

Adaptive changes of telocytes in the urinary bladder of patients affected by neurogenic detrusor overactivity

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Urinary bladder activity involves central and autonomic nervous systems and bladder wall. Studies on the pathogenesis of voiding disorders such as the neurogenic detrusor overactivity (NDO) due to supra-sacral spinal cord lesions have emphasized the importance of an abnormal handling of the afferent signals from urothelium and lamina propria (LP). In the LP (and detrusor) three types of telocytes (TC) are present and form a 3D-network. TC are stromal cells able to form the scaffold that contains and organizes the connective components, to serve as guide for tissue (re)-modeling, to produce trophic and/or regulatory molecules, to share privileged contacts with the immune cells.

Specimens of full thickness bladder wall from NDO patients were collected with the aim to investigate possible changes of the three TC types by using histology, immunohistochemistry and transmission electron microscopy.

The results show that NDO causes several morphological TC changes without cell loss or network interruption. With the exception of those underlying the urothelium, all the TC display signs of activation (increase in Caveolin1 and caveolae, α SMA and thin filaments, Calreticulin and amount of cisternae of the rough endoplasmic reticulum, CD34, euchromatic nuclei and large nucleoli). In all the specimens a cell infiltrate, mainly consisting in plasma cells located in the vicinity or taking contacts with the TC, is present.

In conclusion, our findings show that NDO causes significant changes of all the TC. Notably, these changes can be interpreted as TC adaptability to the pathological condition likely preserving each of their peculiar functions.