بسم الله الرحمن الرحيم

Prof. Moha

Amino Acids Metabolism

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الأستاذ الدكتور

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Lecture 10

- **Methionine**

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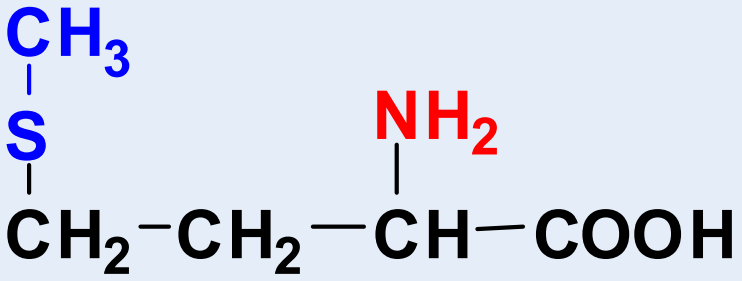
Methionine



Structure

- It is α-amino, γ-methylthiol butyric

Nutrional Value

- It is **essential** amino acid

Metabolic Fate

- It is **glucogenic** amino acid

Methionine

Metabolic Fate

1. Incorporated in protein structure
2. Synthesis of S-adenosyl methionine
3. Biosynthesis of homocysteine
4. Biosynthesis of cysteine
5. Biosynthesis of homoserine
6. Synthesis of glucose

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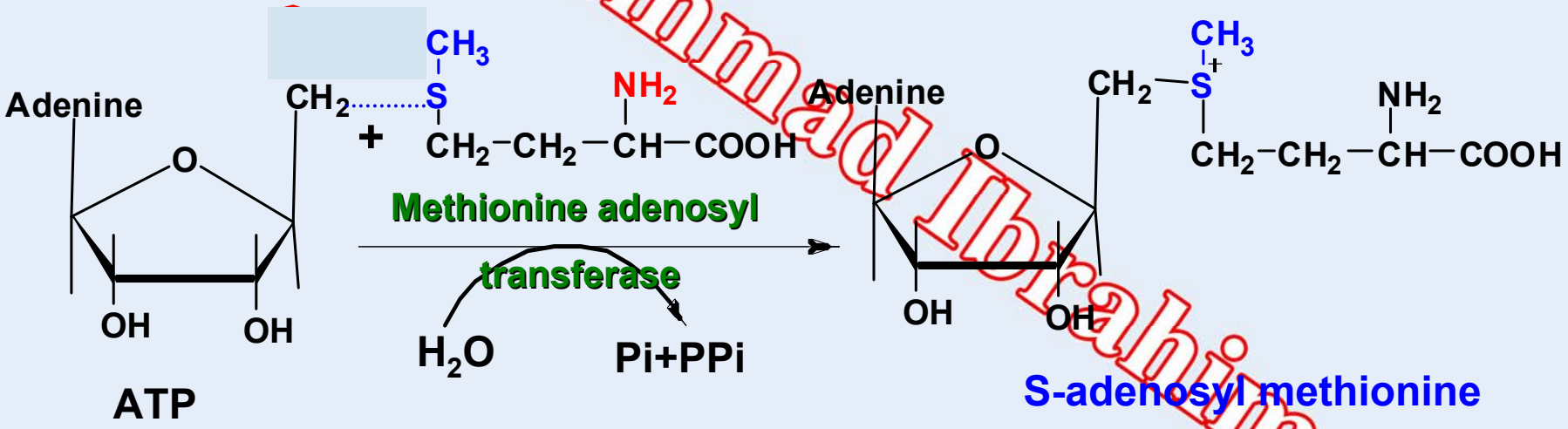
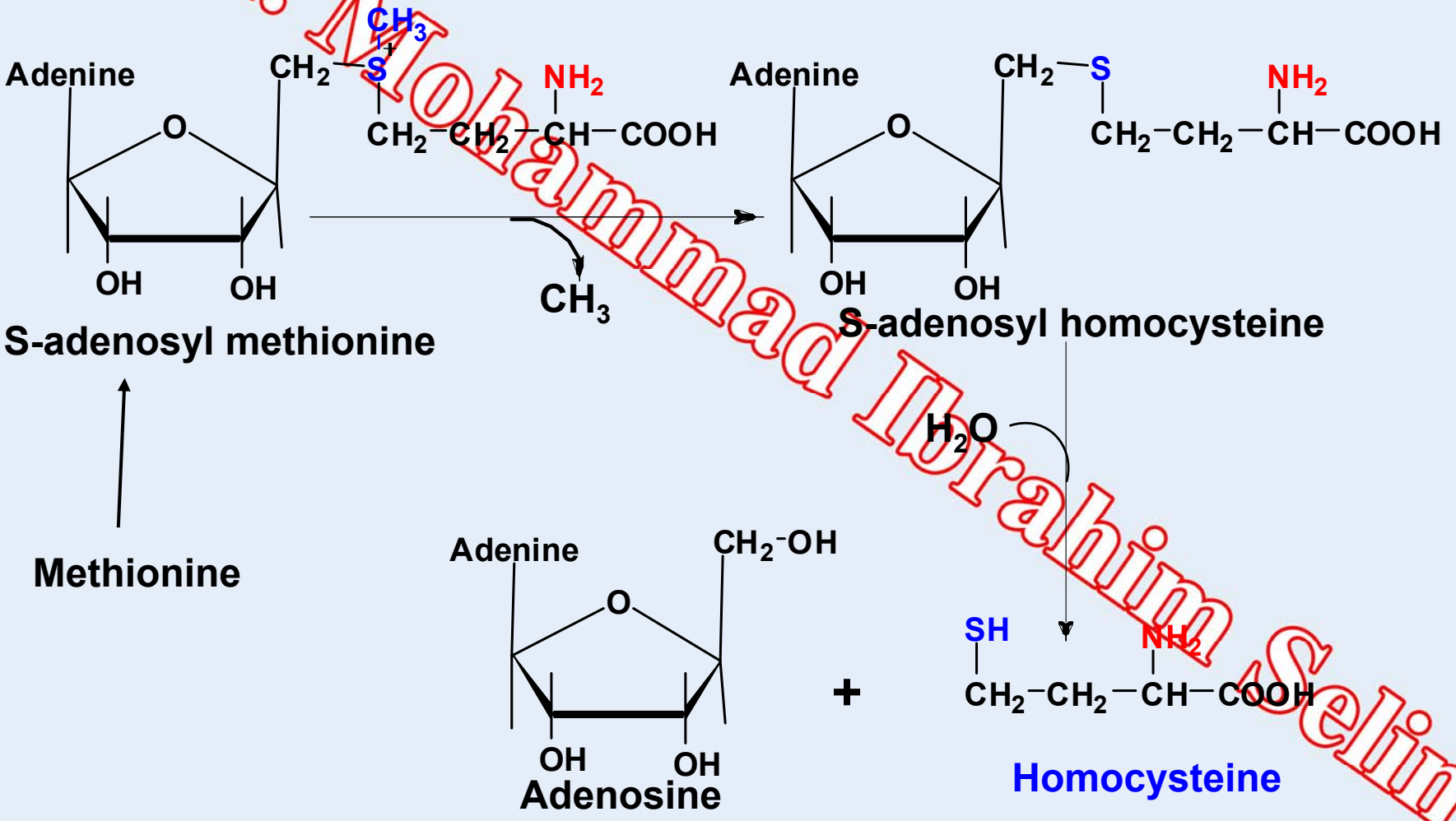
Methionine

2- Synthesis of S-adenosyl methionine



Methionine

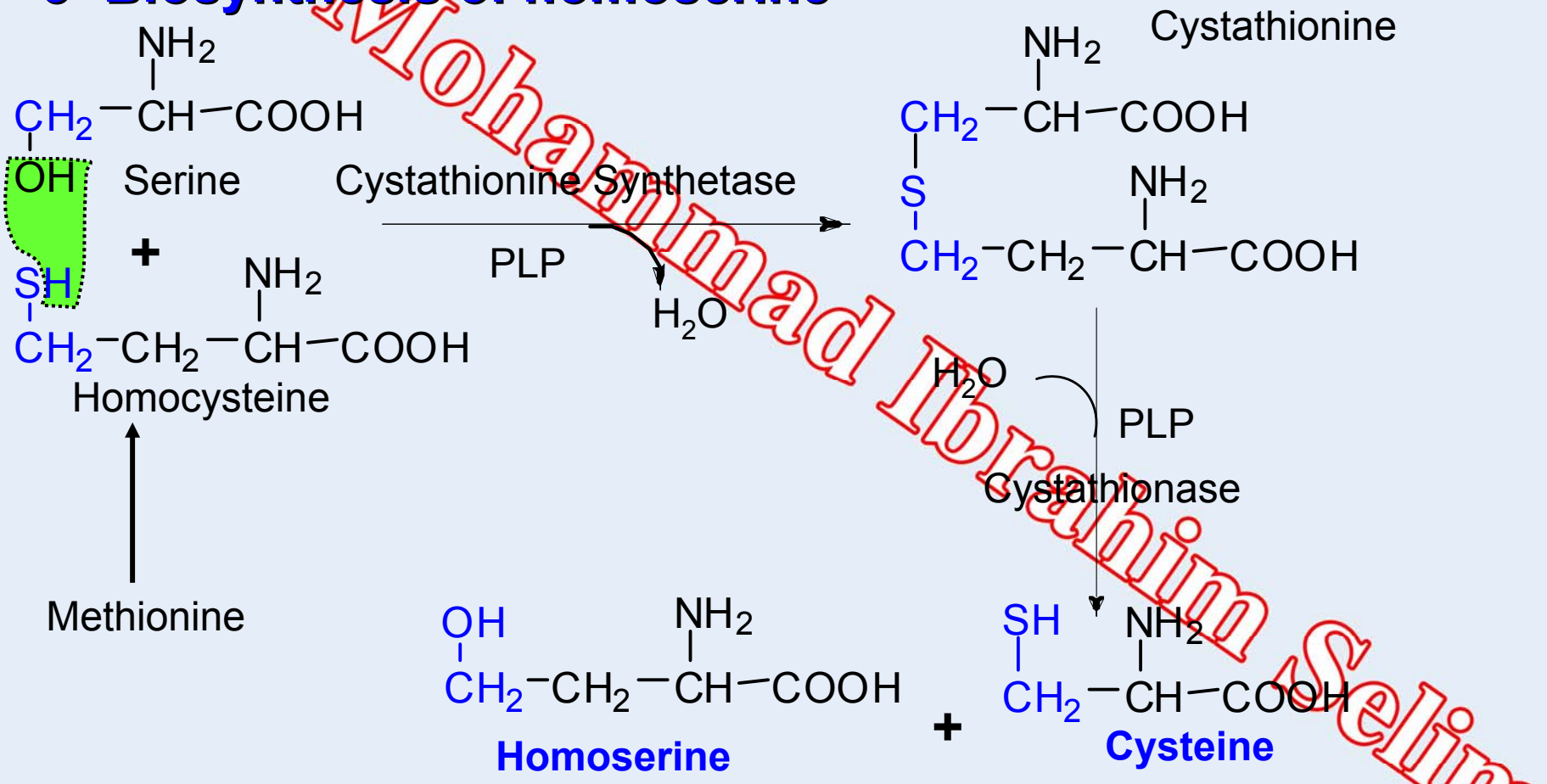
3- Synthesis of homocysteine



Methionine

4- Biosynthesis of cysteine

5- Biosynthesis of homoserine



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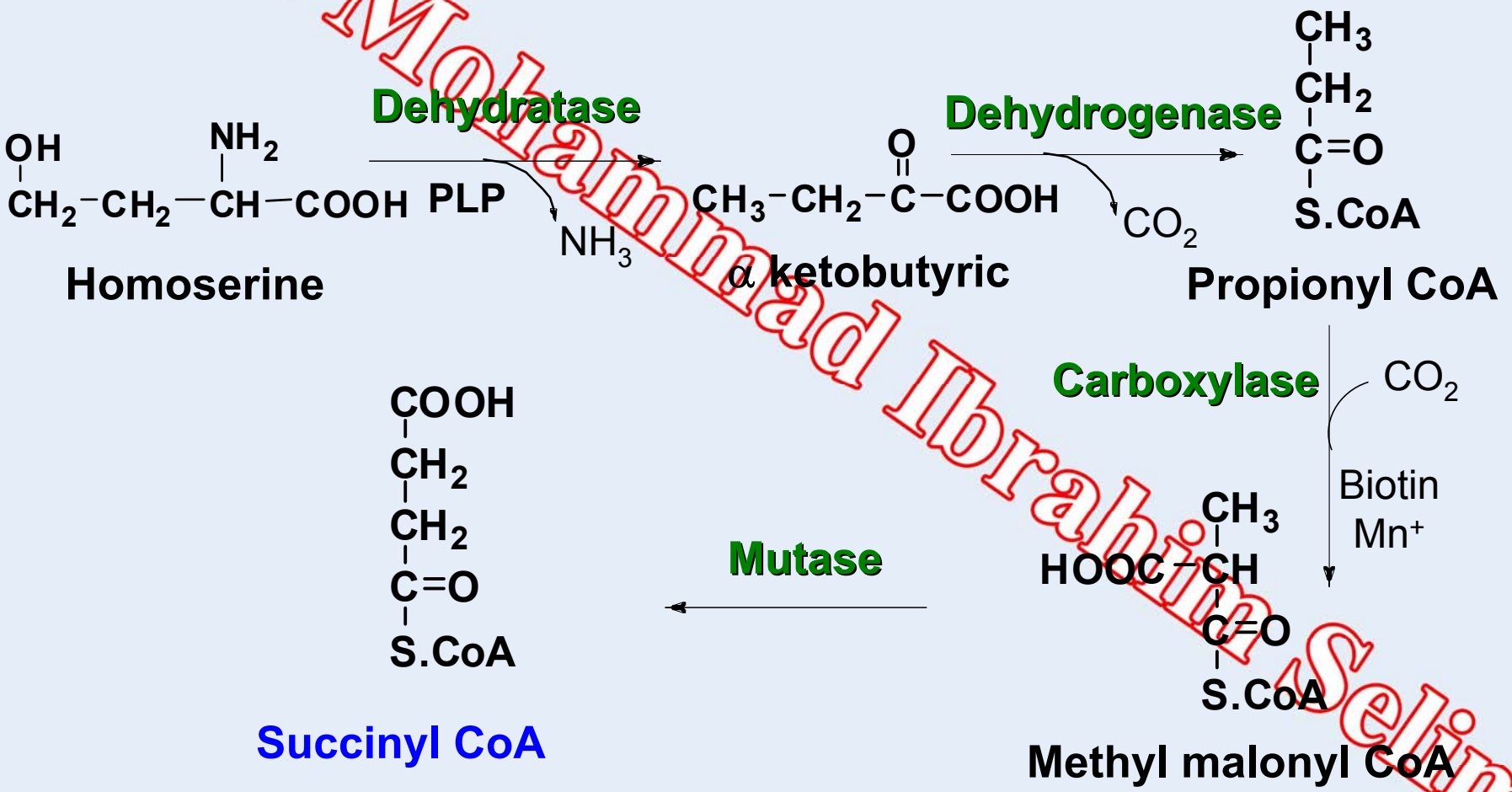
Methionine

6- Glucose biosynthesis



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Methionine

Inborn errors of methionine metabolism

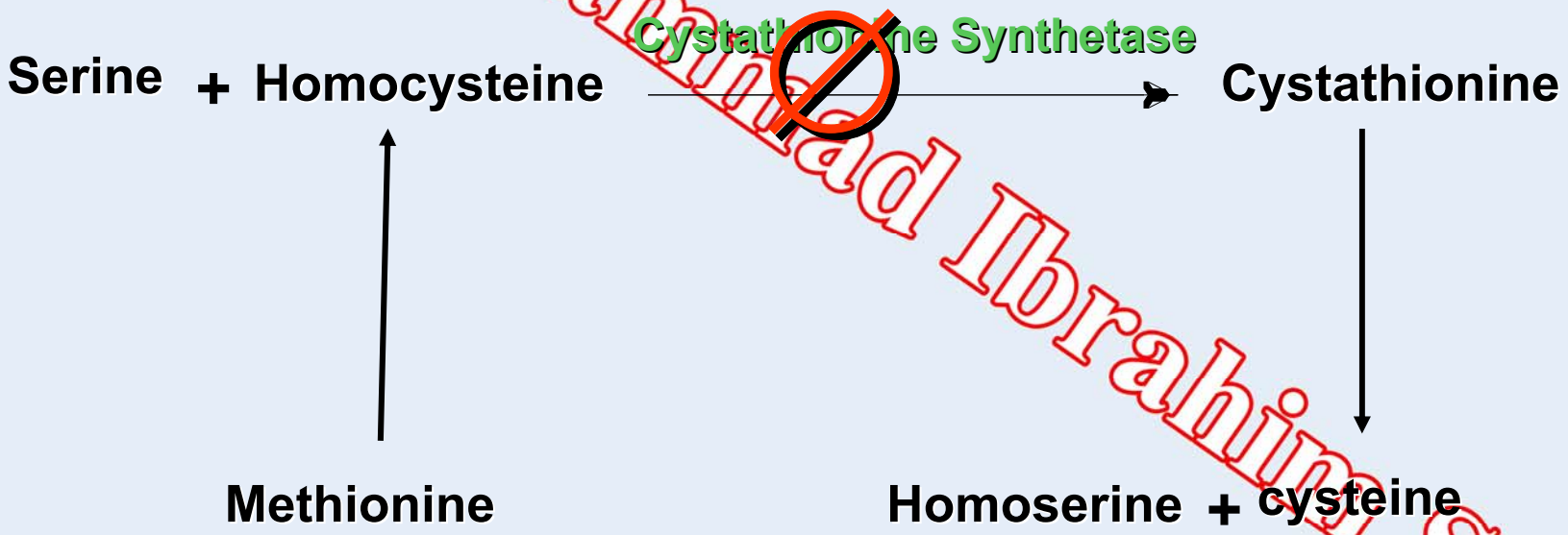
Homocystinuria

- Cause
- Impaired activity of the enzyme cystathionine synthase
- Excreion of large amount of homocysteine in urine

Methionine

Inborn errors of methionine metabolism

Homocystinuria



Methionine

Inborn errors of methionine metabolism

Homocystinuria

- **Cause**
- Impaired activity of the enzyme cystathionine synthase
- Excreion of large amount of homocysteine in urine
- **Symptoms**
- Thrombosis
- Osteoporosis
- Dislocated lenses
- Mental retardation
- **Treatment**
- A diet poor in methionine and rich in cystiene.

Transmethylation

Transmethylation

- Transfer of methyl group
- from methyl **donor**
- to methyl **acceptor**

Transmethylation

Methyl donors

1- S-Adenosyl methionine

2- Choline

3- Betaine

4- 5 Methyl tetrahydrofolic acid

Transmethylation

Methyl acceptors

- Guanidoacetic acid → Creatine
- Carnosine → Anserine
- Ethanolamine → Choline
- Uracil → Thymine
- Noradrenaline → Adrenaline
- N-acetyl serotonine → Melatonine
- Nicotinic acid → N Methyl nicotinic acid
- Nicotinamide → N Methyl nicotinamide
- Pyridine → N Methyl pyridine