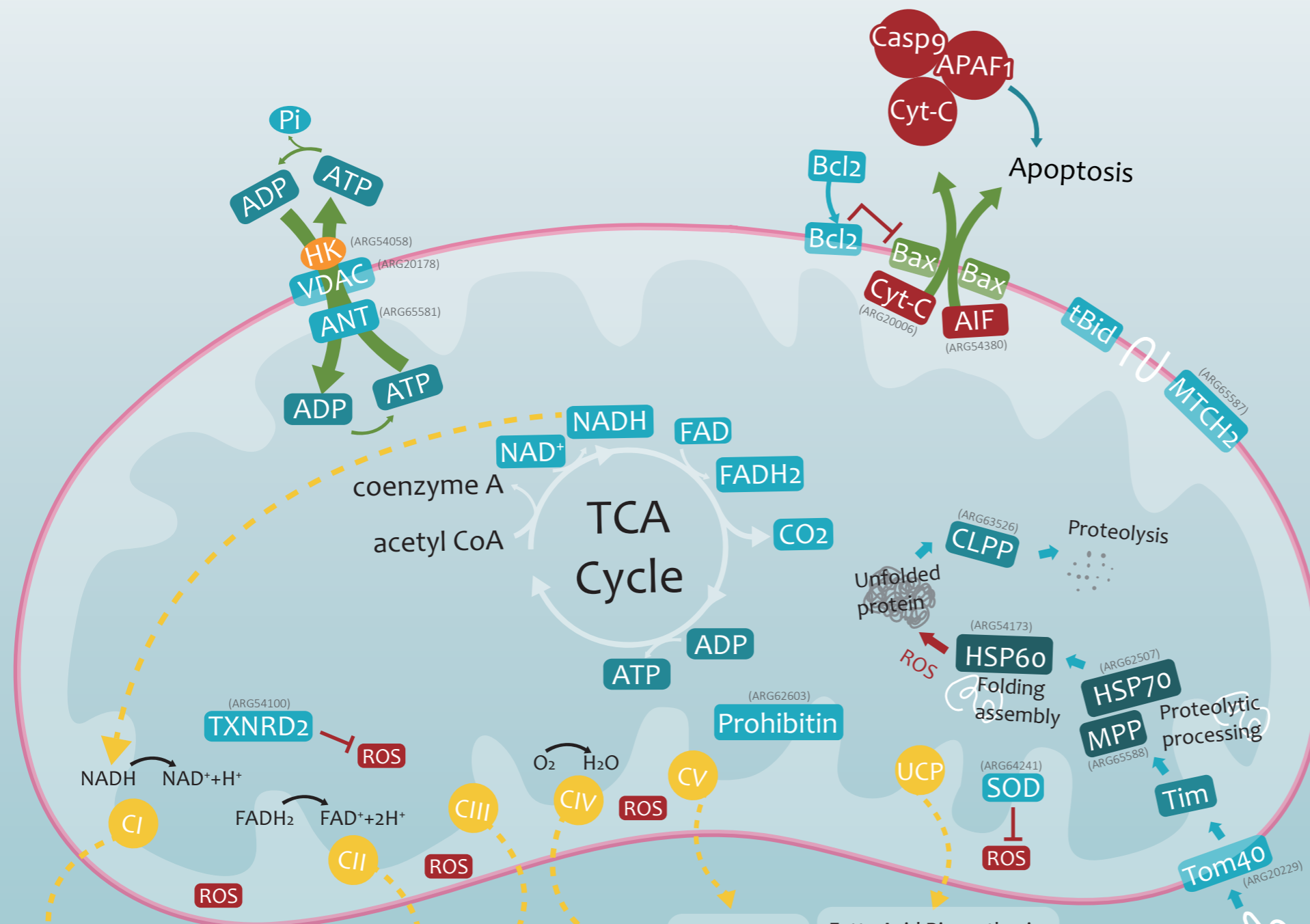


The Structure and Functions of Mitochondria



- | | |
|---------------------------|----------------------------|
| Core subunits: | Accessory subunits: |
| NDUFS1 (ARG65573) | NDUFA13 (ARG65563) |
| NDUFS2 (ARG65574) | NDUFA2 (ARG65564) |
| NDUFS3 (ARG65575) | NDUFA4 (ARG65565) |
| NDUFS7 (ARG65316) | NDUFA5 (ARG65566) |
| NDUFS8 (ARG65578) | NDUFA6 (ARG65567) |
| | NDUFA8 (ARG65568) |
| Accessory factors: | NDUFA9 (ARG65569) |
| NDUFAF1 (ARG65570) | NDUFS4 (ARG65576) |
| NDUFAF2 (ARG65571) | NDUFS5 (ARG65577) |
| NDUFAF4 (ARG65572) | NDUFS6 (ARG65311) |

Mitochondrial Control of Apoptosis Signaling Pathway

Apoptosis is a process of programmed cell death that serves as a major mechanism for the precise regulation of cell numbers. In mammals, activation of caspases is under tight control of the BCL family proteins, including BCL2 and BAX. These proteins mainly act by regulating the release of caspase activators such as cytochrome C and AIF from the inner matrix of mitochondria.

Biogenesis of Mitochondria: Protein Transport and Assembly

Approximately 1500 proteins are present in the mitochondria. The import of mitochondrial proteins synthesized in the cytoplasm and their direction to the correct compartments involves multiple pathways and macromolecular machinery. Preproteins synthesized in the cytoplasm translocate to mitochondrial matrix through the Translocase of Outer Membrane (TOM) and Translocase of Inner Membrane (TIM) macrocomplexes. HSP70 and HSP60 chaperones further process the preproteins by folding and assembly. The unfolded protein will then be cleaved and lysed by ATP-dependent mitochondrial peptidase CLPP.