CHAPTER 18

S-*Adenosylmethionine Metabolism: A Promising Avenue in Anti-Aging Medicine?*

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18.1 Introduction

18.1.1 Discovery of *S*-Adenosylmethionine

In 1951, Cantoni[1,2] identified methylation activity of nicotinamide in rat liver extracts, in which reaction *S*-adenosylmethionine (SAM, also called AdoMet) proved to be the methyl donor (reviewed in ref. 3). Methionine adenosyltransferase (MAT or SAM synthetase) generates SAM by linking the sulfur moiety of methionine with adenosine (derived from ATP; Figure 18.1).

The role of SAM is not confined to methylation, but it is a cofactor to various nucleases, which are implicated in bacterial chromosome integrity.[4–16] SAM plays a pivotal role in the methionine cycle, the polyamine pathway, and the transsulfuration route to glutathione, placing SAM at the heart of metabolism.[7] A proper balance is required between its well-known task as a methyl donor and its availability to these and other biosynthetic routes in order to live to a healthy old age.[17] In 2001, a novel SAM-dependent superfamily was

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