Potential impact of Helicobacter pylori-related human β-defensin-1 on hepatic encephalopathy and neurodegeneration

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Kaltsa et al [1] reported that human β defensin-1 (hBD-1) is upregulated in cirrhotic patients and might serve as a biomarker of bacterial translocation involved in the pathogenesis of complications including hepatic encephalopathy (HE); dysbiosis of gastrointestinal microbiota, even salivary and gastric Helicobacter pylori (Hp) and multiple non-Hp organisms, is associated with systemic inflammation and complications including HE [1-3].

Hp infection (Hp-I), strongly associated with viral-related cirrhosis, is more common in cirrhotic patients with HE. Hp may be involved in HE and post-HE persistent cognitive dysfunction pathophysiology by releasing proinflammatory and vasoactive substances involved, through blood-brain barrier (BBB) disruption, in brain pathologies; Hp might access the brain via the oral-nasal-olfactory pathway or by circulating monocytes (infected with Hp due to defective autophagy) through disrupted BBB, leading to neurodegeneration [4-6]. Likewise, human defensins might also contribute to Hp-related brain pathophysiology by modulating innate and adaptive immune system responses [7].

Hp-1 induces hBD-1 mRNA expression [8], but develops resistance against hBD-1 [9]. Moreover, Hp might be further involved in the BBB breakdown, by releasing defensins, particularly those that display unique distribution at BBB sites. Hp can activate granulocytes and induce defensin release from granulocytes; consequently, defensins, secreted by activated granulocytes, penetrate the BBB, gain access to the brain, thereby possibly contributing to neurodegeneration [9]. In the brain, hBD-1 expression acts as activator and modulator of innate and adaptive immunity within microglia and astrocytes, cerebral cells critical to the brain neuroinflammatory responses. hBD-1 mRNA expression is significantly increased in the choroid plexus and hippocampus of the neurodegenerative brain; hBD-1 might be of considerable importance early in the neurodegenerative process [9]. Finally, serum sCD14 levels, mentioned by the authors [1], are associated with genetic variants in both CD14 promoter and Hp-I and consequently with certain disease or diseases outcomes [10]. However, further studies are needed to elucidate the aforementioned considerations.

References


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