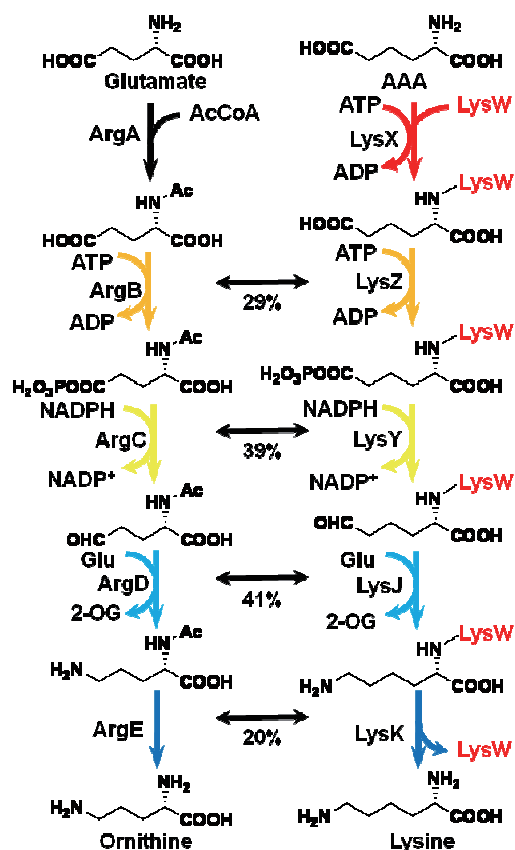


*Sulfolobus*におけるリジン、アルギニン合成**Lysine and arginine biosynthesis in *Sulfolobus***大内拓也<sup>1</sup>, 富田武郎<sup>1</sup>, 堀江暁<sup>1</sup>, 葛山智久<sup>1</sup>, 西山真<sup>1,2</sup>Takuya Ouchi<sup>1</sup>, Takeo Tomita<sup>1</sup>, Akira Horie<sup>1</sup>, Tomohisa Kuzuyama<sup>1</sup>, Makoto Nishiyama<sup>1,2</sup><sup>1</sup> 東京大学、生物生産工学研究センター、<sup>2</sup> 理研 SPring-8)<sup>1</sup>Biotechnology Research Center, The University of Tokyo, <sup>2</sup>RIKEN SPring-8)e-mail: [aa096092@mail.ecc.u-tokyo.ac.jp](mailto:aa096092@mail.ecc.u-tokyo.ac.jp)

Lysine was believed to be synthesized through the diaminopimelate pathway in bacteria and plants with the only exception in lower eukaryotes that synthesize lysine through  $\alpha$ -amino adipate (AAA). In previous studies we found that the *Thermus thermophilus* synthesizes lysine through AAA but not through saccharopine, which differs from the pathway in lower eukaryotes [1]. The *Thermus* pathway is interesting to discuss about evolution of amino acid biosynthesis because its latter part, from AAA to lysine, is similar to arginine biosynthetic pathway and its former part, from 2-OG to AAA, is similar to a part of leucine biosynthetic pathway and the TCA cycle [2]. On the other hand, LysX, catalyzing the first reaction of the latter part, is not a homolog of ArgA which is the first enzyme of arginine pathway catalyzing the modification of the  $\alpha$ -amino group of glutamate by an acetyl group. We found that LysX catalyzes modification of the

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of the  $\alpha$ -amino group of AAA by LysW, small peptides composed of 54 amino acid residues. In bacteria and archaea possessing *lysX* homologs, LysW is encoded upstream the *lysX*, has highly conserved C-terminal sequence (EDWGE), and has a metal binding motif composed of several Cys residues. In the previous study, we revealed that AAA is attached to the  $\gamma$ -carboxyl group of the C-terminal Glu54 of LysW by LysX reaction. In this system LysW is served as a novel carrier protein [3].

In *Sulfolobus*, a hyperthermophilic archaeon, there is two *lysX* homologs in their genome, one is in lysine cluster (*lysYZMWXJK*) and the other is in arginine cluster (*argGHcarAB''lysX''*). In addition, *Sulfolobus* has no homolog of *argA* or *argJ* which catalyzes N-modification of Glu by acetylation in arginine biosynthesis, suggesting that the LysX homolog modifies the amino group of glutamate in arginine biosynthesis. Furthermore,

