The production and role of hydrogen sulfide and hydrogen polysulfides in mammalian cells

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Hydrogen sulfide (H₂S) functions as a signalling molecule and cytoprotectant. H₂S is produced from L-cysteine by cystathionine β -synthase (CBS), cystathionine γ -lyase (CSE), and 3-mercaptopyruvate sulfurtransferase (3MST) coupled with cysteine aminotransferase (CAT). An additional pathway for the production of H₂S from D-cysteine involving 3MST and D-amino acid oxidase (DAO) has been identified. Recently, hydrogen polysulfides (H₂S_n) have been found to stimulate transient receptor potential ankyrin1 (TRPA1) channel, much more potently than H₂S. H₂S_n is produced from 3MP by 3MST. In addition, the interaction between H₂S and nitric oxide (NO), another gaseous signaling molecule, also generates H₂S_n. These observations provide new insight into the enzymatic and non-enzymatic production of these molecules and their mechanisms of physiological functions.