Hormonal Modulation of Nociception Associated with Functional Syndromes

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The impact on society of successful translation of a basic or clinical observation into new therapies is substantial taking into the consideration rapid growth of scientific knowledge. Today, understanding and meeting public concerns are as important for the investigator as performing research studies. As science moves forward the issue of communicating new data to the society poses special challenges to the investigator. These challenges create needs to complement traditional academic publishing by launching free, on line journals, many of them open access and peer-reviewed. The Journal of Autacoids, is an international, peer-reviewed journal that overlays different aspects of biomedical science relevant to biological factors which are being formed by the tissues on which they act; thus they function as local hormones produced by many tissues.

The variations of symptoms and pain perception across the menstrual cycle and that sexual intercourse trigger symptoms in a large percentage of females diagnosed with functional syndromes such as Irritable Bowel Syndrome (IBS), Painful Bladder Syndrome (PBS), Chronic Pelvic Pain (CPP) and others suggest the involvement of sex steroids. Our recent studies showed that estrogen modulation of visceral inputs of primary afferent nociceptors located in the dorsal root ganglia (DRG) accounts for the observed changes in pain perception and symptoms observed during etiology of these functional pain syndromes. Patients with CPP frequently have pain from several organs. For patients with IBS the most common co-morbid diagnoses include PBS or CPP. Pain is strongly associated with this disease and awareness to its pathology is further illustrated by the fact that the average time duration between the onset of pain and the diagnosis is 3 to 10 years. Viscero-somatic and viscero-viseral hyperalgesia and allodynia result in the spread of perception of pain from an initial site to adjacent areas. CPP patients may initially have only one pain source in the pelvis, but a multitude of mechanisms involving the peripheral and central nervous system can lead to the development of painful sensations from other adjacent organs such as lower colonic pain associated with IBS. The localization of estrogen receptors in DRG neurons strongly suggest that estradiol (E2) modulates visceral pain processing peripherally; E2 (both short-term and long-term exposure) significantly decreased the nociceptive signaling in viscerally-labeled DRG neurons. Thus, in addition to central regulation estrogen may affect nociception peripherally.

The concept that brain and gastrointestinal system are closely connected and that this interaction plays an important role in certain feeling states especially in clinical presentations of chronic viscerally-associated nociceptive disorders is widely accepted in scientific and clinical communities. Moreover, our recent data that estrogen can gate primary afferent response to modulate nociception support the idea about involvement of peripheral central system in etiology of a wide range of the functional and inflammatory gastrointestinal diseases and may potentially lead to new interventions and therapies [1,2]. The incidence of persistent, episodic, or chronic visceral pain are more prevalent in females thus defining the site(s) and mechanisms through which female steroid hormones modulate visceral nociception is an important step in understanding the gender differences in pain perception and in designing appropriate therapies for females.

The accumulation of disabilities and nociceptive diseases that limit normal body functions is a major risk factor for neurodegenerative diseases. Many neurodegenerative diseases accompanied by the concomitant decline in cognitive, motor performance share and many pathophysiological changes. Cells of the affected tissues may interact in a cell-to-cell manner messaging through the transfer of hormones, cytokines, and autacoids such as histamine, serotonin, kinins and prostaglandins that are released in pathological processes. The complex interplay and balance between these diverse mediators, ageing, genetic background, and environmental factors may ultimately determine the outcome of progression of chronic neuro degeneration. On a molecular level, these responses are highly complex, involving a vast array of messenger molecules interacting with enzymes and receptors of virtually every class, directing recruitment of many types of cells to recover the healthy state. Indeed, a balance between the messengers with the inherent redundancy of the different body systems makes therapeutic intervention a considerable challenge.

Hormones (including local hormones autacoids) are thought as indispensable cornerstones of the normal development and function, but it appears that nobody region, no neuronal circuit, and virtually no cell is unaffected by them. Thus, increasing awareness toward autacoids appears to be obligatory. New data regarding our understanding of the mechanisms of formation of biologically active autacoids and their interactions will hopefully lead to the development of effective therapies for neurodegenerative and functional disorders. When many scientists were looking for open access publication of their research, the Journal of Autacoids will fulfill most of their needs by using online manuscript submission, review and ranking systems for quality and quick processing for publications.

References


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