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Introduction
Intervertebral disc (IVD) degeneration is one of the leading cause of low back pain (LBP) [1]. Current therapeutic strategies for patients with LBP remain symptomatic and are mainly dedicated to relieve painful symptoms. In this context, the development of regenerative cell-based biotherapies for degenerated IVD has recently been contemplated [2]. To evaluate the clinical relevance of such therapies, an animal model of induced-IVD is required. This animal model should have to exhibit a degeneration process similar to that observed during aging and degeneration of human IVD. In this study, we were interested in using laser to generate a progressive degeneration of IVD in the rabbit.

Materials and Methods
15 New Zealand White rabbits (1 year-old) were used. Two procedures were tested to trigger IVD degeneration: needle aspiration (reference technique) [3] and a laser-based technology. IVD degeneration process was assessed after 30, 60, 90 and 120 days by X-ray radiographies (disc height), MRI (T2 intensity of disc signal) and histological evaluation using a modified Boos’s scoring.

Results
Our data indicate that whatever the procedure tested, a marked IVD degeneration was evidenced as compared to sham-operated animals. A significant decrease in disc height on X-ray radiographies was first demonstrated. In addition, MRI disc signals were significantly reduced in both groups. Finally a statistically significant increase in Boos’s scoring was evidenced in both laser- and aspiration-induced IVD degeneration. Interestingly, IVD degeneration induced by laser treatment was more progressive compared with the aspiration. Moreover, MRI and histological results indicate that laser-induced IVD degeneration was quite similar to that obtained during natural aging process observed in 2 year-old rabbits.

Discussion and Conclusions
Radiological, MRI and histological data confirm the relevance of this new inducible animal model of disc degeneration. Histological examination indicates that IVD degeneration induced by laser treatment is close to the degenerative process observed during the onset of spontaneous disc degeneration. This model could be a useful tool to help us validate a cell-based strategy for the prevention and treatment of IVD degeneration.

References

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Disclosures
The authors have declared no conflicts of interest.