

主な研究課題・発表代表論文

呼吸器・感染症内科学講座 Respiratory Medicine and Infectious Disease

研究領域 医療情報解析学

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1. 呼吸器疾患の病態生理と分子機構の解明:
 - 閉塞性肺疾患の分子機構、生理学的・生化学的モニタリング方法、酸化・窒素化ストレスと気道リモデリングの関連、上下気道の病態生理学的関連性。
2. 呼吸器疾患と身体活動・フレイルの関連機序の解明と早期診断技術の開発:
 - 健康寿命予測システムの創出、マルチバイオマーカーの開発、肺内と肺外臓器の相互作用のRadiomics解析、身体活動に基づく行動変容の早期検出、地域コホートデータに基づく肺・認知機能と活動性連関病態やアレルギー病態への介入の総合的解析。
3. 呼吸器疾患管理のための新たな医療連携モデルと予防策の構築:
 - 呼吸器・地域包括ケアシステムの医療連携モデル、肺炎予防のための多面的アプローチ、希少呼吸器疾患の特性解明と制御法の研究、閉塞性肺疾患に対する予防・先制医療モデル。
4. 診断技術と治療法の革新:
 - 画像診断技術、細菌叢解析、細胞外小胞（エクソソーム）を利用した解析、特発性肺線維症の革新的治療法、重症喘息の先進的診療効率向上戦略。
5. 医工連携とAI技術の応用:
 - 呼吸器疾患の病態自動解析システム、新型コロナウイルスワクチン有効性の予測モデル、呼吸器症状に基づく個別化治療支援AI技術、医療介護ビッグデータを活用した医療支援技術。

発表代表論文

- 1) Takehiro Shiinoki, Koya Fujimoto, Yusuke Kawazoe, Yuki Yuasa, Miki Kajima, Yuki Manabe, Tsunahiko Hirano, Kazuto Matsunaga, Hidekazu Tanaka.
Assessing four-dimensional CT stress maps derived from patient-specific biomechanical models of the lung with pulmonary function test data in lung cancer patients. *BrJRadiol*.2023 Sep;96(1149):20221149. doi:10.1259/bjr.20221149. Epub 2023 Jul 4.
- 2) Hiroshi Iwamoto, Tsunahiko Hirano, Yoshihiro Amano, Keita Murakawa, Ayumi Fukatsu-Chikumoto, Yoshikazu Yamaji, Mayuka Yamane, Kazuki Anabuki, Toshihito Otani, Naoko Higaki, Shintaro Miyamoto, Takeshi Isobe, Akihito Yokoyama, Kazuto Matsunaga, Noboru Hattori. Prospective Real-World Analysis of Asthma Patients With Preserved and Reduced Physical Activity. *J Allergy Clin Immunol Pract*. 2023 Sep;11(9):2792-2800.e2. doi: 10.1016/j.jaip.2023.04.040. Epub 2023 May 11.

- 3) Tomoyuki Kakugawa, Keiko Doi, Yuichi Ohteru, Hiroyuki Kakugawa, Keiji Oishi, Masahiro Kakugawa, Tsunahiko Hirano, Yusuke Mimura and Kazuto Matsunaga. Kinetics of COVID-19 mRNA primary and booster vaccine-associated neutralizing activity against SARS-CoV-2 variants of concern in long-term care facility residents: a prospective longitudinal study in Japan. *Immun Ageing*. 2023 Aug 17;20(1):42. doi: 10.1186/s12979-023-00368-2.
- 4) Yoshikazu Yamaji, Tsunahiko Hirano, Hiromasa Ogawa, Ayumi Fukatsu-Chikumoto, Kazuki Matsuda, Kazuki Hamada, Shuichiro Ohata, Ryo Suetake, Yoriyuki Murata, Keiji Oishi, Maki Asami-Noyama, Nobutaka Edakuni, Tomoyuki Kakugawa, Kazuto Matsunaga. Utility of the Shortness of Breath in Daily Activities Questionnaire (SOBDA-Q) to Detect Sedentary Behavior in Patients with Chronic Obstructive Pulmonary Disease (COPD). *J Clin Med*. 2023 Jun 17;12(12):4105. doi: 10.3390/jcm12124105.
- 5) Naruaki Ogasawara, Kazuto Matsunaga, Hajime Isomoto, Wataru Shimizu. Internal Medicine Year in Review 2022. *Intern Med*. 2023 Dec 1;62(23):3431-3435. doi: 10.2169/internalmedicine.2266-23. Epub 2023 Jun 7.
- 6) Yusuke Kawazoe, Takehiro Shiinoki, Koya Fujimoto, Yuki Yuasa, Tsunahiko Hirano, Kazuto Matsunaga, Hidekazu Tanaka. Investigation of the combination of intratumoral and peritumoral radiomic signatures for predicting epidermal growth factor receptor mutation in lung adenocarcinoma. *J Appl Clin Med Phys*. 2023 Jun;24(6):e13980. doi: 10.1002/acm2.13980. Epub 2023 Apr 1.
- 7) Nikhil T. Awatade, Peter A. B. Wark, Andrew S. L. Chan, SM Abdullah Al Mamun, Nurul Yaqeen Mohd Esa, Kazuto Matsunaga, Chin Kook Rhee, Philip M. Hansbro, Sukhwinder Singh Sohal, and on behalf of the Asian Pacific Society of Respiriology (APSR) COPD Assembly. The Complex Association between COPD and COVID-19. *J Clin Med*. 2023 May 31;12(11):3791. doi: 10.3390/jcm12113791.
- 8) Maki Asami-Noyama, Kosuke Ito, Misa Harada, Yukari Hisamoto, Yoshie Kunihiro, Eiji Ikeda, Tasuku Yamamoto, Junki Suizu, Ayumi Fukatsu, Syuichiro Ohata, Yoriyuki Murata, Keiji Oishi, Yoshikazu Yamaji, Nobutaka Edakuni, Tomoyuki Kakugawa, Tsunahiko Hirano, Kazuto Matsunaga. A case of development of autoimmune pulmonary alveolar proteinosis during the treatment of hypersensitivity pneumonitis. *Respir Med Case Rep*. 2023 May 16;44:101862. doi: 10.1016/j.rmcr.2023.101862. eCollection 2023
- 9) Keiji Oishi 1, Kazuki Hamada 1, Yoriyuki Murata 1, Kazuki Matsuda 1, Syuichiro Ohata 1, Yoshikazu Yamaji 1, Maki Asami-Noyama 1, Nobutaka Edakuni 1, Tomoyuki Kakugawa 2, Tsunahiko Hirano 1, Kazuto Matsunaga.
A Real-World Study of Achievement Rate and Predictive Factors of Clinical and Deep Remission to Biologics in Patients with Severe Asthma.
J Clin Med. 2023 Apr 16;12(8):2900. doi: 10.3390/jcm12082900

- 10) Yoriyuki Murata, Tsunahiko Hirano, Keiko Doi, Ayumi Fukatsu-Chikumoto, Kazuki Hamada, Keiji Oishi, Tomoyuki Kakugawa, Masafumi Yano, Kazuto Matsunaga.
Computed Tomography Lung Density Analysis: An Imaging Biomarker Predicting Physical Inactivity in Chronic Obstructive Pulmonary Disease: A Pilot Study.
J Clin Med. 2023 Apr 19;12(8):2959. doi: 10.3390/jcm12082959.
- 11) Keiji Oishi, Maki Asami-Noyama, Tasuku Yamamoto, Kosuke Matsumori, Kosei Yonezawa, Michiya Watanabe, Yukari Hisamoto, Ayumi Fukatsu, Kazuki Matsuda, Kazuki Hamada, Ryo Suetake, Syuichiro Ohata, Yoriyuki Murata, Yoshikazu Yamaji, Kenji Sakamoto, Kosuke Ito, Hisayuki Osoreda, Nobutaka Edakuni, Tomoyuki Kakugawa, Tsunahiko Hirano, Kazuto Matsunaga. Detection of impaired gas exchange using the 1-minute sit-to-stand test in patients with interstitial lung disease. Respir Investig. 2023 Mar;61(2):186-189. doi: 10.1016/j.resinv.2022.12.009. Epub 2023 Jan 30.
- 12) Tsunahiko Hirano, Kazuto Matsunaga: Measurement of Blood Eosinophils in Asthma and Chronic Obstructive Pulmonary Disease. Intern Med. 2023 Jan 1;62(1):21-25. doi: 10.2169/internalmedicine.9339-22. Epub 2022 Apr 16.
- 13) Keiji Oishi, Kazuto Matsunaga, Tasuku Yamamoto, Kazuki Matsuda, Yoriyuki Murata, Tsunahiko Hirano. Practical Recommendations for a Selection of Inhaled Corticosteroids in COPD: A Composite ICO Chart. Biomolecules. 2023 Jan 22;13(2):213. doi: 10.3390/biom13020213
- 14) Marc Miravittles, Kazuto Matsunaga, Michael Dreher:
Stepwise management of COPD: What is next after bronchodilation?
Therapeutic Advances in Respiratory Disease. 2023 Jan. Dec:17:17534666231208630. doi:10.1177/17534666231208630
- 15) Kurumi H, Takata T, Kanda T, Sugihara T, Kakugawa T, Yokota SI, Morisaki T, Akashi T, Isomoto H. Investigating the role of heat shock protein 47 in fibrosis in Crohn's disease. Sci Rep 2022; 12: 10966.
- 16) Ayumi Chikumoto, Keiji Oishi, Kazuki Hamada, Tsunahiko Hirano, Tomoyuki Kakugawa, Keiko Kanesada, Kazuto Matsunaga: Sequential Biotherapy Targeting IL-5 and IL-4/13 in Patients with Eosinophilic Asthma with Sinusitis and Otitis Media. Biomolecules 2022 ;12(4):522.
- 17) Shiinoki T, Fujimoto K, Kawazoe Y, Yuasa Y, Kajima M, Manabe Y, Ono T, Hirano T, Matsunaga K, Tanaka H: Predicting programmed death-ligand 1 expression level in non-small cell lung cancer using a combination of peritumoral and intratumoral radiomic features on computed tomography. Biomed Phys Eng Express, 2022 Feb 1;8(2)
- 18) Joon Young Choi, Stephen Milne, Faisal Yunus, Chin Kook Rhee, Kazuto Matsunaga: Current Chronic Obstructive Pulmonary Disease Treatment Status in Asia: A Position Statement of the Asian Pacific Society of Respiriology. Tuberculosis and Respiratory Diseases 85(3) 279-282.

- 19) Maki Asami-Noyama, Misa Harada, Yukari Hisamoto, Taiga Kobayashi, Keiji Oishi, Nobutaka Edakuni, Tsunahiko Hirano, Tomoyuki Kakugawa, Kazuto Matsunaga: Platypnea-orthodeoxia syndrome in a patient with ongoing COVID-19. *Respirology Case Reports*. 2022 Jul 19;10(8):e01009.
- 20) Yasuko Kajimura, Yukinori Nakamura, Tsunahiko Hirano, Yoshinori Tanaka, Kaoru Yamamoto, Yoshihiro Tokunaga, Takahiro Sasaki, Keiji Oishi, Toshiaki Yujiri, Kazuto Matsunaga, Yukio Tanizawa: Significance of alveolar nitric oxide concentration in the airway of patients with organizing pneumonia after allogeneic hematopoietic stem cell transplantation. *Annals of hematology* 101(8) 1803-1813 2022.
- 21) Asami-Noyama M, Furuya-Kondo T, Suetake R, Matsuda K, Oishi K, Yamaji Y, Hirano T, Kakugawa T, Itoh H, Matsunaga K: Invasive thymoma extending to the right atrium with superior vena cava syndrome presenting massive intracardiac thrombosis immediately after the start of chemotherapy: an autopsy case report. *International Cancer Conference Journal* 2022 Feb28; 11:158-163.
- 22) Ohteru Y, Hamada K, Oishi K, Suizu J, Harada M, Murakawa K, Chikumoto A, Matsuda K, Uehara S, Ohata S, Murata Y, Yamaji Y, Sakamoto K, Asami-Noyama M, Edakuni N, Hirano T, Kakugawa T, Murakami T, Takemura T, Matsunaga K: Antineutrophil cytoplasmic antibody-negative granulomatosis with polyangiitis localized to the lungs. *Respiratory Medicine Case Reports* 2022Feb 2; 36: 101600.
- 23) Keiji Oishi, Kazuto Matsunaga, Maki Asami-Noyama, Tasuku Yamamoto, Yukari Hisamoto, Tetsuya Fujii, Misa Harada, Junki Suizu, Keita Murakawa, Ayumi Chikumoto, Kazuki Matsuda, Haruka Kanesada, Yujiro Kikuchi, Kazuki Hamada, Sho Uehara, Ryo Suetake, Syuichiro Ohata, Yoriyuki Murata, Yoshikazu Yamaji, Kenji Sakamoto, Kosuke Ito, Hisayuki Osoreda, Nobutaka Edakuni, Tomoyuki Kakugawa, Tsunahiko Hirano & Masafumi Yano: The 1-minute sit-to-stand test to detect desaturation during 6-minute walk test in interstitial lung disease. *Primary Care Respiratory Medicine*,2022 Jan 27; 32(5).
- 24) Yamamoto T, Oishi K, Suizu J, Murakawa K, Hisamoto Y, Fujii T, Harada M, Chikumoto A, Kikuchi Y, Hamada K, Uehara S, Ohata S, Murata Y, Sakamoto K, Yamaji Y, Asami-Noyama M, Edakuni N, Kakugawa T, Hirano T, Matsunaga K: False-positive Elevation of Beta-D-glucan and Aspergillus Galactomannan Levels Due to Mendelson's Syndrome after Rice Aspiration: A Case Report. *Internal medicine* 2022 Mar 19
- 25) Hamada K, Oishi K, Murata Y, Hirano T, Matsunaga K: Feasibility of Discontinuing Biologics in Severe Asthma: An Algorithmic Approach. *Journal of Asthma and Allergy*. 2021 Dec 7;14:1463-1471
- 26) Murakami N, Nakashima S, Fujimoto K, Makihira S, Nishifuji S, Doi K, Li X, Hirano T, and Matsunaga K: Orthogonality-Constrained CNMF-Based Noise Reduction with Reduced Degradation of Biological Sound. *Sensors* 2021, 21(23), 7981.

- 27) Tanaka H, Ono T, Manabe Y, Kajima M, Fujimoto K, Yuasa Y, Shiinoki T, Yamaji Y, Matsunaga K: Anemia is a Prognostic Factor for Overall Survival Rate in Patients with Non-Small Cell Lung Cancer Treated with Stereotactic Body Radiation Therapy. *Cancer Management and Research*, 2021 Sep 27;13:7447-7453.
- 28) Asami-Noyama M, Harada M, Murakawa K, Suizu J, Murakawa K, Chikumoto A, Hamada K, Murata Y, Oishi K, Yamaji Y, Edakuni N, Hirano T, Kakugawa T, Matsunaga K: Non-pneumophila Legionella species pneumonia with orange-coloured sputum. *Respirol Case Rep*, 2021 Jul 29;9(9):e0814.
- 29) Chikumoto A, Matsunaga K, Oishi K, Hamada K, Yamaji Y, Hirano T: What are key symptoms to be captured for preventing a physician's underestimation of asthma control? *J Allergy Clin Immunol Pract*, Vol.9, No.1, 564-566, 2021
- 30) Hirano T, Matsunaga K, Oishi K, Doi K, Harada M, Suizu J, Murakawa K, Chikumoto A, Ohteru Y, Matsuda K, Uehara S, Hamada K, Ohata S, Murata Y, Yamaji Y, Asami-Noyama M, Edakuni N: Abundant TNF-LIGHT expression in the airways of patients with asthma with persistent airflow limitation: Association with nitrate and inflammatory profiles. *Respiratory Investigation*, 59(5), 651-660, 2021
- 31) Takahashi S, Hirano T, Yasuda K, Donishi T, Suga K, Doi K, Oishi K, Ohata S, Murata Y, Yamaji Y, Asami-Noyama M, Edakuni N and Matsunaga K: Impact of Frailty on Hippocampal Volume in Patients with Chronic Obstructive Pulmonary Disease. *Biomedicines*, 9(9), 1103, 2021
- 32) Utsunomiya T, Mimura-Kimura Y, Yamamoto T, Aoe K, Oishi K, Kamei H, Matsunaga K, Yano M, Mimura Y: Cytokine Adsorption to Polymyxin B-Immobilized Fiber: An in vitro Study. *Blood Purif*, 50(2):230-237, 2021
- 33) Keiji Oishi, Arata Azuma, Shinji Abe, Yoriyuki Murata, Kenji Sakamoto, Yusuke Mimura, Maki Asami-Noyama, Tomoyuki Kakugawa, Tsunahiko Hirano, Kazuto Matsunaga: Improved Prognostic Prediction by Combination of Early Initiation of Polymyxin B Hemoperfusion with Modified Gender-Age-Physiology Index in Acute Exacerbation of Idiopathic Pulmonary Fibrosis. *Blood Purification*, 2021 Published online: September 9, 2021
- 34) Matsunaga K, Harada M, Suizu J, Oishi K, Noyama M, Hirano T: Comorbid Conditions in Chronic Obstructive Pulmonary Disease: Potential Therapeutic Targets for Unmet Needs. *Journal of Clinical Medicine*, 9(10), E3078, 2020
- 35) Hirano T, Doi K, Matsunaga K, Takahashi S, Donishi T, Suga K, Oishi K, Yasuda K, Mimura Y, Harada M, Suizu S, Murakawa K, Chikumoto A, Ohteru Y, Matsuda K, Uehara S, Hamada K, Ohata S, Murata Y, Yamaji Y, Asami-Noyama M, Edakuni N, Kakugawa T: A Novel Role of Growth Differentiation Factor (GDF)-15 in Overlap with Sedentary Lifestyle and Cognitive Risk in COPD. *J Clin Med*, 9(9), E2737, 2020
- 36) Matsunaga K, Kuwahira I, Hanaoka M, Saito J, Tsuburai T, Fukunaga K, Matsumoto H, Sugiura H, Ichinose M, Japanese Respiratory Society Assembly on Pulmonary Physiology: An official JRS statement: The principles of fractional exhaled nitric oxide (FeNO) measurement

- and interpretation of the results in clinical practice. *Respiratory Investigation*, S2212-5345(20)30091-5, 2020
- 37) Matsunaga K, Adachi M, Nagase H, Okoba T, Hayashi N, Tohda Y: Association of low-dosage systemic corticosteroid use with disease burden in asthma. *NPJ Primary Care Respiratory Medicine*, 30(1), 35, 2020
 - 38) Matsunaga K, Katoh N, Fujieda S, Izuhara K, Oishi K: Dupilumab: Basic aspects and applications to allergic diseases. *Allergol Int*, 69(2), 187-196, 2020
 - 39) Jiang F, Hirano T, Ohgi J, Chen X: A voxel image-based pulmonary airflow simulation method with an automatic detection algorithm for airway outlets. *Int J Numer Method Biomed Eng*, 36(3), 2020
 - 40) Yamaji Y, Oishi K, Hamada K, Ohteru Y, Chikumoto A, Murakawa K, Matsuda K, Suetake R, Murata Y, Ito K, Asami-Noyama M, Edakuni N, Hirano T, Matsunaga K: Detection of type2 Biomarkers for Response in COPD. *J Breath Res*, Vol.14, No.2, 026007, 2020
 - 41) Hamada K, Oishi K, Chikumoto A, Murakawa K, Ohteru Y, Matsuda K, Uehara S, Suetake R, Ohata S, Murata Y, Yamaji Y, Asami-Noyama M, Ito K, Edakuni N, Hirano T, Matsunaga K: Impact of sinus surgery on type 2 airway and systemic inflammation in asthma. *Journal of Asthma*, 1-9, 2020
 - 42) Nagase H, Adachi M, Matsunaga K, Yoshida A, Okoba T, Hayashi N, Emoto K, Tohda Y: Prevalence, disease burden, and treatment reality of patients with severe, uncontrolled asthma in Japan. *Allergol Int*, Vol.69 No.1, 53-60, 2020
 - 43) Matsunaga K, Oishi K, Miravittles M, Anzueto A: Time To Revise COPD Treatment Algorithm. *Int J Chron Obstruct Pulmon Dis*, 14, 2229-2234, 2019
 - 44) Chikumoto A, Oishi K, Hamada K, Matsuda K, Uehara S, Suetake R, Yamaji Y, Asami-Noyama M, Edakuni N, Hirano T, Murakami T, Matsunaga K: Cryptococcosis as a cause of organizing pneumonia. *Respir Med Case Rep*, 27, 100851, 2019
 - 45) Oishi K, Hirano T, Murata Y, Hamada K, Uehara S, Suetake R, Yamaji Y, Asami-Noyama M, Edakuni N, Ohata S, Utsunomiya T, Sakamoto K, Onoda H, Matsumoto T, Matsunaga K, Yano M: Medication persistence rates and predictive factors for discontinuation of antifibrotic agents in patients with idiopathic pulmonary fibrosis: a real-world observational study. *Ther Adv Respir Dis*, Vol.13, 1-15, 2019
 - 46) Hirano T, Matsunaga K, Hamada K, Uehara S, Suetake R, Yamaji Y, Oishi K, Asami M, Edakuni N, Ogawa H, Ichinose M: Combination of assist use of short-acting beta-2 agonists inhalation and guidance based on patient-specific restrictions in daily behavior: Impact on physical activity of Japanese patients with chronic obstructive pulmonary disease. *Respiratory investigation*, 57(2), 133-139, 2019
 - 47) Kamei T, Nakamura H, Nanki N, Minakata Y, Matsunaga K, Mori Y, Dr; for Command Study Group: Clinical benefit of two-times-per-day aclidinium bromide compared with once-a-day tiotropium bromide hydrate in COPD: a multicentre, open-label, randomised study. *BMJ Open*, Vol.9, No.7, e024114. 2019

- 48) Nagase H, Adachi M, Matsunaga K, Yoshida A, Okoba T, Hayashi N, Emoto K, Tohda Y: Prevalence, disease burden, and treatment reality of patients with severe, uncontrolled asthma in Japan. *Allergol Int*, Vol.69, 53-60, 2019
- 49) Rhee CK, Chau NQ, Yunus F, Matsunaga K, Perng DW: on behalf the COPD Assembly of the APSR: Management of COPD in Asia: A position statement of the Asian Pacific Society of Respiriology. *Respirology*, Vol.24, No.10, 1018-1025, 2019