

VI 数理分子生命理学専攻
・数理生命科学プログラム

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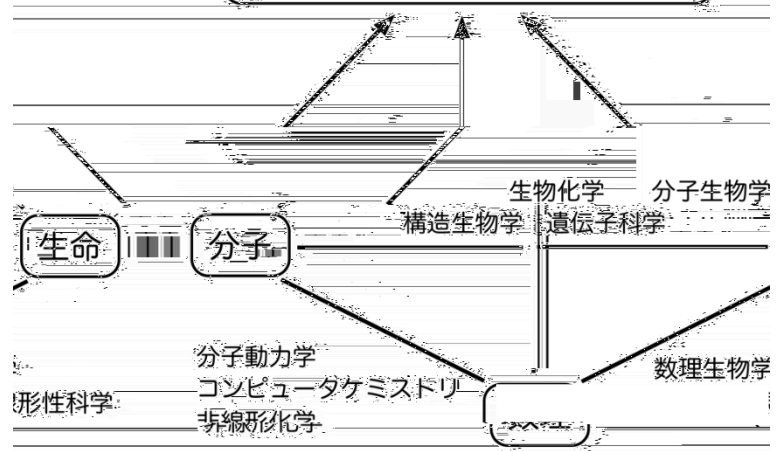
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分子機能制御と生命秩序の形成
自然界の複雑系と自己組織化



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Development and optimization of CRISPR-Cas9-based artificial transcription activator systems

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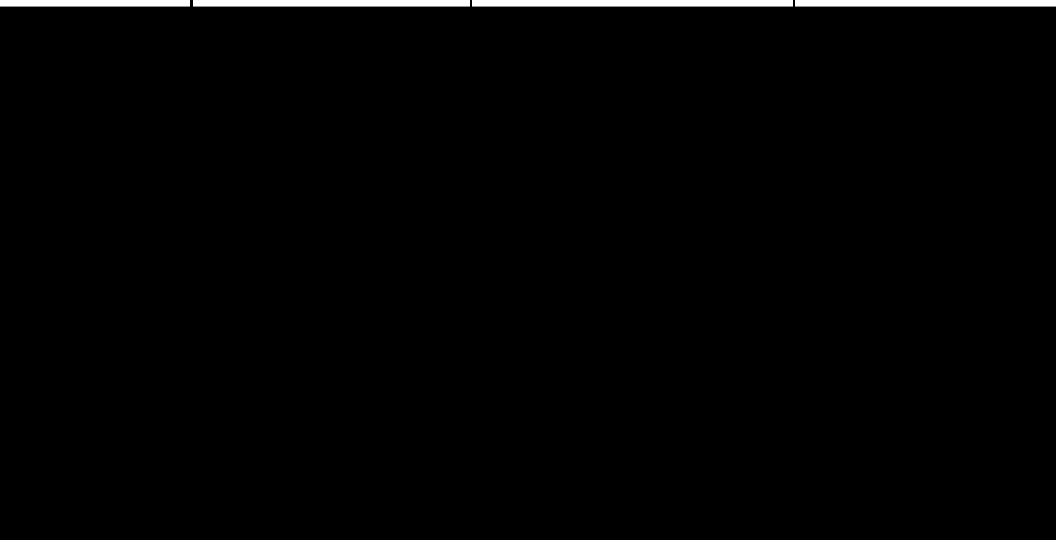
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2. R. Egami, T. Kokaji, A. Hatano, K. Yugi, M. Eto, K. Morita, S. Ohno, M. Fujii, K. Hironaka, S. Uematsu, A. Terakawa, Y. Bai, Y. Pan, T. Tsuchiya, H. Ozaki, H. Inoue, S. Uda, H. Kubota, Y. Suzuki, M. Matsumoto, K.I. Nakayama, A. Hirayama, T. Soga, S. Kuroda, "Trans-Omic Analysis Reveals Obesity-Associated Dysregulation of Inter-Organ Metabolic Cycles between the Liver and Skeletal Muscle", *iScience*, vol.24(3), 102217 (2021)
3. A. Ohara, M. Fujii, A. Awazu, "Spontaneous organizations of diverse network structures in coupled logistic maps with a delayed connection change", *Journal of the Physical Society of Japan*, vol.89, 114801 (2020)
4. T. Kokaji, A. Hatano, Y. Ito, K. Yugi, M. Eto, S. Ohno, M. Fujii, K. Hironaka, R. Egami, H. Inoue, S.

- Uda, H. Kubota, Y. Suzuki, K. Ikeda, M. Arita, M. Matsumoto, K. I. Nakayama, A. Hirayama, T. Soga, S. Kuroda, “Trans-omic analysis reveals allosteric and gene regulation-axes for altered glucose-responsive liver metabolism associated with obesity”, *Science Signaling*, vol.13, eaaz1236 (2020)
5. D. Hoshino, K. Kawata, K. Kunida, A. Hatano, K. Yugi, T. Wada, M. Fujii, T. Sano, Y. Furuichi, Y. Manabe, Y. Suzuki, N. L. Fujii, T. Soga, S. Kuroda, “Trans-omic analysis reveals Ros-dependent pentose phosphate pathway activation after high-frequency electrical stimulation in C2C12 myotubes”, *iScience*, vol.23(10), 101558 (2020)
 6. T. Wada, K. Hironaka, M. Wataya, M. Fujii, M. Eto, S. Uda, D. Hoshino, K. Kunida, H. Inoue, H. Kubota, T. Takizawa, Y. Karasawa, H. Nakatomi, N. Saito, H. Hamaguchi, Y. Furuichi, Y. Manabe, N. L. Fujii, S. Kuroda, “Single-cell information analysis reveals that skeletal muscles incorporate cell-to-cell variability as information not noise”, *Cell Reports*, vol.32(9), 108051 (2020)
 7. D. Aoki, A. Awazu, M. Fujii, J. Uewaki, M. Hashimoto, N. Tochio, T. Umehara, S. Tate, “Ultrasensitive Change in Nucleosome Binding by Multiple Chaperone FACT”, *Journal of Molecular Biology*, vol.432(16), 4637-4657 (2020)
 8. N. Matsuda, K. Hironaka, M. Fujii, T. Wada, K. Kunida, H. Inoue, M. Eto, D. Hoshino, Y. Furuichi, Y. Manabe, N. L. Fujii, H. Noji, H. Imamura, S. Kuroda, “Monitoring and mathematical modeling of mitochondrial ATP in myotubes at single-cell level reveals two distinct population with different kinetics”, *Quantitative Biology*, vol.8, 228-237 (2020)

1. M. Arimoto, M. Fujii, A. Awazu, “Mathematical model of spatiotemporal dynamics of plant hormones responsible for plant stress response”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
2. Y. Kaneshige, M. Fujii, F. Hayashi, K. Morigaki, Y. Tanimoto, H. Yamashita, A. Awazu, “Relationship between function and dynamics of rhodopsin using normal mode analysis”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
3. S. Nakahata, A. Awazu, M. Fujii, “A mathematical model of chromosomal dynamics in budding yeast during DNA double strand break”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
4. T. Oda, M. Fujii, N. Sakamoto, A. Awazu, “Analysis of physical properties and functionalities of

- ArsInsC and DNA repeat sequences”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
5. A. Ohara, M. Fujii, A. Awazu, “Self organized network structures in coupled dynamical system with connection palasticity inspired by cerebral nervous system”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
 6. T. Komoto, M. Fujii, A. Awazu, “The dynamics of chromosomes on early differentiation stage from ES cell”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
 7. Y. Yasui, A. Sugiyama, N. Sakamoto, A. Awazu, “Dynamic and cell specific changes in intranuclear chromosomal structures during early development of sea urchin”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
 8. K. Watanabe, Y. Kurose, Y. Yasui, Naoaki Sakamoto, Akinori Awazu, “Modeling of sea urchin gastrulation based on cytoskeleton imaging”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,
 9. M. Imada, A. Sugiyama, S. Hayashi, K. Watanabe, Y. Yasui, N. Sakamoto, A. Awazu, “Imaging analysis of inter- and intra-nuclear dynamics of sea urchin”, The 58th Annual Meeting of the Biophysical Society of Japan, 2020 9 16 -18 ,

1. _____, _____, _____, DNA
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Vol. 38 p 29 (2021)

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1. Tiwari,SP, “Retrieving potential three-dimensional biological shape matches from a small number of two-dimensional single particle XFEL diffraction patterns”, The 3rd R-CCS International Symposium (2021.02)

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1. Tiwari,SP, “Retrieving potential three-dimensional biological shape matches from a small number of two-dimensional single particle XFEL diffraction patterns”, 20th Annual Meeting of the Protein Society Meeting of Japan (2020.07, Japan)

1. Y. Xu, N. Takayama, H. Er, S. Nakata, “Oscillatory motion of a camphor object on a surfactant solution”, *ACS Applied Materials and Interfaces*, **12**, 1674–1679, DOI: 10.1021/acs.jpcb.0c09314.
 2. S. Tanaka, S. Nakata, M. Nagayama, “A surfactant reaction model for the reciprocating motion of a self-propelled droplet”, *Soft Matter*, **17**, 388–396, DOI: 10.1039/d0sm01500h.
 3. S. Nakata, R. Fujita, “Self-propelled motion of camphor disk on nervonic acid molecular layer and its dependence on phase transition”, *ACS Applied Materials and Interfaces*, **12**, 5524–5529, DOI: 10.1021/acs.jpcb.0c03044.
 4. S. Nakata, Y. Yamaguchi, K. Fukuhara, M. Hishida, H. Kitahata, Y. Katsumoto, Y. Umino, M. Denda, N. Kumazawa, “Characteristic responses of a 1,2-dioleoyl- α -glycero-3-phosphocholine molecular layer to monovalent and divalent metal cations”, *Colloids and Polymers Science*, **398**, 602, 125115-1-5, DOI: 10.1016/j.colsurfa.2020.125115.
 5. S. Nakata, T. Matsufuji, J. Gorecki, H. Kitahata, H. Nishimori, “Inversion probability of three-bladed self-propelled rotors after forced stops of different durations”, *Soft Matter*, **22**, 13123–13128, DOI: 10.1039/d0cp00746c.
 6. M. Matsuo, Y. Hirata, K. Kurihara, T. Toyota, T. Miura, K. Suzuki, T. Sugawara, “Environment-Sensitive Intelligent Self-Reproducing Artificial Cell with a Modification-Active Lipo-Deoxyribozyme”, *ACS Applied Materials and Interfaces*, **11**, 1-18, DOI: 10.3390/mi11060606.
-
1. T. Amemiya, K. Shibata, M. Watanabe, S. Nakata, K. Nakamura, T. Yamaguchi, “Glycolytic Oscillations in Cancer Cells, Chapter 15, Physics of Biological Oscillators”, A. Stefanovska, P. V. E. McClintock (Eds.), Springer, 2021, Doi: 10.1007/978-1-4939-9555-5_15

1. S. Nakata, “Self-propelled motion based on nonlinearity”, Workshop on self-organization and active motion, Online, 2020.9.29.
2. M. Matsuo, “A proliferating coacervate droplet as a prebiotic pattern in the origin of life”, Workshop on self-organization and active motion, Online, 2020.9.29.

1. Y. Xu, S. Nakata, “Oscillatory motion of a camphor object on a surfactant solution”, Workshop on self-organization and active motion, Online, 2020.9.29.
2. M. Kuze, S. Nakata, “Chemical oscillations and waves on microbead in Belousov-Zhabotinsky reaction”, Online, 2021.3.9.

1. _____, “_____”, _____, 101 _____, _____, 2021 3 21
1. _____, _____, _____, _____, Oliver Steinbock, _____, “_____”, _____, 101 _____, A05-1pm-04, _____, 2021 3 19 .
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1. Li J, Hsu A, Hua Y, Wang G, Cheng L, Ochiai H, Yamamoto T, Pertsinidis A. Single-gene imaging links genome topology, promoter-enhancer communication and transcription control. *Nature Structural & Molecular Biology*, 27, 1032-1040, 2020
2. Ochiai H, Hayashi T, Umeda M, Yoshimura M, Harada A, Shimizu Y, Nakano K, Saitoh N, Liu Z, Yamamoto T, Okamura T, Ohkawa Y, Kimura H, Nikaido I. Genome-wide kinetic properties of transcriptional bursting in mouse embryonic stem cells. *Science Advances*, 6, eaaz6699, 2020
3. Miyamoto T, Hosoba K, Itabashi T, Iwane AH, Akutsu SN, Ochiai H, Saito Y, Yamamoto T, Matsuura S. Insufficiency of ciliary cholesterol in hereditary Zellweger syndrome. *The EMBO Journal*, 39, e103499, 2020
4. Kurita, T., Moroi, K., Iwai, M., Okazaki, K., Shimizu, S., Nomura, S., Saito, F., Maeda, S., Takami, A., Sakamoto, A., Ohta, H., Sakuma, T. and Yamamoto, T. Efficient and multiplexable genome editing using Platinum TALENs in oleaginous microalga, NIES-2145. *Genes to Cells*, 25, 695-702, 2020
5. Hozumi, A., Matsunobu, S., Mita, K., Treen, N., Sugihara, T., Horie, T., Sakuma, T., Yamamoto, T., Shiraishi, A., Hamada, M., Satoh, N., Sakurai, K., Satake, H. and Sasakura, Y. GABA-Induced GnRH Release Triggers Chordate Metamorphosis. *Current Biology*, 30, 1555-1561.e4, 2020
6. Takahashi, M., Ikeda, K., Ohmuraya, M., Nakagawa, Y., Sakuma, T., Yamamoto, T. and Kawakami, K. Six1 is required for signaling center formation and labial-lingual asymmetry in developing lower incisors. *Developmental Dynamics*, 249, 1098-1116, 2020
7. Sekiguchi, M., Sobue, A., Kushima, I., Wang, C., Arioka, Y., Kato, H., Kodama, A., Kubo, H., Ito, N., Sawahata, M., Hada, K., Ikeda, R., Shinno, M., Mizukoshi, C., Tsujimura, K., Yoshimi, K., Ishizuka, K., Takasaki, Y., Kimura, H., Xing, J., Yu, Y., Yamamoto, M., Okada, T., Shishido, E., Inada, T., Nakatochi, M., Takano, T., Kuroda, K., Amano, M., Aleksic, B., Yamamoto, T., Sakuma, T., Aida, T., Tanaka, K., Hashimoto, R., Arai, M., Ikeda, M., Iwata, N., Shimamura, T., Nagai, T., Nabeshima, T., Kaibuchi, K., Yamada, K., Mori, D. and Ozaki, N. ARHGAP10, which encodes Rho GTPase-activating protein 10, is a novel gene for schizophrenia risk. *Translational Psychiatry*, 10, 247, 2020
8. Yaguchi S, Yaguchi J, Suzuki H, Kinjo S, Kiyomoto M, Ikeo K, Yamamoto T. Establishment of

10. Iida M, Suzuki M, Sakane Y, Nishide H, Uchiyama I, Yamamoto T, Suzuki KT, Fujii S. A simple and practical workflow for genotyping of CRISPR-Cas9-based knockout phenotypes using multiplexed amplicon sequencing. *Genes Cells*, 25(7):498-509, 2020
11. Fujii, S., Tago, T., Sakamoto, N., Yamamoto, T., Satoh, T., Satoh, A.K. Recycling endosomes associate with Golgi stacks in sea urchin embryos. *Communicative & Integrative Biology*, 13(1), 59-62, 2020
12. Pieplow, A., Dastaw, M., Sakuma, T., Sakamoto, N., Yamamoto, T., Yajima, M., Oulhen, N., Wessel, G.M. CRISPR-Cas9 editing of non-coding genomic loci as a means of controlling gene expression in the sea urchin. *Developmental Biology*, 472, 85-97, 2021
13. Numakura Y, Uemura R, Tanaka M, Izawa T, Yamate J, Kuramoto T, Kaneko T, Mashimo T, Yamamoto T, Serikawa T, Kuwamura M. PHF24 is expressed in the inhibitory interneurons in rats. *Exp Anim*, 70(1):137-143, 2021
14. Nishinaka-Arai, Y., Niwa, A., Matsuo, S., Kazuki, Y., Yakura, Y., Hiroma, T., Toki, T., Sakuma, T., Yamamoto, T., Ito, E., Oshimura, M., Nakahata, T. and Saito, M.K. Down syndrome-related transient abnormal myelopoiesis is attributed to a specific erythro-megakaryocytic subpopulation with GATA1 mutation. *Haematologica*, 106, 635-640, 2021
15. Lee, J.M., Kim, U., Yang, H., Ryu, B., Kim, J., Sakuma, T., Yamamoto, T. and Park, J.H. TALEN-mediated generation of Nkx3.1 knockout rat model. *The Prostate*, 81, 182-193, 2021
16. Arima, Y., Nakagawa, Y., Takeo, T., Ishida, T., Yamada, T., Hino, S., Nakao, M., Hanada, S., a a a

doi:10.1111/1365-3113.12101

- International new WAve Forum (REIWA Forum), 2020 11 8 ,
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 6. _____ . 7 - , 2020 2 12 ,
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 9. Tetsushi Sakuma. Development of transcriptional activation platforms of cancer-related genes using Class 1 and Class 2 CRISPR systems. 79 Symposia S2, 2020 10 1 ,
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1. Nakano T, Shoukamy MI, Tsuda M, Sasanuma H, Hirota K, Takata M, Masunaga S, Takeda S, Ide H, Bessho T, Tano K. Participation of TDP1 in the repair of folmaldehyde-induced DNA-protein

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CRISPR Journal

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triacylglycerol. Sakamoto A, Okazaki K, Yamamoto T, Ohta H, Hori K, Shimizu S, Takami A,
Nomura S, Saito F. March 2, 2021

