BIOLOGICAL ACTIONS AND TRANSLATIONAL POTENTIAL OF HYDROGEN SULFIDE

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Over the last decade, hydrogen sulfide (H_2S) has emerged as an important endogenous gasotransmitter in mammalian cells and tissues. Similar to the previously characterized gasotransmitters nitric oxide and carbon monoxide, H_2S is produced by the body by enzymatic reactions and regulates a host of physiological and pathophysiological processes in various cells and tissues. H_2S production and H_2S tissue levels are decreased in a number of conditions (e.g. diabetes mellitus and aging) and are increased in other states (e.g. various forms of inflammation and critical illness). Over the last decades, multiple approaches have been identified for the therapeutic exploitation of H_2S, either based on H_2S donation or inhibition of H_2S biosynthesis. H_2S donation can be achieved through the inhalation of H_2S gas, and/or the parenteral or enteral administration of various formulations of fast-releasing H_2S donors (salts of H_2S such as NaHS and Na_2S), or slow-releasing H_2S donors (GYY4137 being the prototypical compound). On the side of pharmacological inhibition of H_2S synthesis, there are small molecule compounds targeting each of the three H_2S-producing enzymes CBS, CSE and 3-MST. During the presentation, examples of the biological activities, along with translational efforts using H_2S donors and H_2S biosynthesis inhibitors in cardiovascular disease and cancer will be highlighted.