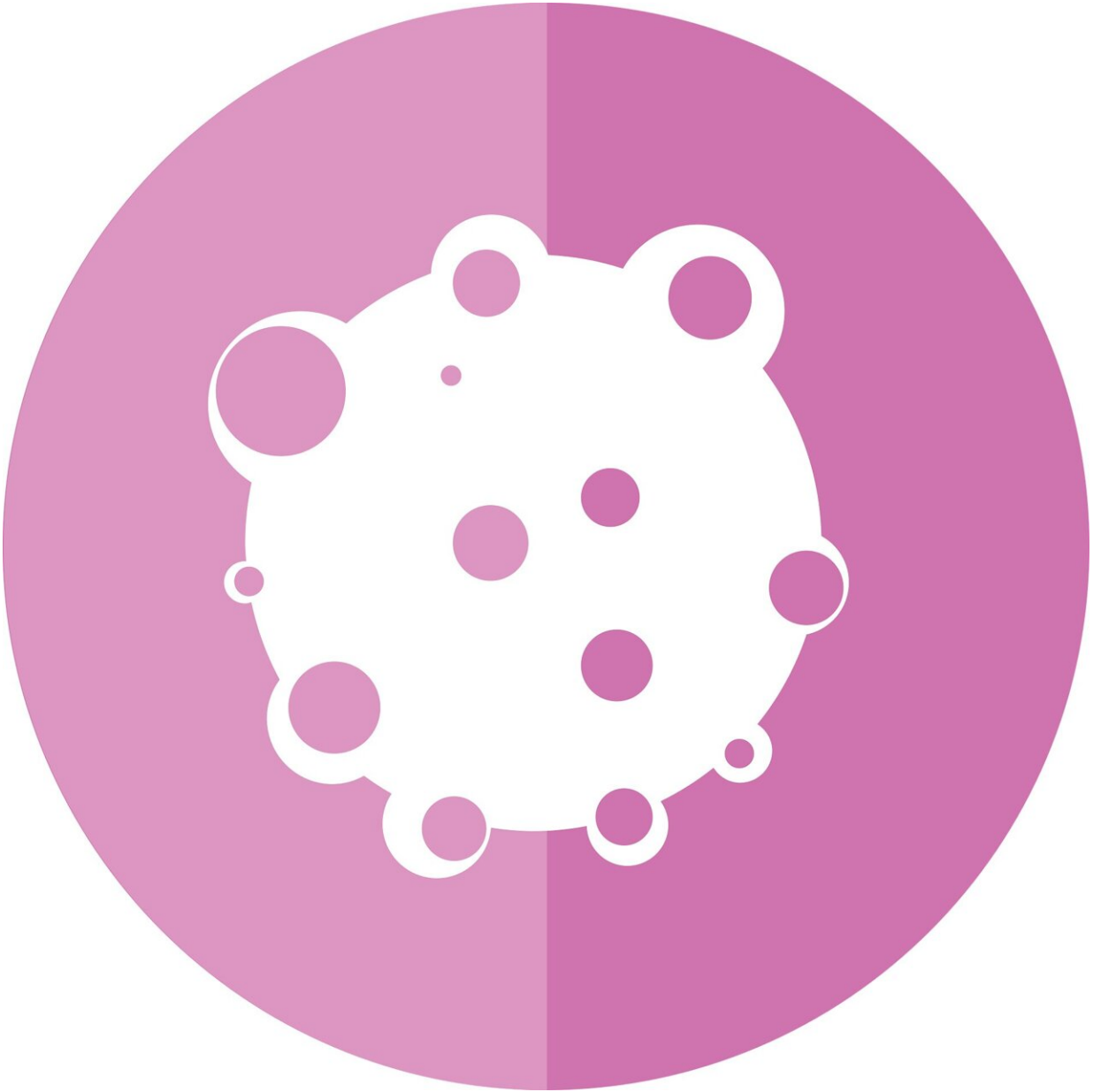


Erk5 and its potential applications in cancer treatment

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A new editorial paper was [published](#) in *Oncoscience*, titled "Role of Erk5 expressed in bone marrow mesenchymal stem cells on bone homeostasis and its potential applications in cancer treatment."

In their new editorial, researchers Tetsuhiro Horie and Eiichi Hinoi from Kanazawa Medical University, Gifu Pharmaceutical University, and Gifu University discuss Extracellular signal-regulated kinase 5 (Erk5). Erk5 belongs to the mitogen-activated protein kinase (MAPK) family and is specifically phosphorylated and subsequently activated by MAPK/Erk5 kinase 5 (Mek5). Compared to classical MAPKs Erk1/2, Erk5 is unique in that it has distinctive structures on its C-terminus with two proline-rich domains and a nuclear localization signal domain, which regulate autophosphorylation and transcription.

"Erk5 signaling is activated by hypoxia, oxidative stress, cytokines and growth factors, and is involved in angiogenesis, neurogenesis and energy metabolism, as well as tumor growth and metastasis," write the researchers.

Bone homeostasis is maintained by the coordinated activities of osteoclasts (bone-resorbing cells) and osteoblasts (bone-forming cells) derived from [hematopoietic stem cells](#) (HSCs) and bone marrow [mesenchymal stem cells](#) (BM-MSCs), respectively. Bone diseases such as osteoporosis and osteopetrosis are caused by an imbalance between [bone resorption](#) and formation due to aging, menopause, genetic mutations, etc.

Previously, using paired-related homeobox 1 (Prx1)-Cre; Erk5^{fl/fl} mice (MSC-specific Erk5 knockout mice), the researchers showed that Erk5 activates Smad-specific E3 ubiquitin protein ligase 2 (Smurf2) by directly phosphorylating Thr249 (Smurf2^{T249}) and regulates skeletal development during embryogenesis by inducing the degradation of Smad1 protein, but the function of Erk5 in BM-MSCs in adulthood was not clear.

"Therefore, we generated and analyzed conditional Erk5 [knockout mice](#) (LepR-Cre; Erk5^{fl/fl} mice) using leptin receptor (LepR)-Cre, which

targets adult BM-MSCs," state the authors.

More information: Tetsuhiro Horie et al, Role of Erk5 expressed in bone marrow mesenchymal stem cells on bone homeostasis and its potential applications in cancer treatment, *Oncoscience* (2024). [DOI: 10.18632/oncoscience.601](https://doi.org/10.18632/oncoscience.601)

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