Intravesically administrated pirfenidone@polydopamine nanoparticles alleviate bladder inflammation and preserve bladder function after acute complete spinal cord injury

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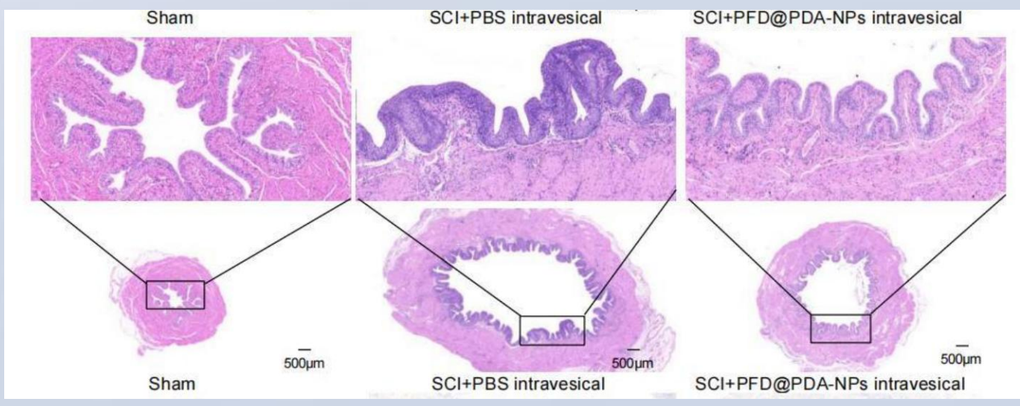
ABSTRACT

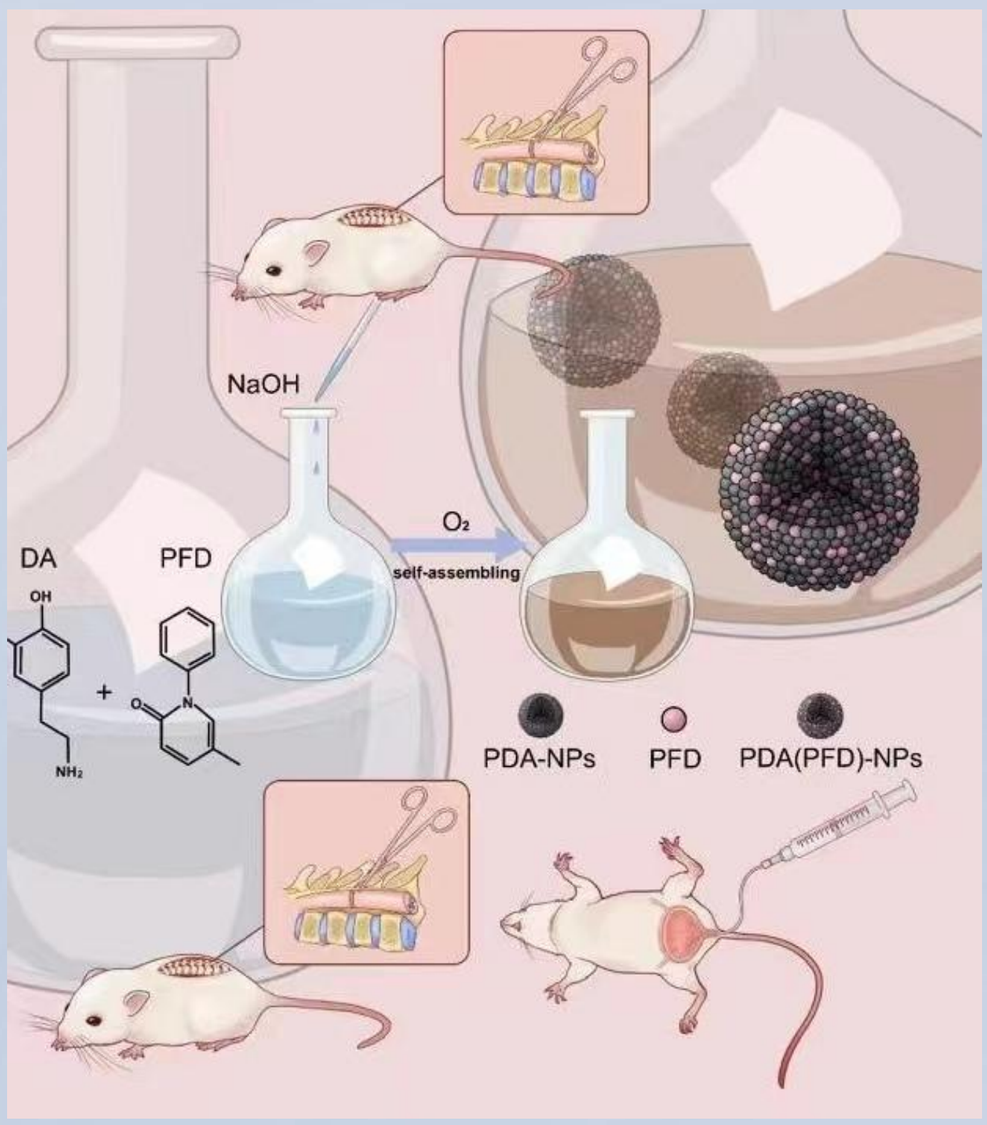
Spinal cord injury (SCI) is a devastating disease that can cause persistent damage to urinary system. Rapid and significant changes in the barrier function and aggravated inflammation have been found in bladder at the earliest stage of acute SCI. Early intervention for the pathological changes of bladder caused by SCI may protect the bladder function and prevent the long-term urinary complications. In the present study, we designed and constructed a polydopamine nanosystem containing pirfenidone, aiming to alleviate bladder inflammation and preserve bladder function through intravesical instillation at early stage of acute SCI

METHODS

A polydopamine-based drug delivery system carrying pirfenidone (PFD@PDA NPs) was designed. The capability of penetration and retention of PFD@PDA NPs in bladder was evaluated. The effects of intravesical stellation of PFD@PDA NPs on the bladder inflammation and oxidative stress caused by SCI was assessed. The urodynamic parameters of SCI animal were determined and the effect of PFD@PDA NPs on the urodynamic parameters of SCI animal was also estimated

RESULTS





CONCLUSIONS

Early intravesical application of PFD@PDA NPs to SCI patients may help preserve bladder function, reduce the susceptibility to UTIs and improve the patients' quality of life. The present study also provides valuable insight into the development of intravesical drug delivery platforms for bladder dysfunction.

REFERENCES

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