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Editorial

Thyronamines

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Abstract

Background & Aim: Thyroid hormone L-thyroxine, are now back within the focus of basic and clinical research. Numerous prompt pharmacological effects, like metabolic depression, hypothermia, negative chronotropy, negative inotropy, hyperglycemia, reduction of the ratio , ketonuria and reduction of fat mass also as promising therapeutic potential within the experimental prophylaxis and treatment of stroke have already been demonstrated in rodent experimental models. This review summarizes the currently still somewhat scattered data on TAM, trying to yield an entire and updated picture of the present state of TAM research, which addresses issues on TAM biosynthesis, receptors, signalling and therefore the rapeutically relevant targets like energy metabolism and the circulatory system .

Thyronamines (TAMs) are a newly identified class of endogenous signaling compounds. Their structure is just like that of hormone and deiodinated hormone derivatives, except that TAMs don't possess a carboxylate group.

Despite some initial publications dating back to the 1950s, TAMs didn't become an independent area of research until 2004, once they were rediscovered as potential ligands to a category of G protein-coupled receptors called trace-amine associated receptors. Since this discovery, two representatives of TAMs, namely 3-iodothyronamine and thyronamine (T0AM), are detected in vivo . Intraperitoneal or central injection of 3-T1AM or T0AM into mice, rats, or Djungarian hamsters caused various prompt effects, like metabolic depression, hypothermia, negative chronotropy, negative inotropy, hyperglycemia, reduction of the ratio , ketonuria, and reduction of fat mass. Although their physiological function remains elusive, 3-T1AM and T0AM have already revealed promising therapeutic potential because they represent the sole endogenous compounds inducing hypothermia as a prophylactic or acute treatment of stroke and might thus be expected to cause fewer side effects than synthetic compounds.

the first detailed description of their most prominent congener 3-iodothyronamine (3T1AM) 14 years ago, boosted research on this hormone metabolite tremendously. TAMs exert actions partly opposite to and distinct from known functions of thyroid hormones. These fascinating metabolic, anapyrexic, cytoprotective, and brain effects quickly evoked the hope to use hormone-derived TAMs as a therapeutic option. The G protein-coupled receptor (GPCR) TAAR1, a member of the trace amine-associated receptor (TAAR) family, was identified because the first target and effector of TAM action. The initial enthusiasm on pharmacological actions of exogenous TAMs elicited many questions, like sites of biosynthesis, analytics, modes of action, inactivation, and role of TAMs in (patho)physiology. Meanwhile, it became clear that TAMs not only interact with TAAR1 or other TAAR relations but also with several aminergic receptors and non-GPCR targets like transient receptor potential channels, mitochondrial proteins, and therefore the serum TAM-binding protein apolipoprotein B100, thus classifying 3T1AM as a multitarget ligand. The physiological mode of action of TAMs remains controversial because regulation of endogenous TAM production and therefore the sites of its biosynthesis aren't fully elucidated. Methods for 3T1AM analytics need further validation, as they revealed different blood and tissue concentrations counting on detection principles used like monoclonal antibody-based immunoassay vs liquid chromatography-matrix-assisted laser desorption/ionization mass spectrometry or time-of-flight mass spectrometry.