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Comparison of Endometriosis Induction Methods in Rodents: Lesion Burden, Pain-Related Responses, and Tissue Endpoints

Abstract:

Several induction methods are used in preclinical rodent models of endometriosis, but their suitability varies depending on the intended biological and functional endpoints. To assess their relative utility and translational relevance, we compared widely used induction approaches in mice and rats using intermittent evoked and non-evoked assessments together with terminal histopathologic, immunohistochemical, and molecular analyses.

Our findings demonstrated clear differences between species and induction methods. In mice, a syngeneic inoculation approach appeared better suited for rapid in vivo screening studies aimed at generating endometrioma-like lesion burden efficiently. In contrast, the rat inoculation model, particularly when combined with hormonal priming, produced smaller endometrioma-like lesions but was associated with a greater pain-related response. These observations suggest that model selection should be guided not only by lesion burden, but also by the functional phenotype of interest.

The utility and interpretation of immunohistochemical staining and molecular analyses also differed according to the induction method employed and the specific research questions being addressed. Overall, these findings support a fit-for-purpose approach to model selection in preclinical endometriosis research, with mouse syngeneic inoculation offering advantages for rapid lesion-based screening and hormonally primed rat inoculation providing value for studies focused on pain-related outcomes.

Biography: Patrick Sweeney, PhD, is a distinguished professional in preclinical research and pharmaceutical drug development. He is the Co-Founder and Chief Operating Officer of Naason Science, Inc., a South Korea-based company specializing in preclinical research and CNS-focused drug development. With more than two decades of experience in the preclinical CRO and business development sectors, Dr. Sweeney has contributed to advancing innovative research and translational science. His professional expertise includes neuroscience, animal models, drug discovery, and research commercialization. He has also contributed to scientific publications on neurodegenerative diseases and translational digital biomarkers. Through his leadership and international experience, Dr. Sweeney supports collaborative research and the development of innovative therapeutic solutions.