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RAMAN STUDY TO EXPLORE A NEW DISCRIMINATE METHOD OF BLADDER CONDITIONS

Hypothesis / aims of study

Raman spectroscopy is a techniques detecting the information of molecular vibration and used for determination of the chemical structure of sample. The Raman system formulated by our research with ball lens mounted hollow fiber Raman probe (BHRP) in combination of an endoscope permits the measurement of Raman spectra in vivo noninvasively. Hence, an analysis of the differences of bladder conditions between disease-model animals and normal animals using Raman spectroscopy might lead to the development of a new diagnostic technique that can discriminate the disease-induced changes in the bladder.

Study design, materials and methods

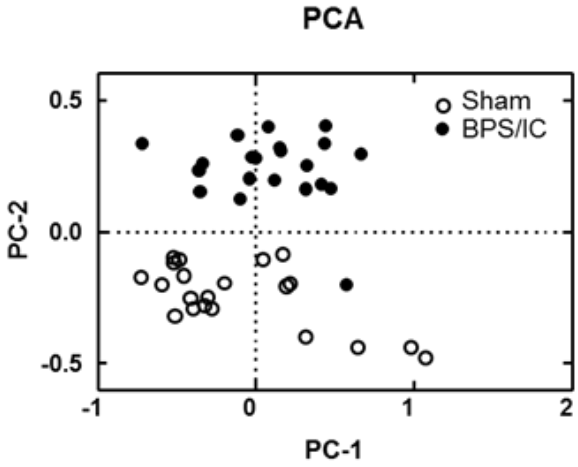
To explore an application possibility of Raman spectroscopy for detection of bladder condition change, Raman spectra of the chronic cystitis, Bladder pain syndrome/ Interstitial cystitis (BPS/IC) model animal bladder tissue and the control (Sham rat) tissue were compared.

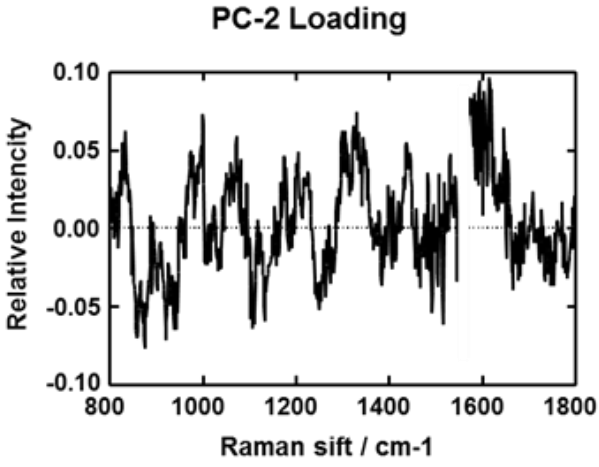
Experiments were performed using female Wister rats (150-300g). A BPS/IC model was made by injection of 0.4 mol L^{-1} acidum hydrochloricum (HCl) into the urinary bladder for 90 seconds. Sham rats were injected with saline instead of HCl. Raman spectra were obtained from the corrected rat bladder wall by the Raman system with BHRP. Raman spectrum was normalized at 1003 cm^{-1} (C-H deformation vibration) and was analysed using the principal component analysis (PCA).

Results

Treatment with intravesical HCl showed thickening of the transitional epithelium (hypertrophy and/or proliferation of the transitional cell epithelium) and inflammatory cell infiltration.

Raman spectra of rat tissues could be detected with ball lens mounted hollow fiber Raman probe (BHRP). In addition, the differences between normal and BPS/IC model bladders were detected using principal component analyses of these Raman spectra.





Interpretation of results

Differences between BPS/IC model and sham rat bladders were detected by Raman spectroscopy. Raman technique might be useful for determination of establishment of animal models instead of using pathological methods.

Concluding message

The Raman technique has a possibility as a detection system of differentiation between normal and disorder model animals and then, might be useful for diagnosis of the disease instead of using pathological methods.

References

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Disclosures

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