

Cardiovascular Surgery

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Major Scientific Interests of the Group

Most of clinical questions throughout the cardiovascular surgery field would be our scientific interests as shown in the projects below. Among them we are now focusing on AI application onto the management in the intensive care unit, and development of a novel hybrid ventricular assist device.

Projects for Regular Students in Doctoral or Master's Programs

- 1) AI application onto the management in the intensive care unit
- 2) Development of a novel hybrid ventricular assist device
- 3) Elucidation of signal transduction in aneurysmal formation
- 4) Elucidation of hematological deterioration during cardiopulmonary bypass
- 5) Development of vitamin K-reduced functional food
- 6) Development of valve simulation imaging technology
- 7) Regenerative medicine using adipose tissue stem cells

Study Programs for Short Stay Students (one week – one trimester)

- 1) Involvement in above clinical and translational researches
- 2) Observership in OR, ICU or laboratories

Selected Publications

- 1) Matsubara Y, Kiyohara H, Mikami Y, Nanki K, Namkoong H, Chubachi S, Hiramatsu Y, et al. (Japan COVID-19 Task Force) Gastrointestinal symptoms in COVID-19 and disease severity: a Japanese registry-based retrospective cohort study. *J Gastroenterol* 2024 Mar; 59(3): 195-208. doi: 10.1007/s00535-023-02071-x. Epub 2024 Jan 25.
- 2) Kawamata T, Wakimoto A, Nishikawa T, Ikezawa M, Hamada M, Inoue Y, Kulathunga1 K, Salim FN, Kanai M, Nishino T, Gentleman K, Liu C, Obana N, Fukuda S, Mathis BJ, Takahashi S, Taya Y, Sakai S, Hiramatsu Y. Natto consumption suppresses atherosclerotic plaque progression in LDL receptor-deficient mice transplanted with iRFP-expressing hematopoietic cells. *Scientific Reports* 2023, 13:22469, <https://doi.org/10.1038/s41598-023-48562-y>
- 3) Shimoda T, Liu C, Mathis BJ, Goto Y, Ageyama N, Kato H, Matsubara M, Ohigashi T, Goshio M, Suzuki Y, Hiramatsu Y. Effect of cardiopulmonary bypass on coagulation factors II, VII, and X in a primate model: an exploratory pilot study. *ICVTS Interdisciplinary CardioVascular and Thoracic Surgery*, ivad194, <https://doi.org/10.1093/icvts/ivad194>, Published: 28 November 2023
- 4) Yamashita T, Khanh VC, Ngo Nhat H, Osaka M, Hiramatsu Y, Ohneda O. Impairment of HIF-2 α expression induced the compensatory overexpression of the HIF-1 α /SDF-1 axis to promote wound healing. *Stem Cells Dev.* 2023 Jun 30. doi: 10.1089/scd.2023.0114. Online ahead of print. PMID: 37392019
- 5) Sasaki K, Kuniyama T, Suzuki S, Matsumiya G, Fukuda H, Shiiya N, Koyama T, Komiya T, Yaku H, Shiose A, Usui A, Kobayashi J, Ishii Y, Tanji M, Misumi H, Ohtsuka T, Yoshimura N, Hiramatsu Y, Nitta T. Multicenter study of surgical ablation for atrial fibrillation in aortic valve replacement. *ASAIO J.* 2023 May 1;69: 483-9. doi:

10.1097/MAT.0000000000001882. Epub 2023 Apr 27.

- 6) Mathis BJ, Tanaka K, Hiramatsu Y. Obesity vs. metabolically healthy obesity in east Asia. *Encyclopedia MDPI* 2023, 3, 730–745. <https://doi.org/10.3390/encyclopedia3020053>
- 7) Sakamoto H, Kato H, Tsukada T, Mathis BJ, Hiramatsu, Y. Twisting of HeartMate II outflow graft 2.5 years after implantation - HM2 is still ongoing. *Journal of Artificial Organs*, 2023 Feb 20; <https://doi.org/10.1007/s10047-023-01387-y>
- 8) Mathis BJ, Tanaka K, Hiramatsu Y. Metabolically Healthy Obesity: Are Interventions Useful? *Current Obesity Reports*, 2023 Feb 23; <https://doi.org/10.1007/s13679-023-00494-4>
- 9) Goto Y, Hiramatsu Y, Ageyama N, Mathis BJ, Maki N, Matsubara M, Inoue Y, Sato Y. Myeloid progenitor inhibitory factor-1 (CCL23) inhibits lung leukocyte recruitment in a primate cardiopulmonary bypass-induced pulmonary ischemia model. *Heart Lung Circ.* 2023 Jan 9:S1443-9506(22)01240-9. doi: 10.1016/j.hlc.2022.11.017.
- 10) Sekiya T, Ogura Y, Kai H, Kawaguchi A, Okawa S, Hirohama M, Kuroki T, Morii W, Hara A, Hiramatsu Y, Hitomi S, Kawakami Y, Arakawa Y, Maruo K, Chiba S, Suzuki H, Kojima H, Tachikawa H, Yamagata K. TMPRSS2 gene polymorphism common in East Asians confers decreased COVID-19 susceptibility. *Front Microbiol*, 2022 Nov 30;13:943877. doi: 10.3389/fmicb.2022.943877. eCollection 2022.
- 11) Lee H, Chubachi S, Namkoong H, Asakura T, Tanaka H, Otake S, Nakagawara K, Morita A, Fukushima T, Watase M, Kusumoto T, Masaki K, Kamata H, Ishii M, Harada N, Ueda T, Ueda S, Ishiguro T, Arimura K, Saito F, Yoshiyama T, Nakano Y, Mutoh Y, Suzuki Y, Murakami K, Okada Y, Koike R, Kitagawa Y, Kimura A, Imoto S, Hiramatsu Y, Miyano S, Ogawa S, Kanai T, Fukunaga K, et al.; Japan COVID-19 Task Force. Characteristics of hospitalized patients with COVID-19 during the first to fifth waves of infection: a report from the Japan COVID-19 Task Force. *BMC Infect Dis.* 2022 Dec 12;22(1):935. doi: 10.1186/s12879-022-07927-w. *BMC Infect Dis*
- 12) Mathis BJ, Kato H, Hiramatsu Y. Induction of cardiac pathology: endogenous versus exogenous Nrf2 upregulation. *Cells.* 2022 Nov 30;11(23):3855. doi: 10.3390/cells11233855.
- 13) Yamaguchi A, Kato H, Matsubara M, Mathis BJ, Hiramatsu Y. Arterial switch operation with coronary button extension and neo-pulmonary trunk realignment for a rare coronary pattern. *J Card Surg.* 2022 Dec;37(12):5616-5618. doi: 10.1111/jocs.17188. Epub 2022 Nov 15.
- 14) Mathis BJ, Kato H, Matsuiishi Y, Hiramatsu Y. Endogenous and exogenous protection from surgically induced reactive oxygen and nitrogen species. *Surg Today.* 2022 Nov 8. doi: 10.1007/s00595-022-02612-6.
- 15) Mathis BJ, Tanaka K, Hiramatsu Y. Factors of obesity and metabolically healthy obesity in Asia. *Medicina (Kaunas).* 2022 Sep 13;58(9):1271. doi: 10.3390/medicina58091271.
- 16) Yamaguchi A, Sakamoto H, Mathis BJ, Watanabe Y, Kato H, Hiramatsu Y. Right ventricular outflow tract myxoma with absent pulmonary valve. *Heart Surgery Forum* 2022-4741 25 (3), 2022 [Epub June 2022] doi: 10.1532/hsf.4741
- 17) Fukushima T, Chubachi S, Namkoong H, Asakura T, Tanaka H, Lee H, Azekawa S, Okada Y, Koike R, Kimura A, Imoto S, Miyano S, Ogawa S, Kanai T, Fukunaga K, Inoue Y, Chiba S, Yamagata K, Hiramatsu Y, Japan COVID-19 Task Force. Clinical significance of pre-diabetes, undiagnosed diabetes, and diagnosed diabetes on clinical outcomes in COVID-19: Integrative analysis from the Japan COVID-19 Task Force. *Diabetes Obes Metab.* 2022 Sep 3. doi: 10.1111/dom.14857. Online ahead of print.
- 18) Yoshimura N, Hirata Y, Inuzuka R, Tachimori H, Hirano A, Sakurai T, Shiraishi S, Matsui H, Ayusawa M, Nakano T, Kasahara S, Hiramatsu Y, Yamagishi M, Miyata H, Yamagishi H, Sakamoto K. Effect of procedural volume on the outcomes of congenital heart surgery in Japan. *J Thorac Cardiovasc Surg.* 2022 Jun 18:S0022-5223(22)00703-6. doi: 10.1016/j.jtcvs.2022.06.009. Online ahead of print. PMID: 35963799
- 19) Chang YH, Vuong CK, Ngo NH, Yamashita T, Ye X, Futamura Y, Fukushima M, Obata-Yasuoka M, Hamada H, Osaka M, Hiramatsu Y, Sakurai T, Ohneda O. Extracellular vesicles derived from Wharton's Jelly mesenchymal stem cells inhibit the tumor environment via the miR-125b/HIF1 α signaling pathway. *Sci Rep.* 2022 Aug 8;12(1):13550. doi: 10.1038/s41598-022-17767-y. PMID: 35941273
- 20) Chang YH, Ngo NH, Vuong CK, Yamashita T, Osaka M, Hiramatsu Y, Ohneda O. Type 2 diabetes mellitus promotes the differentiation of adipose tissue-derived mesenchymal stem cells into cancer-associated fibroblasts, induced by breast cancer cells. *Stem Cells Dev.* 2022 Jul 30. doi: 10.1089/scd.2022.0086. Online ahead of print. PMID: 35734905

