Letter to the Editor

Taurine: A Novel Preventer of Neurofibroma Growth?

Dear Editor:

Neurofibromatosis type 1 (NF1) is one of the most common human genetic disorders.¹ Neurofibromas are common manifestations in patients with NF1.¹ These tumors are composed of Schwann cells, mast cells, endothelial cells, pericytes, and fibroblasts.¹ Fibroblasts are one of the major cellular components of these complex tumors and produce collagen, which constitutes ~50% of the dry weight of neurofibromas.¹,² Collagen production by fibroblasts and subsequent extracellular matrix remodeling in the emerging neurofibromas are two essential events that facilitate invasion and recruitment of blood vessels by providing cellular and protein infrastructure for these tumors.¹,³

Animal studies have shown that inflammatory mast cells secrete proinflammatory growth factors such as basic fibroblast growth factor, platelet-derived growth factor, and transforming growth factor β (TGF-β) that promotes fibrosis by inducing fibroblast proliferation and collagen synthesis.¹ TGF-β has been demonstrated to play an important role in the initiation, maintenance, and termination of fibrosis in the alteration of the extracellular matrix and tumor progression in stromal cells of epithelial cancers.¹,³

Taurine, a sulfur-containing semi-essential amino acid, plays an important role in several essential biological processes such as membrane stabilization and immunity; it has antioxidant and anti-inflammatory effects.⁴ Taurine is considered to be an indispensable amino acid for humans.⁴ The level of cysteine sulfenic acid decarboxylase, an enzyme required for biosynthesis of taurine, is low in humans.⁴ Therefore, taurine has been added to infant formula as well as to parenteral solutions.¹ Taurine occurs naturally in food, especially in seafood and meat.⁴ Taurine-containing health drinks are marketed for the treatment of various conditions, for improvement of athletic performance and for general well-being.⁴

Several studies have demonstrated the antifibrotic effects of taurine. Taurine has been shown to ameliorate progressive renal fibrosis⁵ and to decrease extracellular matrix production and mesangial expansion in diabetic nephropathy.⁶ In these studies, taurine decreased the expression of TGF-β as well as profibrotic action of this cytokine.⁵,⁶ Another study has shown that taurine improves pancreatic fibrosis by inhibition of TGF-β production in pancreatic stellate cells, the predominant source of extracellular matrix proteins in the pancreas.⁷ This amino acid has also been demonstrated to be effective in blocking lung fibrosis and hepatic fibrosis through reduction of TGF-β expression in these tissues.⁸,⁹ Most of these anti-TGF-β properties of taurine are attributed to its antioxidant and anti-inflammatory effects.⁵–⁹

In view of the abovementioned facts, we hypothesize that due to its antifibrotic and anti-TGF-β effects, taurine might prevent the growth of neurofibromas.

References


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