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所属 Affiliation

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専門 Research Area	**分子生物学、腫瘍生物学** Molecular Biology, Cancer Biology
研究課題 代表的な研究	① **RNA 創薬：microRNA を用いたがん治療** 我々は抗がん活性とヌクレアーゼ耐性を向上した化学修飾 miR-143 を開発した。化学修飾 miR-143 が KRAS ネットワークを制御することを明らかにし、KRAS 変異大腸がん皮下移植マウスを用いて皮下投与で著明な腫瘍縮小効果を確認した。microRNA による核酸創薬の開発を目指している。 ② **植物由来物質によるがんの未病医療** 多くの食物に含まれるファイトケミカルによる細胞死はミトコンドリアを標的にしてがん細胞をアポトーシスに誘導することを明らかにした。我々はがん予防に資する機能性食品の研究開発を進めている。植物のエクソソーム miRNA の機能及び体内動態についても研究を進めている。
Main Research Projects	① **Discovery of RNA drugs: Cancer treatment using microRNAs** We have developed a chemically modified miR-143 that possesses enhanced anticancer activity and is resistant to nucleases. We have also demonstrated that this chemically modified miR-143 regulates the KRAS network and confirmed that subcutaneous administration led to marked tumor shrinkage in KRAS-mutant mice subcutaneously implanted with colorectal cancer cells. We are presently working to develop oligonucleotide therapeutics using this and other microRNAs. ② **Use of plant-derived substances to treat cancer before onset of symptoms** We have demonstrated that cell death induced by phytochemicals contained in many foods also induces apoptosis in cancer cells by targeting mitochondria. We are presently researching and developing functional foods that may prevent cancer as well as investigating the functions and kinetics of plant exosomal miRNAs in the body.
研究業績 (過去 5 年)	1. Inomata, Y., J. W. Oh, K. Taniguchi, N. Sugito, N. Kawaguchi, F. Hirokawa, S. W. Lee, Y. Akao, S. Takai, K. P. Kim and K. Uchiyama. "Downregulation of miR-122-5p Activates Glycolysis via PKM2 in Kupffer Cells of Rat and Mouse Models of Non-Alcoholic Steatohepatitis." Int J Mol Sci 23(9), 2022. (IF: 5.923, CS: 6.0) 査読あり 2. Akao, Y., R. Terazawa, N. Sugito, K. Heishima, K. Morikawa, Y. Ito, R. Narui, R. Hamaguchi and T. Nobukawa. "Understanding of cell death induced by the constituents of Taxus yunnanensis wood." Sci Rep 12(1): 6282, 2022. (IF: 4.379, CS: 7.1) 査読あり 3. Heishima, K., N. Sugito, T. Soga, M. Nishikawa, Y. Ito, R. Honda, Y. Kuranaga, H. Sakai, R. Ito, T. Nakagawa, H. Ueda and Y. Akao. "Petasin potently inhibits mitochondrial complex I-based metabolism that supports tumor growth and metastasis." J Clin Invest 131(17), 2021. (IF: 14.808, CS: 17.7) 査読あり 4. Fukada, M., N. Matsuhashi, T. Takahashi, N. Sugito, K. Heishima, K. Yoshida and Y. Akao. "Postoperative changes in plasma miR21-5p as a novel biomarker for colorectal cancer recurrence: A prospective study." Cancer Sci 112(10): 4270-4280, 2021. (IF: 6.716, CS: 8.5) 査読あり 5. Akao, Y., Y. Kuranaga, K. Heishima, N. Sugito, K. Morikawa, Y. Ito, T. Soga and T. Ito. "Plant hvu-MIR168-3p enhances expression of glucose transporter 1 (SLC2A1) in human cells by silencing genes related to mitochondrial electron transport chain complex I." J Nutr Biochem: 108922, 2021. (IF: 6.048, CS: 9.7) 査読あり 6. Tokumaru, Y., M. Asaoka, M. Oshi, E. Katsuta, L. Yan, S. Narayanan, N. Sugito, N. Matsuhashi, M. Futamura, Y. Akao, K. Yoshida and K. Takabe. "High Expression of microRNA-143 is Associated with Favorable Tumor Immune Microenvironment and Better Survival in Estrogen Receptor Positive Breast Cancer." Int J Mol Sci 21(9), 2020. (IF: 5.923, CS: 6.0) 査読あり

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8. Tsujino, T., N. Sugito, K. Taniguchi, R. Honda, K. Komura, Y. Yoshikawa, T. Takai, K. Minami, Y. Kuranaga, H. Shinohara, Y. Tokumaru, K. Heishima, T. Inamoto, H. Azuma and Y. Akao. "MicroRNA-143/Musashi-2/KRAS cascade contributes positively to carcinogenesis in human bladder cancer." Cancer Sci 110(7): 2189-2199, 2019. (IF: 6.716, CS: 8.5) 査読あり
9. Tokumaru, Y., T. Tajirika, N. Sugito, Y. Kuranaga, H. Shinohara, T. Tsujino, N. Matsuhashi, M. Futamura, Y. Akao and K. Yoshida. "Synthetic miR-143 Inhibits Growth of HER2-Positive Gastric Cancer Cells by Suppressing KRAS Networks Including DDX6 RNA Helicase." Int J Mol Sci 20(7), 2019. (IF: 5.923, CS: 6.0) 査読あり
10. Takai, T., T. Tsujino, Y. Yoshikawa, T. Inamoto, N. Sugito, Y. Kuranaga, K. Heishima, T. Soga, K. Hayashi, K. Miyata, K. Kataoka, H. Azuma and Y. Akao. "Synthetic miR-143 Exhibited an Anti-Cancer Effect via the Downregulation of K-RAS Networks of Renal Cell Cancer Cells In Vitro and In Vivo." Mol Ther 27(5): 1017-1027, 2019. (IF: 11.454, CS: 17.7) 査読あり
11. Shinohara, H., N. Sugito, Y. Kuranaga, K. Heishima, Y. Minami, T. Naoe and Y. Akao. "Potent antiproliferative effect of fatty-acid derivative AIC-47 on leukemic mice harboring BCR-ABL mutation." Cancer Sci 110(2): 751-760, 2019. (IF: 6.716, CS: 8.5) 査読あり
12. Taniguchi, K., N. Sugito, H. Shinohara, Y. Kuranaga, Y. Inomata, K. Komura, K. Uchiyama and Y. Akao. "Organ-Specific MicroRNAs (MIR122, 137, and 206) Contribute to Tissue Characteristics and Carcinogenesis by Regulating Pyruvate Kinase M1/2 (PKM) Expression." Int J Mol Sci 19(5), 2018. (IF: 5.923, CS: 6.0) 査読あり
13. Taniguchi, K., A. Iwatsuki, N. Sugito, H. Shinohara, Y. Kuranaga, Y. Oshikawa, T. Tajirika, M. Futamura, K. Yoshida, K. Uchiyama and Y. Akao. "Oncogene RNA helicase DDX6 promotes the process of c-Myc expression in gastric cancer cells." Mol Carcinog 57(5): 579-589, 2018. (IF: 4.784, CS: 8.1) 査読あり
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18. Sugito, N., K. Taniguchi, Y. Kuranaga, M. Ohishi, T. Soga, Y. Ito, M. Miyachi, K. Kikuchi, H. Hosoi and Y. Akao. "Cancer-Specific Energy Metabolism in Rhabdomyosarcoma Cells Is Regulated by MicroRNA." Nucleic Acid Ther 27(6): 365-377, 2017. (IF: 5.486, CS: 9.1) 査読あり
19. Shinohara, H., Y. Kuranaga, M. Kumazaki, N. Sugito, Y. Yoshikawa, T. Takai, K. Taniguchi, Y. Ito and Y. Akao. "Regulated Polarization of Tumor-Associated Macrophages by miR-145 via Colorectal Cancer-Derived Extracellular Vesicles." J Immunol 199(4): 1505-1515, 2017. (IF: 5.422, CS: 9.0) 査読あり
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外部資金 (過去 5 年)	令和 2-4 年度　科学研究費補助金 若手研究　（研究代表者）課題番号 20K16354 横紋筋肉腫由来エクソソームにおける増殖と転移での関与の解明
略歴	平成 22 年 4 月　岐阜大学工学部生命工学部 卒業 平成 26 年 4 月　岐阜大学大学院工研究科生命工学専攻修士課程　入学 平成 28 年 3 月　　同　上　　修了 平成 28 年 4 月　岐阜大学大学院連合創薬医療情報研究科 創薬科学専攻博士後期課程　入学 平成 31 年 3 月　　同　上　　修了 平成 31 年 4 月　岐阜大学大学院連合創薬医療情報研究科　研究員(AMED) 令和　4 年 4 月　岐阜大学大学院連合創薬医療情報研究科　特任助教