

One-carbon (1CM) metabolism

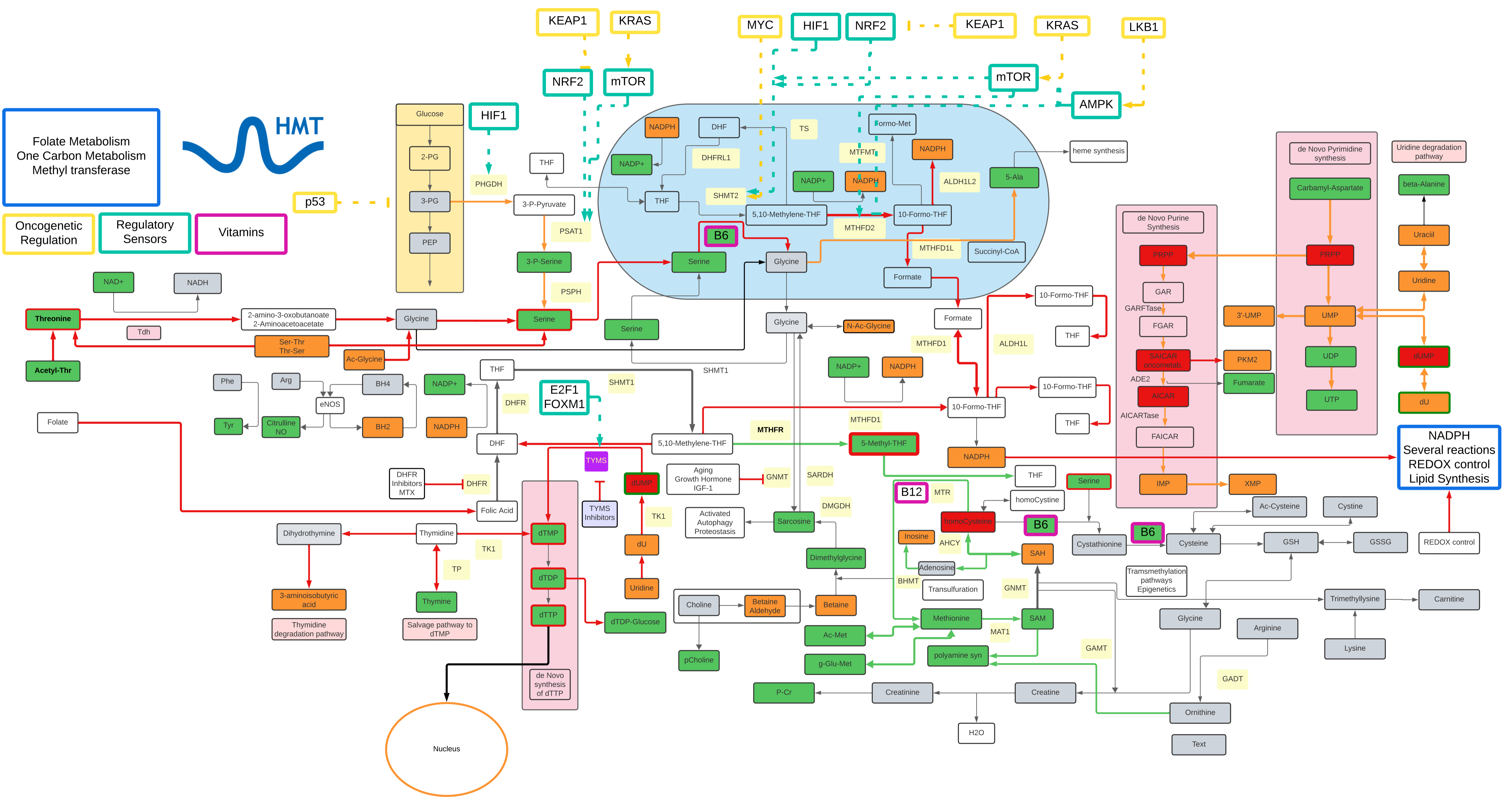
encompasses folate-mediated 1C transfer reactions and related processes, including nucleotide and amino acid biosynthesis, antioxidant regeneration, and epigenetic regulation. 1C pathways are compartmentalized in the cytosol, mitochondria, and nucleus. These reactions are essential for many cellular functions, including:

- DNA methylation: 1CM provides methyl groups for the methylation of DNA, which is a key epigenetic feature of the genome.
- Amino acid homeostasis: 1CM helps regulate amino acid homeostasis.
- Redox balance: 1CM helps maintain redox balance.
- Cellular biosynthesis: 1CM provides carbon units for the synthesis of DNA, polyamines, amino acids, creatine, and phospholipids.
- Cellular proliferation: 1CM contributes to cellular proliferation during development and in adult proliferative tissues.

1CM is a complex process that involves multiple pathways, including the folate and methionine cycles, located in the cytosol, mitochondria, and nucleus. The water-soluble B-vitamins (B12, B6) act as coenzymes and methyl acceptors and donors.

1CM has been linked to several health conditions, including:

- **Cancer:** 1CM is a target of chemotherapy with such as methotrexate and 5-Fluorouracil.
- **Neurological disorders:** Impairments in 1CM may be associated with neurological disorders such as Alzheimer's disease and Parkinson's disease.



Folate Metabolism
One Carbon Metabolism
Methyl transferase

Oncogenetic Regulation
Regulatory Sensors
Vitamins

HMT

Nucleus