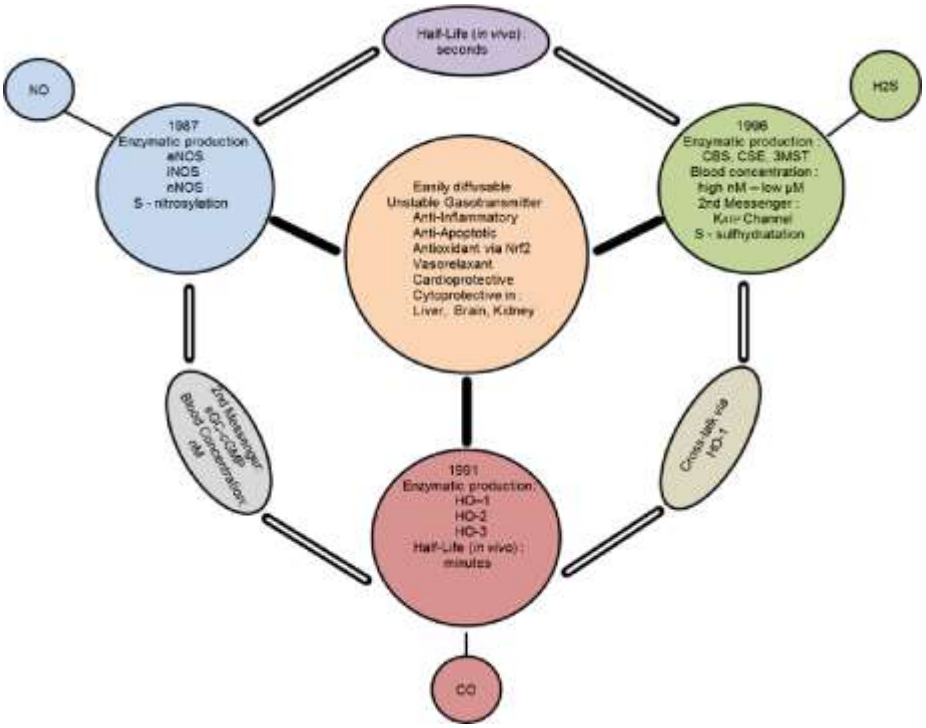
H2 as a gaseous signal modulator

Gaseous signaling molecules are gaseous molecules that are
either synthesized internally (endogenously) in
the organism, tissue or cell or are received by the organism, tissue or cell from outside (say, from the atmosphere or hydrosphere, as in the case of oxygen) and that are used to transmit chemical signals which induce certain physiological or biochemical changes in the organism, tissue or cell.



Oxidative stress impacts multiple signaling pathways, including the extracellular signal-regulated protein kinase (ERK)1/2, NF-κB, JNK, andnuclear factor-erythroid 2p45-related factor 2 (Nrf2) pathways. Along with selectively scavenging ·OH, H2 may alleviate oxidative stress-induced injury by targeting these pathways. Studies has confirmed that H2 could exert anti-inflammatory effects by regulating Toll-like receptor 4 (TLR4) signaling, and anti-apoptotic effects through Ras-ERK1/2-MEK1/2 and Akt pathway inactivation. H2 may also protect against allergic reactions by directly modulating FcεRI-related signaling, rather than through radical-scavenging activity.

Since H2 may influence multiple signaling pathways to exert broad effects, crosstalk between these pathways likely influences H2 therapeutic outcomes. The effects of H2 as a gaseous signal modulator in a therapeutic setting may involve a network of signaling molecules.