Overactive Bladder (OAB) is a significant medical problem affecting ~17% of the population at an annual cost of over $65 billion in the United States alone. Current OAB therapies are limited in efficacy and relief. Novel therapeutic approaches are urgently needed especially those that directly target detrusor smooth muscle (DSM). This is important because many forms of OAB are associated with increased DSM contractions during bladder filling and urinary storage which is normally facilitated by DSM relaxation. Recent studies from Dr Petkov’s laboratory at the University of South Carolina indicate that in human DSM, the large conductance voltage- and Ca\(^{2+}\)-activated K\(^+\) (BK) channels are critical regulators of DSM myogenic and neurogenic contractions. BK channel function in DSM is to control Ca\(^{2+}\) influx through voltage-gated Ca\(^{2+}\) (CaV) channels which in turn determine the degree of DSM contractility. New data from the Petkov’s laboratory reveal that oestrogens can directly activate BK channels in human DSM cells thus reducing DSM excitability and contractility. Initial experiments by the Petkov laboratory show that oestrogens reduce spontaneous phasic contractions of human DSM isolated strips in a concentration-dependent manner which involves a direct interaction of oestrogens with BK channels independent of oestrogen receptors as demonstrated in excised membrane patches. Modulation of BK channel activity or their regulatory mechanisms by oestrogens may provide the basis for developing new therapeutic interventions for OAB. To facilitate such novel approaches we need to have a better understanding of BK channels regulation by oestrogens.

Biography

Georgi V Petkov is a Tenured Professor of Pharmacology at the University of South Carolina. His studies have helped to identify new pharmacological targets for drugs targeting urinary bladder dysfunction. He has published over 50 peer-reviewed papers in journals such as Journal of Physiology (London), American Journal of Physiology, Journal of Urology. He serves as Editor and Reviewer for many peer-reviewed journals including Journal of Urology. He has given many invited seminars worldwide and received various academic honors and awards at national and international level.

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