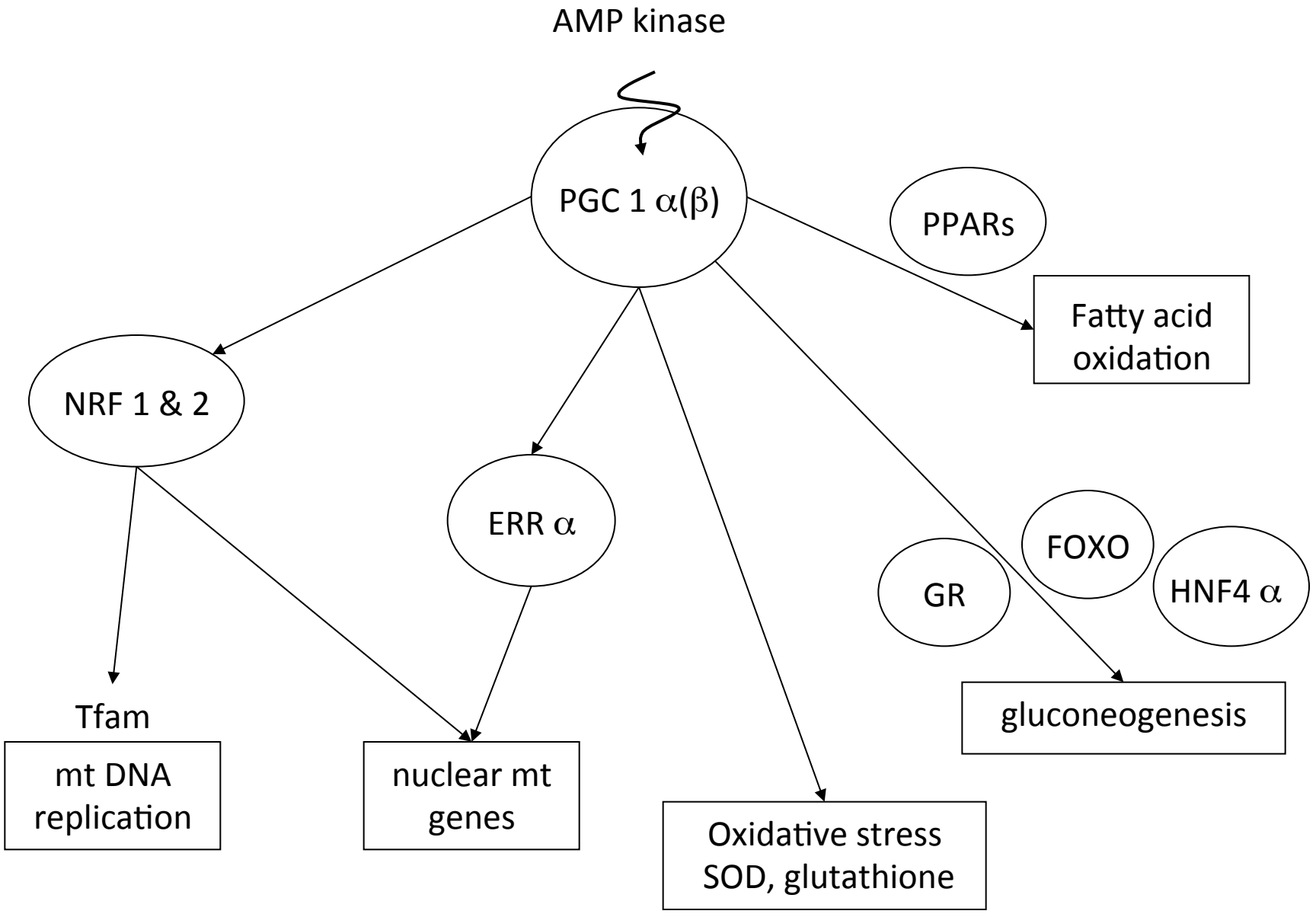
Ca2+

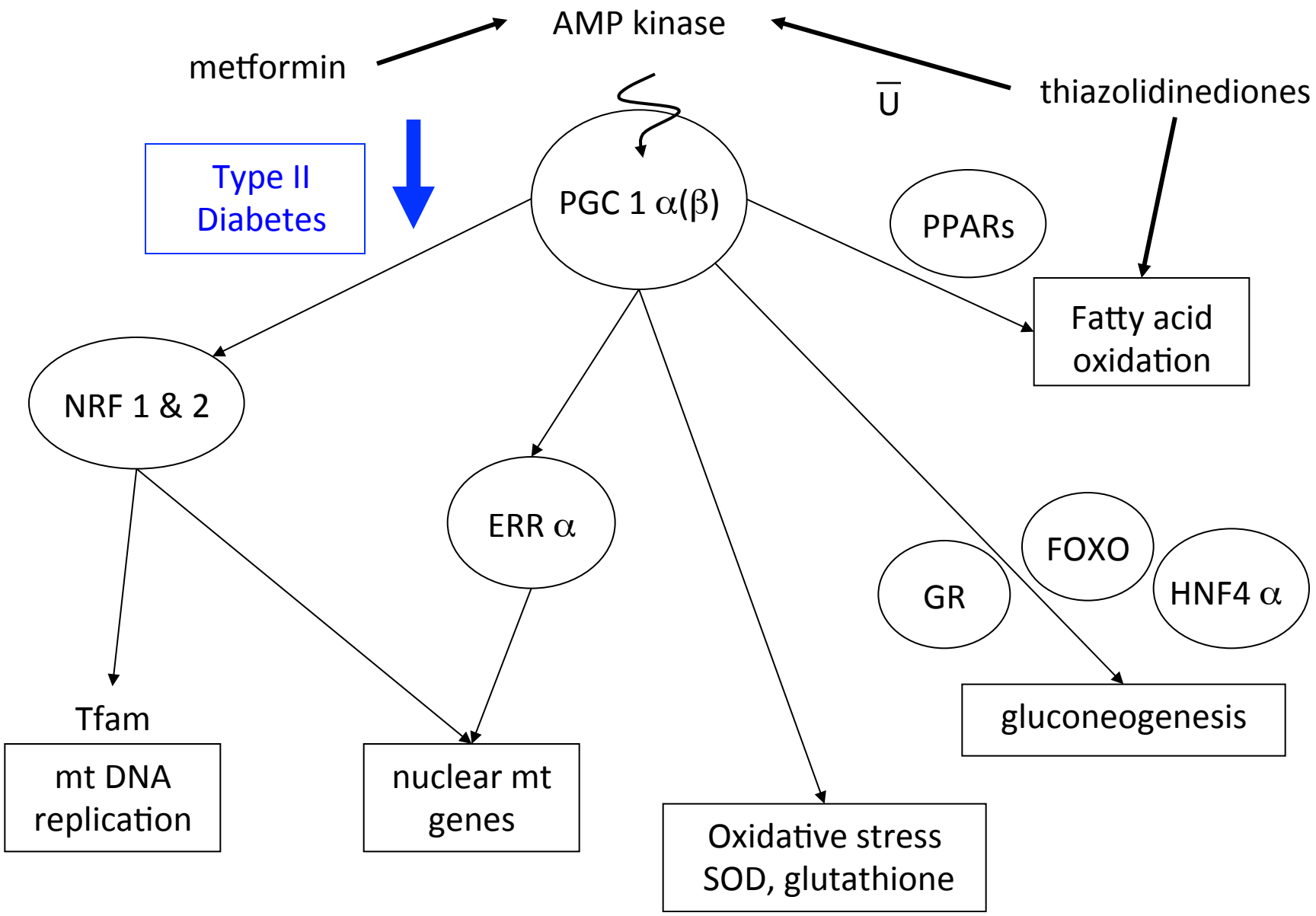

glucose
GLUT2
adenosine
glucose 6-P
ADP
A1
Gi
ATP
AC
cAMP
ATP
SUR1
K+
Kir6.2
Gs
PKA
Ca2+
ATP
P2Y other?
P2Y1
(high glucose)
IP3
Ca2+
Ca2+
L-type
Ca2+ channel
Gq
PLC
PIP2
PKC
DAG
Ca2+
P2X
ATP
(low glucose)
insulin



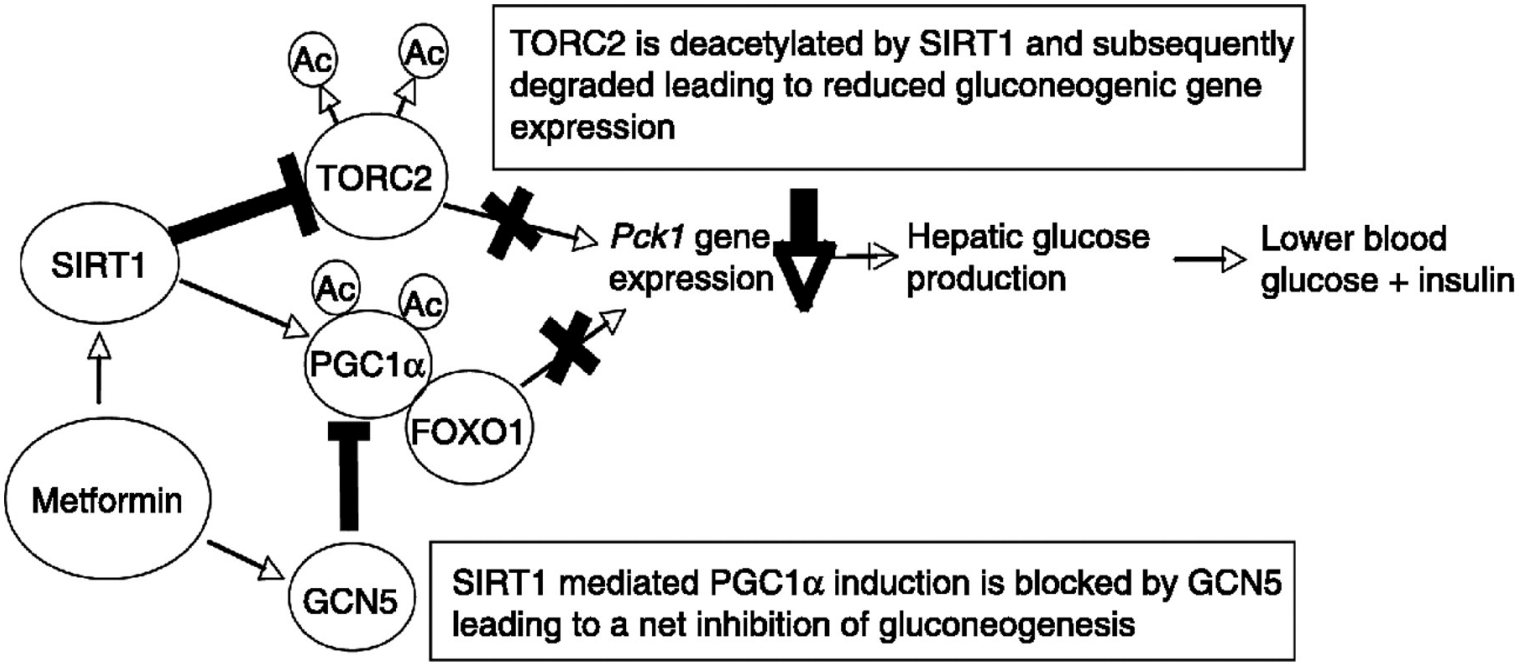
AMP kinase




AMP kinase
PGC 1 α(β)
PPARs
Fatty acid oxidation
NRF 1 & 2
ERR α
FOXO
GR
HNF4 α
Tfam
mt DNA replication
nuclear mt genes
Oxidative stress SOD, glutathione
gluconeogenesis


AMP kinase
metformin
thiazolidinediones
Type II Diabetes
PGC 1 α(β)
PPARs
Fatty acid oxidation
NRF 1 & 2
ERR α
FOXO
GR
HNF4 α
Tfam
mt DNA replication
nuclear mt genes
Oxidative stress SOD, glutathione
gluconeogenesis

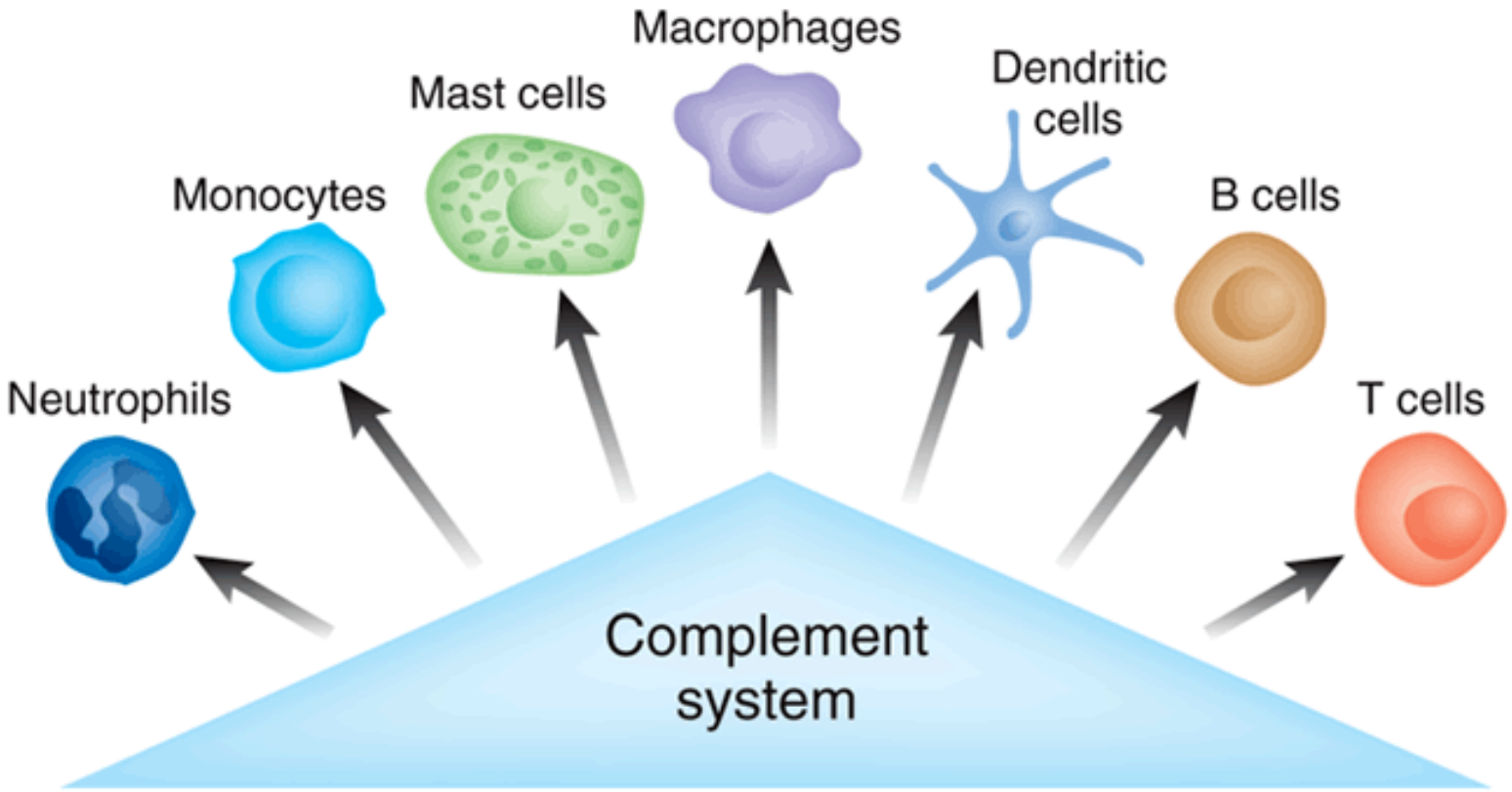
Metformin reduces gluconeogensis



LATE ONSET TYPE 1 DIABETES

an autoimmune disease

induced by many different stressors



Innate immunity

Opsonization
Lysis of pathogens
Chemotaxis
Inflammation
Cell activation

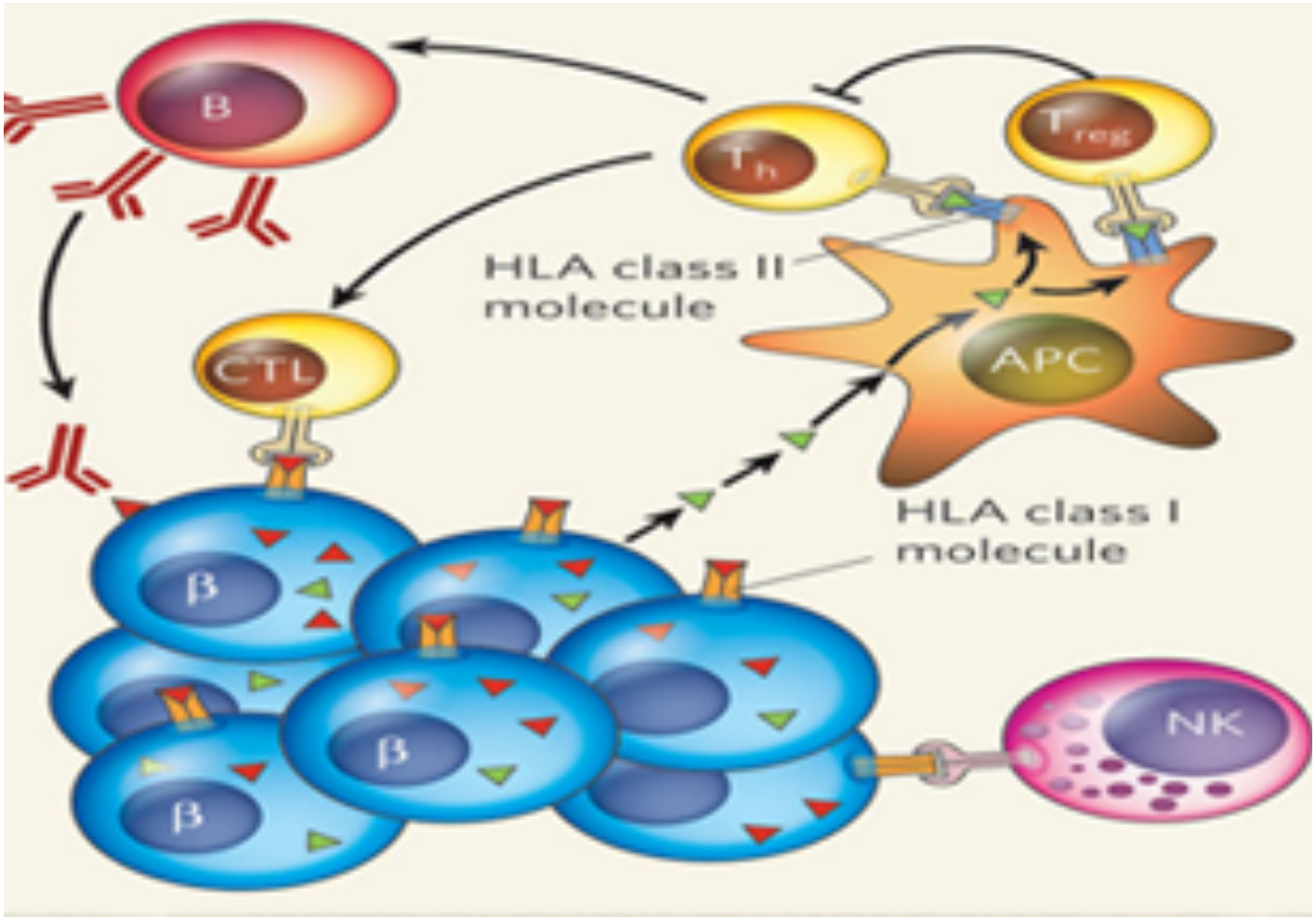
Disposal system

Clearance of immune complexes and apoptotic cells

Adaptive immunity

Augmentation of antibody response
Promotion of T-cell response
Elimination of self-reactive B cells
Enhancement of immunologic memory

Katie Ris-Vicari



APC antigen presenting cells
B B-lymphocytes
HLA human leukocyte antigen
NK natural killer cells