

Standardization and consensus in the development and application of bone organoids

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Supplementary Methods

1. Expert invitation

To ensure a comprehensive and interdisciplinary approach to the consensus on bone organoid development and application, we invited experts from various fields including stem cell biology, tissue engineering, bone biology, biomaterials, and clinical orthopedics. Experts were selected based on their significant contributions to the fields of organoid technology and bone tissue engineering, with a focus on their publication

history in high-impact journals and experience in bone-related research and clinical applications. The selection criteria emphasized expertise in bone physiology, osteogenesis, and regenerative medicine, ensuring that the consensus would have clinical relevance. Additionally, diversity in research backgrounds and geographical representation was prioritized to foster a global and inclusive perspective. Invitations were extended to senior researchers, early-career scientists, and clinicians, all of whom contributed their unique insights into the challenges and opportunities in bone organoid technology. Experts could nominate additional researchers, with final selections made by the core team (Fengjin Zhou, Long Bai, Hongbo Tan, Jiacaan Su). This expert group participated in a series of virtual meetings and discussions, providing valuable input that shaped the final consensus, which aims to guide future research and clinical translation in the field of bone organoids.

2. Consensus building

The consensus-building process was designed to gather expert opinions on the development and application of bone organoids, ensuring both scientific rigor and clinical relevance. It began with the core team drafting a detailed questionnaire covering critical topics such as cell types, matrix materials, and construction methods for bone organoids. Experts were invited to provide quantitative and qualitative feedback, which was discussed in a series of virtual roundtable meetings. These discussions allowed experts to present their views, debate approaches, and propose new ideas, while the core team moderated and refined the questionnaire based on feedback. Consensus was defined as $\geq 90\%$ agreement on key questions, and where disagreements arose, follow-up discussions were held to address concerns. After the meetings, a summary was circulated, and a revised version of the questionnaire was distributed for final review. The process culminated in a formal consensus report, outlining the agreed standards for bone organoid research and providing a framework for future studies.