

Course 285 | Principles of Metabolism
Metabolism and endocrinology programme, Karolinska Institutet

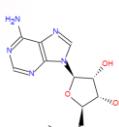
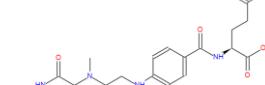
One-carbon unit – the smallest building block

Methyl groups

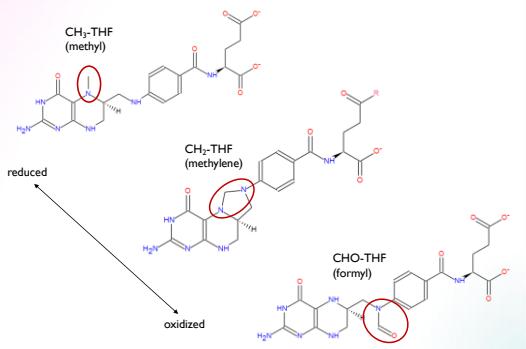
The diagram illustrates several chemical structures:

- Creatine:** A molecule consisting of a guanidino group ($\text{NH}_2\text{C}(=\text{O})\text{NHC}(=\text{O})\text{NH}_2$) attached to a methyl group (CH_3) via a methylene bridge (CH_2).
- Adrenaline:** A catecholamine derivative with a methyl group (CH_3) at position 1.
- 5-methylcytosine (DNA):** A deoxyribose sugar nucleoside with a methyl group (CH_3) at the 5-position of the pyrimidine ring.
- N-methyllysine (protein):** A proteinogenic amino acid with a methyl group (CH_3) at the N-terminal position.
- Choline (phospholipids):** A quaternary ammonium cation ($\text{CH}_3\text{CH}_2\text{CH}_2\text{N}^+(\text{H}_3\text{C})_3$) with a hydroxyl group (OH).
- Nucleobases:** A purine ring system with a methyl group (CH_3) highlighted in red.

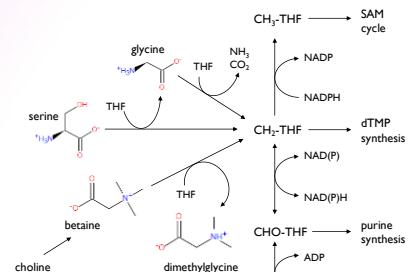
One-carbon carriers: SAM and THF

S-adenosylmethionine (SAM) 	CH₃-tetrahydrofolate 
<i>a.k.a.</i> "Wills" factor" 	
Lucy Wills, India, ca 1930	

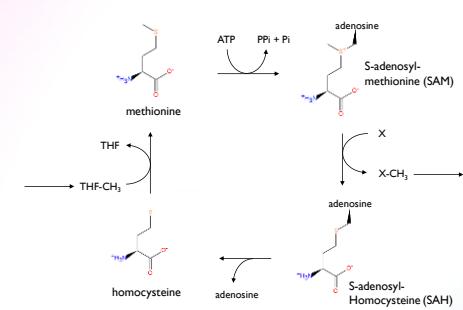
THF carries several forms of one-carbon units



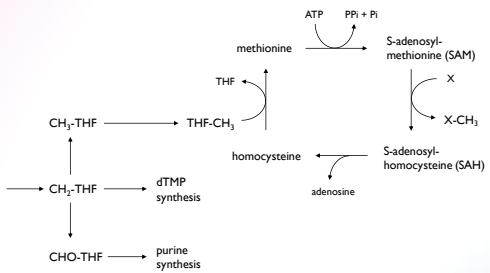
THF metabolism



The S-adenosylmethionine (SAM) cycle

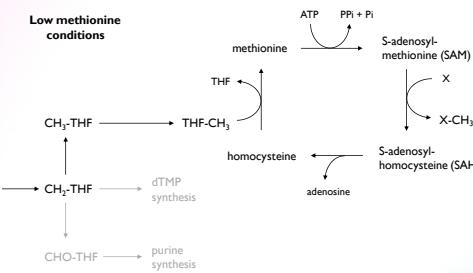


SAM-THF interactions: the "folate trap"



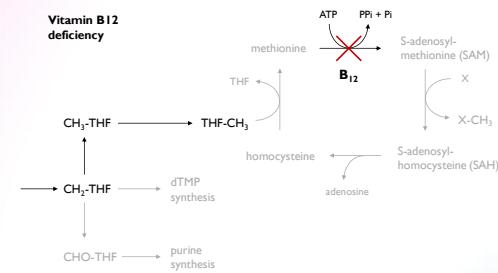
Scott & Weir, Lancet 1982

SAM-THF interactions: the "folate trap"



Scott & Weir, Lancet 1982

SAM-THF interactions: the "folate trap"



Scott & Weir, Lancet 1982