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Ferroptosis, Cysteine metabolism, Cancer metabolism

[논문]

1. Nguyen, C. T. N., Kim, S. M., and Kang, Y. P. Mass spectrometry-based approaches to explore metabolism regulating ferroptosis. BMB Reports, 55, 9, 2022.
2. Kang, Y. P., Mockabee-Macias, A., Jiang, C., Falzone, A., Prieto-Farigua, N., Stone E., Harris, I. S., and DeNicola, G. M. Non-canonical glutamate-cysteine ligase activity protects against ferroptosis. Cell Metabolism, 33, 1. 2021.
3. Kang, Y. P., Falzone, A., Liu, M., González-Sánchez, P., Choi, B.-H., Coloff, J. L., Saller, J. J., Karreth, F. A., & DeNicola, G. M. PHGDH supports liver ceramide synthesis and sustains lipid homeostasis. Cancer & Metabolism, 8, 6. 2020.
4. Kang, Y. P., Torrente, L., Falzone, A., Elkins, C. M., Liu, M., Asara, J.M., Dibble, C.C. & DeNicola, G. M. Cysteine dioxygenase 1 is a metabolic liability for non-small cell lung cancer. Elife. e45572. 2019.
5. Kang, Y. P., Ward, N. P. & DeNicola, G. M. Recent advances in cancer metabolism: a technological perspective. Experimental & molecular medicine, 50, 31. 2018. Review.

Understanding and targeting of cysteine metabolism in cancer

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CDO1 is an enzyme oxidizing cysteine and produce cysteine-sulfinic acid (CSA). CDO1 is generally depleted in NSCLC cells and tumors due to epigenetic silencing. We found that CDO1 restoration in NSCLC cells depleted cysteine, impaired cell growth and increased sensitivity to oxidative stress. Mechanistically, CDO1 expression led to a significant accumulation of sulfite due to GOT1-mediated transamination of CSA. Further, sulfite reacted with cystine, accelerating cysteine depletion and toxicity. Our results demonstrate that CDO1 is a metabolic liability for NSCLC cells through toxic sulfite production and cysteine depletion. Cystine deprivation induces ferroptosis in cancer cells, which provides therapeutic potential. Here, we show that cystine deprivation induced both GSH depletion and glutamate accumulation to accelerate ferroptosis. Surprisingly, GCLC directly catalyzes gamma-glutamyl peptide synthesis in cysteine starved cells. gamma-glutamyl peptide production reduced intracellular glutamate accumulation, thereby preventing the glutamate-mediated oxidative stress and ferroptosis induction. Therefore, the combinatorial approach of cystine deprivation and GCLC inhibition will provide better therapeutic potential to treat NSCLC.