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I. 基本情報

事　業　名：（日本語）革新的がん医療実用化研究事業
（英　語）Practical Research for Innovative Cancer Control

研究開発課題名：（日本語）高齢者 MDS におけるクローン進化の経時的理解に基づく新たな治療戦略の構築
（英　語）New therapeutic strategies for myelodysplastic syndromes based on chronological evaluation of their clonal dynamics.

研究開発担当者 所属 役職 氏名：（日本語）京都大学・大学院医学研究科・腫瘍生物学・教授・小川　誠司
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実　施　期　間：平成 28 年 4 月 1 日～平成 29 年 3 月 31 日

分担研究開発課題名：（日本語）MDS における空間的多様性の解明に基づく至適な検体採取法の開発
（英　語）Development of the sampling methods suitable for the analysis of special heterogeneity of MDS

研究開発分担者 所属 役職 氏名：（日本語）長崎大学　原爆後障害医療研究所　血液内科学・教授・宮崎泰司
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分担研究開発課題名：（日本語）MDS におけるクローン進化の遺伝学的理解に基づく、新規バイオマーカー・治療標的分子の同定とこれを用いた早期診断・予防技術・治療層別化技術の開発
（英　語）Developing new strategies of early diagnosis, effective prevention, and risk stratification through understanding of clonal dynamics in MDS.

研究開発分担者 所属 役職 氏名：（日本語）金沢大学　医薬保健研究域医学系　細胞移植学・血液学・教授・中尾眞二
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分担研究　　（日本語）MDS における空間的多様性の解明に基づく至適な検体採取法の開発
開発課題名：　（英　語 Development of appropriate sampling for determination of clonal architecture of in MDS heterogeneity.
研究開発分担者　（日本語）東京医科大学・血液内科学・教授・大屋敷一馬
所属 役職 氏名：（英　語）Tokyo Medical University, Department of Hematology, Professor: Kazuma Ohyashiki

分担研究　　（日本語）MDS におけるクローン進化の遺伝学的理解に基づく、新規バイオマーカー・治療標的分子の同定とこれを用いた早期診断・予防技術・治療層別化技術の開発
開発課題名：　（英　語）Identification of novel biomarkers and targeted molecules, and investigation of early diagnosis, prevention, and appropriate therapies based on genetic evidence of clonal evolution in MDS.
研究開発分担者　（日本語）筑波大学　医学医療系　血液内科・准教授・坂田麻実子
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II. 成果の概要（総括研究報告）

（和文）
骨髄異形成症候群（MDS）は、高齢者に高頻度に認められ、有効な治療が確立されていない代表的ながんである。本研究では、この代表的な高齢者のがんにおけるクローン進化の遺伝学的理解に基づく、新規バイオマーカー・治療標的分子の同定とこれを用いた早期診断・予防技術・治療層別化技術の開発を行った。
主な研究成果は以下の 2 点である。
①MDS における時間的クローン進化の解明
京都大学　大学院医学研究科・腫瘍生物学　小川誠司教授は、次世代シーケンス技術を用い、時系列で複数回の解析を行うことによって、MDS におけるクローン進化を解明した。その結果に基づき、新規バイオマーカーおよび治療標的分子を検索し診断および予後に関する解析を行った。さらに、金沢大学医薬保健研究域医学系細胞移植学・血液学　中尾眞二教授は、高頻度に MDS へ進展する前 MDS 状態である再生不良性貧血におけるクローン性造血から MDS へ進展するクローン進化を、次世代シーケンス技術を用いて解明した。続いて、筑波大学医学医療系血液内科　坂田麻実子准教授は、MDS における加齢に伴う造血細胞の変化を、ゲノム異常のみならず遺伝子発現異常に注目して解析し、MDS におけるクローン進化をゲノムとエピゲノムの異常の組み合わせから解明した。特に、メチル基をヒドロキシメチル化する TET 酵素群に注目して解析し、クローン進化の新たなメカニズムを明らかにした。
MDS におけるクローン進化の遺伝学的理解に基づく、新規バイオマーカー・治療標的分子の同定とこれを用いた早期診断・予防技術・治療層別化技術の開発に関しては、京都大学の小川教授が国際共同研究により、数百例の MDS 症例の全エクソンシーケンス解析により体細胞変異ならびに胚細胞変異よりバ

イオマーカーを抽出した。続いて数千例の MDS 症例においてシーケンス結果を解析することにより、白血病進展を診断する技術開発を行った。この成果を Nature Genetics 誌に報告し(牧島、小川ら Nature Genetics 2017)、予想以上の成果が得られた。プレスリリースを行い機関誌に取り上げられている。
京都大学・AMED・東京大学医科学研究所
http://www.kyoto-u.ac.jp/ja/research/research_results/2016/161220_1.html
http://www.amed.go.jp/news/release_20161220-01.html
http://www.ims.u-tokyo.ac.jp/imsut/jp/research/papers/_2.php
アメリカ血液学会機関誌【ASH clinical news】・【The Hematologist】・ライフサイエンスレビュー
https://www.ashclinicalnews.org/news/literature-scan/investigating-clonal-dynamics-of-different-mutations-in-myelodysplastic-syndromes/
http://www.hematology.org/Thehematologist/Diffusion/7096.aspx
http://first.lifesciencedb.jp/archives/15045
②MDS における空間的多様性の解明に基づく至適な検体採取法の開発
長崎大学原爆後障害医療研究所・血液内科学　宮﨑泰司教授は、MDS 関連疾患である急性骨髄性白血病（AML）治療後に寛解に至り、その 2 年後に骨髄増殖性腫瘍（MPN）を発症した症例について、エクソームシーケンス、ターゲットシーケンスを用いて、造血細胞の空間的クローン構成を詳細に検討した。さらには、東京医科大学・血液内科学　大屋敷一馬教授は、MDS において、骨髄における微小環境を検討し、MDS 細胞と間質細胞の相互作用におけるシグナル伝達を明らかにすることによって、MDS における、空間的多様性を明らかにした。特に、間質細胞のエクソソームに内包された液性因子が MDS の発症に関与することを証明した。

（英文）
Myelodysplastic syndromes (MDS) are a typical group of chronic myeloid neoplasms which are frequent in the elderly. Therefore MDS are refractory to most treatments and no curative therapy is available. In this study, we developed new strategies of early diagnosis, effective prevention, and risk stratification through understanding of clonal dynamics in such a typical cancer in old patients (MDS). Main subjects in this study are chronological assessment (①) and spatial analysis (②) of clonal dynamics in this disease.
① Chronological assessment of clonal dynamics in MDS
Professor Ogawa, Kyoto University clarified clonal dynamics in MDS by next-generation sequencing at multiple time points using serial samples. His team searched for new biomarkers and molecular targets, which were used for further developing the strategies of precise diagnosis and prognostic prediction. Using chronological samples, professor Nakao, Kanazawa University clarified clonal dynamics during MDS evolution from aplastic anemia, which is pre-MDS disease. By combined analysis of genome and epigenome, associate professor Sakata, Tsukuba University identified abnormal gene-expression profile associated with senescence of hematopoietic stem cells. Her team focused their study on TET enzymes to elucidate a novel mechanism of clonal dynamics.
For developing new strategies of early diagnosis, effective prevention, and risk stratification through understanding of clonal dynamics in MDS, professor Ogawa, Kyoto University collaborated with multiple international groups to discover various germline and somatic mutations and detected

novel biomarkers and molecular targets among them. His group and collaborators analyzed the results from more than 2,000 cases with MDS and novel biomarkers significantly associated with leukemic evolution. They reported these findings in Nature genetics (Makishima H, Ogawa S et al. 2017).

② Spatial analysis of clonal dynamics in MDS

Professor Miyazaki, Nagasaki University analyzed spatial architecture of neoplastic clones in MDS-related diseases, which evolved from acute myeloid leukemia into myeloproliferative neoplasms. Moreover, professor Ohyashiki, Tokyo Medical University analyzed microenvironment in bone marrow of MDS patients and studied signal transduction associated with interaction between MDS and stromal cells. His group clarified spatial heterogeneity of MDS owing to pathogenic humoral factors included in exosomes. These findings were confirmed and already submitted as manuscripts.

The journals "ASH clinical news" and "The Hematologist" picked up this study.

https://www.ashclinicalnews.org/news/literature-scan/investigating-clonal-dynamics-of-different-mutations-in-myelodysplastic-syndromes/

http://www.hematology.org/Thehematologist/Diffusion/7096.aspx

III. 成果の外部への発表

（１）学会誌・雑誌等における論文一覧（国内誌 0 件、国際誌 44 件）

1. Yabe M, Yabe H, Morimoto T, Fukumura A, Ohtsubo K, Koike T, Yoshida K, Ogawa S, Ito E, Okuno Y, Muramatsu H, Kojima S, Matsuo K, Hira A, Takata M., The phenotype and clinical course of Japanese Fanconi Anaemia infants is influenced by patient, but not maternal ALDH2 genotype., **Br J Haematol**., 2016-175-457－461
2. Volkert S, Haferlach T, Holzwarth J, Zenger M, Kern W, Staller,M, Nagata Y, Yoshida K, Ogawa S, Schnittger S, Haferlach C., Array CGH identifies copy number changes in 11% of 520 MDS patients with normal, karyotype and uncovers prognostically relevant deletions. **Leukemia**., 2016-30-259－261
3. Tsujita Y, et al., Phosphatase and tensin homolog (PTEN) mutation can cause activated phosphatidylinositol 3-kinase delta syndrome-like immunodeficiency , **J Allergy Clin Immunol**., 2016-138-1672－1680 e1610
4. Tominaga R, Katagiri T, Kataoka K, Kataoka K, Wee RK, Maeda A,Gomyo H, Mizuno I, Murayama T, Ogawa S, Nakao S., Paroxysmal nocturnal hemoglobinuria induced by the occurrence of BCR-ABL in a PIGA mutant hematopoietic progenitor cell., **Leukemia**, 2016-30-1208－1210
5. Shiba N, Yoshida K, Shiraishi Y, Okuno Y, Yamato G, Hara Y, Nagata Y, Chiba K, Tanaka H, Terui K, Kato M, Park MJ, Ohki K, Shimada A, Takita J, Tomizawa D, Kudo K, Arakawa H, Adachi S, Taga T, Tawa A, Ito E, Horibe K, Sanada M, Miyano S, Ogawa S, Hayashi Y., Whole-exome sequencing reveals the spectrum of gene mutations and the clonal evolution patterns in paediatric acute myeloid leukaemia., **Br J Haematol**., 2016-175- 476－489
6. Sakurai M, Kasahara H, Yoshida K, Yoshimi A, Kunimoto H, Watanabe N, Shiraishi Y, Chiba K, Tanaka H, Harada Y, Harada H, Kawakita T, Kurokawa M, Miyano S, Takahashi S, Ogawa S, Okamoto S, Nakajima H., Genetic basis of myeloid transformation in familial platelet disorder/acute myeloid leukemia patients with haploinsufficient RUNX1 allele., **Blood Cancer J**., 2016-6 e392
7. Palomo L, Xicoy B, Garcia O, Mallo M, Adema V, Cabezon M, Arnan M, Pomares H, Jose Larrayoz M, Jose Calasanz M, Maciejewski JP, Huang D, Shih LY, Ogawa S, Cervera J, Such E, Coll R, Grau J, Sole F, Zamora L., Impact of SNP array karyotyping on the diagnosis and the outcome of chronic myelomonocytic leukemia with low risk cytogenetic features or no metaphases, **Am J Hematol**., 2016-91-185－192
8. Ogawa S., Clonal hematopoiesis in acquired aplastic anemia., **Blood**., 2016-128- 337－347
9. Niemoller C, Renz N, Bleul S, Blagitko-Dorfs N, Greil C, Yoshida K, Pfeifer D, Follo M, Duyster J, Claus R, Ogawa S, Lubbert M, Becker H., Single cell genotyping of exome sequencing-identified mutations to characterize the clonal composition and evolution of inv(16) AML in a CBL mutated clonal hematopoiesis., **Leuk Res**., 2016-47- 41－46

10. Nagata Y, et al., Variegated RHOA mutations in adult T-cell leukemia/lymphoma., **Blood**, 2016-127- 596－604
11. Muraoka M, Okuma C, Kanamitsu K, Ishida H, Kanazawa Y, Washio, K, Seki M, Kato M, Takita J, Sato Y, Ogawa S, Tsukahara H, Oda, M, Shimada A., Adults with germline CBL mutation complicated with juvenile myelomonocytic leukemia at infancy., **J Hum Genet.**, 2016-61- 523－526
12. Morishima S, Kashiwase K, Matsuo K, Azuma F, Yabe T, Sato- Otsubo A, Ogawa S, Shiina T, Satake M, Saji H, Kato S, Kodera Y, Sasazuki T, Morishima Y, Japan Marrow Donor P., High-risk HLA alleles for severe acute graft-versus-host disease and mortality in unrelated donor bone marrow transplantation, **Haematologica**., 2016-101-491－498
13. Mori T, Nagata Y, Makishima H, Sanada M, Shiozawa Y, Kon A, Yoshizato T, Sato-Otsubo A, Kataoka K, Shiraishi Y, Chiba K, Tanaka H, Ishiyama K, Miyawaki S, Mori H, Nakamaki T, Kihara R, Kiyoi H, Koeffler HP, Shih LY, Miyano S, Naoe T, Haferlach C, Kern W, Haferlach T, Ogawa S, Yoshida K., Somatic PHF6 mutations in 1760 cases with various myeloid neoplasms. Somatic mosaicism in chronic myeloid leukemia in remission., **Leukemia**., 2016-30-2270－2273
14. Mitani K, Nagata Y, Sasaki K, Yoshida K, Chiba K, Tanaka H, Shiraishi Y, Miyano S, Makishima H, Nakamura Y, Nakamura Y, Ichikawa M, Ogawa S., Somatic mosaicism in chronic myeloid leukemia in remission, **Blood**., 2016-128-2863－2866
15. Merlevede J, et al., Mutation allele burden remains unchanged in chronic myelomonocytic leukaemia responding to hypomethylating agents., **Nat Commun**, 2016-7- 10767
16. Maruyama H, Katagiri T, Kashiwase K, Shiina T, Sato-Otsubo A, Zaimoku Y, Maruyama K, Hosokawa K, Ishiyama K, Yamazaki H,Inoko H, Ogawa S, Nakao S., Clinical significance and origin of leukocytes that lack HLA-A allele expression in patients with acquired aplastic anemia., **Exp Hematol**., 2016-44- 931－939
17. Mansouri L, et al., Frequent NFKBIE deletions are associated with poor outcome in primary mediastinal B-cell lymphoma., **Blood**., 2016-128-2666－2670
18. Madan V, et al., Comprehensive mutational analysis of primary and relapse acute promyelocytic leukemia., **Leukemia**., 2016-30- 1672－1681
19. Kitamura K, Okuno Y, Yoshida K, Sanada M, Shiraishi Y, Muramatsu H, Kobayashi R, Furukawa K, Miyano S, Kojima S, Ogawa S, Kunishima S., Functional characterization of a novel GFI1B mutation causing congenital macrothrombocytopenia., **J Thromb Haemost.**, 2016-14- 1462－1469
20. Kim T, Yoshida K, Kim YK, Tyndel MS, Park HJ, Choi SH, Ahn JS, Jung SH, Yang DH, Lee JJ, Kim HJ, Kong G, Ogawa S, Zhang Z, Kim HJ, Kim DD., Clonal dynamics in a single AML case tracked for 9 years reveals the complexity of leukemia progression., **Leukemia**., 2016-30- 295－302
21. Ki Kim S, Ueda Y, Hatano E, Kakiuchi N, Takeda H, Goto T, Shimizu T, Yoshida K, Ikura Y, Shiraishi Y, Chiba K, Tanaka H, Miyano S, Uemoto S, Chiba T, Ogawa S, Marusawa H., TERT promoter mutations and chromosome 8p loss are characteristic of nonalcoholic fatty

liver disease-related hepatocellular carcinoma., **Int J Cancer**., 2016-139- 2512－2518

22. Kato M, Seki M, Yoshida K, Sato Y, Oyama R, Arakawa Y, Kishimoto H, Taki T, Akiyama M, Shiraishi Y, Chiba K, Tanaka H, Mitsuiki N, Kajiwara M, Mizutani S, Sanada M, Miyano S, Ogawa S, Koh K, Takita J., Genomic analysis of clonal origin of Langerhans cell histiocytosis following acute lymphoblastic leukaemia., **Br J Haematol**., 2016-175- 169－172
23. Kataoka K,et al., Aberrant PD-L1 expression through 3'-UTR disruption in multiple cancers., **Nature**., 2016-534- 402－406
24. Kataoka K, Ogawa S., Variegated RHOA mutations in human cancers., **Exp Hematol**., 2016-44-1123－1129
25. Inaguma Y, Akatsuka Y, Hosokawa K, Maruyama H, Okamoto A, Katagiri T, Shiraishi K, Murayama Y, Tsuzuki-Iba S, Mizutani Y, Nishii C, Yamamoto N, Demachi-Okamura A, Kuzushima K, Ogawa S, Emi N, Nakao S., Induction of HLA-B*40:02-restricted T cells possessing cytotoxic and suppressive functions against haematopoietic progenitor cells from a patient with severe aplastic anaemia., **Br J Haematol**., 2016-172- 131－134
26. Imashuku S, Muramatsu H, Sugihara T, Okuno Y, Wang X, Yoshida K, Kato A, Kato K, Tatsumi Y, Hattori A, Kita S, Oe K, Sueyoshi A, Usui T, Shiraishi Y, Chiba K, Tanaka H, Miyano S, Ogawa S, Kojima S, Kanno H., PIEZO1 gene mutation in a Japanese family with hereditary high phosphatidylcholine hemolytic anemia and hemochromatosis-induced diabetes mellitus., **Int J Hematol**, 2016-104- 125－129
27. Ikeda F, Toki T, Kanezaki R, Terui K, Yoshida K, Kanno H, Ohga S, Ohara A, Kojima S, Ogawa S, Ito E., ALDH2 polymorphism in patients with Diamond-Blackfan anemia in Japan., **Int J Hematol**., 2016-103- 112－114
28. Arashiki N, Takakuwa Y, Mohandas N, Hale J, Yoshida K, Ogura H, Utsugisawa T, Ohga S, Miyano S, Ogawa S, Kojima S, Kanno H., ATP11C is a major flippase in human erythrocytes and its defect causes congenital hemolytic anemia., **Haematologica**., 2016-101- 559－565
29. Makishima H, Yoshizato T, Yoshida K, Sekeres MA, Radivoyevitch T, Suzuki H, Przychodzen B, Nagata Y, Meggendorfer M, Sanada M, Okuno Y, Hirsch C, Kuzmanovic T, Sato Y, Sato-Otsubo A, LaFramboise T, Hosono N, Shiraishi Y, Chiba K, Haferlach C, Kern W, Tanaka H, Shiozawa Y, Gómez-Seguí I, Husseinzadeh HD, Thota S, Guinta KM, Dienes B, Nakamaki T, Miyawaki S, Sauntharajah Y, Chiba S, Miyano S, Shih LY, Haferlach T, Ogawa S, Maciejewski JP., Dynamics of clonal evolution in myelodysplastic syndromes., **Nat Genet**., 2017-49-204－212
30. Hosono N, Makishima H, Mahfouz R, Przychodzen B, Yoshida K, Jerez A, LaFramboise T, Polprasert C, Clemente MJ, Shiraishi Y, Chiba K, Tanaka H, Miyano S, Sanada M, Cui E, Verma AK, McDevitt MA, List AF, Sauntharajah Y, Sekeres MA, Boultwood J, Ogawa S, Maciejewski JP. Recurrent genetic defects on chromosome 5q in myeloid neoplasms., **Oncotarget**., 2017-8- 6483－6495
31. Yamato G, Shiba N, Yoshida K, Shiraishi Y, Hara Y, Ohki K, Okubo J, Okuno H, Chiba K, Tanaka H, Kinoshita A, Moritake H, Kiyokawa N, Tomizawa D, Park MJ, Sotomatsu M, Taga T, Adachi S, Tawa A, Horibe K, Arakawa H, Miyano S, Ogawa S, Hayashi Y., ASXL2

Mutations are Frequently Found in Pediatric AML Patients with t(8;21)/RUNX1-RUNX1T1 and Associated with a Better Prognosis., **Genes Chromosomes Cancer**., 2017

32. Takagi M, Ogata S, Ueno H, Yoshida K, Yeh T, Hoshino A, Piao J, Yamashita M, Nanya M, Okano T, Kajiwara M, Kanegane H, Muramatsu H, Okuno Y, Shiraishi Y, Chiba K, Tanaka H, Bando Y, Kato M, Hayashi Y, Miyano S, Imai K, Ogawa S, Kojima S, Morio T., Haploinsufficiency of TNFAIP3 (A20) by germline mutation is involved in autoimmune lymphoproliferative syndrome., **J Allergy Clin Immunol**., 2017
33. Sun QY, Ding LW, Tan KT, Chien W, Mayakonda A, Lin DC, Loh XY, Xiao JF, Meggendorfer M, Alpermann T, Garg M, Lim SL, Madan V, Hattori N, Nagata Y, Miyano S, Yeoh AE, Hou HA, Jiang YY, Takao S, Liu LZ, Tan SZ, Lill M, Hayashi M, Kinoshita A, Kantarjian HM, Kornblau SM, Ogawa S, Haferlach T, Yang H,Koeffler HP., Ordering of mutations in acute myeloid leukemia with partial tandem duplication of MLL (MLL-PTD)., **Leukemia**., 2017- 1 －10
34. Nishizawa S, Sakata-Yanagimoto M, Hattori K, Muto H, Nguyen T, Izutsu K, Yoshida K, Ogawa S, Nakamura N, Chiba S., BCL6 locus is hypermethylated in angioimmunoblastic T-cell lymphoma., **Int J Hematol**., 2017
35. Nadeau SA, An W, Mohapatra BC, Mushtaq I, Bielecki TA, Luan H, Zutshi N, Ahmad G, Storck MD, Sanada M, Ogawa S, Band V, Band H., Structural Determinants of the Gain-of-Function Phenotype of Human Leukemiaassociated Mutant CBL Oncogene., **J Biol Chem**., 2017
36. Muramatsu H, Okuno Y, Yoshida K, Shiraishi Y, Doisaki S, Narita A, Sakaguchi H, Kawashima N, Wang X, Xu Y, Chiba K, Tanaka H, Hama A, Sanada M, Takahashi Y, Kanno H, Yamaguchi H, Ohga S, Manabe A, Harigae H, Kunishima S, Ishii E, Kobayashi M, Koike K, Watanabe K, Ito E, Takata M, Yabe M, Ogawa S, Miyano S, Kojima S., Clinical utility of next-generation sequencing for inherited bone marrow failure syndromes., **Genet Med**., 2017
37. Ikeda F, Yoshida K, Toki T, Uechi T, Ishida S, Nakajima Y, Sasahara Y, Okuno Y, Kanezaki R, Terui K, Kamio T, Kobayashi A, Fujita T, Sato-Otsubo A, Shiraishi Y, Tanaka H, Chiba K, Muramatsu H, Kanno H, Ohga S, Ohara A, Kojima S, Kenmochi N, Miyano S, Ogawa S, Ito E., Exome sequencing identified RPS15A as a novel causative gene for Diamond-Blackfan anemia., **Haematologica**., 2017
38. Ichimura T, Yoshida K, Okuno Y, Yujiri T, Nagai K, Nishi M, Shiraishi Y, Ueno H, Toki T, Chiba K, Tanaka H, Muramatsu H, Hara T, Kanno H, Kojima S, Miyano S, Ito E, Ogawa S, Ohga S., Diagnostic challenge of Diamond-Blackfan anemia in mothers and children by wholeexome sequencing., **Int J Hematol**., 2017
39. Hoshino A, Okada S, Yoshida K, Nishida N, Okuno Y, Ueno H, Yamashita M, Okano T, Tsumura M, Nishimura S, Sakata S, Kobayashi M, Nakamura H, Kamizono J, Mitsui-Sekinaka K, Ichimura T, Ohga S, Nakazawa Y, Takagi M, Imai K, Shiraishi Y, Chiba K, Tanaka H, Miyano S, Ogawa S, Kojima S, Nonoyama S,Morio T, Kanegane H. Abnormal hematopoiesis and autoimmunity in human subjects with germline IKZF1 mutations., **J Allergy Clin Immunol**, 2017

40. Ding LW, Sun QY, Tan KT, Chien W, Thippeswamy AM, Eng Juh Yeoh A, Kawamata N, Nagata Y, Xiao JF, Loh XY, Lin DC, Garg M, Jiang YY, Xu L, Lim SL, Liu LZ, Madan V, Sanada M, Fernandez LT, Preethi H, Lill M, Kantarjian HM, Kornblau SM, Miyano S, Liang DC, Ogawa S, Shih LY, Yang H, Koeffler HP., Mutational Landscape of Pediatric Acute Lymphoblastic Leukemia., **Cancer Res**., 2017-77- 390－400
41. Chien W, Sun QY, Ding LW, Mayakonda A, Takao S, Liu L, Lim SL, Tan KT, Garg M, De Sousa Maria Varela A, Xiao J, Jacob N, Behrens K, Stocking C, Lill M, Madan V, Hattori N, Gery S, Ogawa S, Wakita S, Ikezoe T, Shih LY, Alpermann T, Haferlach T, Yang H, Koeffler HP., Diagnosis and relapse: cytogenetically normal acute myelogenous leukemia without FLT3-ITD or MLL-PTD., **Leukemia**., 2017
42. Ohta S, Isojima T, Mizuno Y, Kato M, Mimaki M, Seki M, Sato Y, Ogawa S, Takita J, Kitanaka S, Oka A., Partial monosomy of 10p and duplication of another chromosome in two patients, **Pediatr Int**., 59-99－102
43. Ohyashiki K, Kuroda M, Ohyashiki JH: Chromosomes and chromosomal instability in human cancer. The Molecular Basis of Human Cancer (2nd Edition). Editor, Coleman B Tsongalis GJ, Springer, 2016. 241-262.
44. Ohyashiki JH, Umezu T, Ohyashiki K: Exosomes promote bone marrow angiogenesis in hematologic neoplasia: The role of hypoxia. ***Current Opinion in Hematology*, 2016**, 23(3): 268-273.

（2）学会・シンポジウム等における口頭・ポスター発表

1. Cancer Genetics 4. 口頭, Hideki Makishima, 第 13 回国際人類遺伝学会, 2016/4/7, 国内
2. Clonal Dynamics in Myelodysplastic Syndromes.口頭, Hideki Makishima, Kenichi Yoshida, Thomas LaFramboise, Tetsuichi Yoshizato, Matthew Ruffalo, Mikkael A. Sekeres, Bartlomiej Przychodzen, Hiromichi Suzuki, Masashi Sanada, Yasunobu Nagata, Yusuke Okuno, Yusuke Sato, Aiko Sato-Otsubo, Michael J. Clemente, Naoko Hosono, Yuichi Shiraishi, Kenichi Chiba, Hiroko Tanaka, Yusuke Shiozawa, Ines Gomez-Segui, Holleh Husseinzadeh, Swapna Thota, Kathryn Guinta, Brittney Dienes, Tsuyoshi Nakamaki, Shuichi Miyawaki, Yogen Saunthararajah, Shigeru Chiba, Satoru Miyano, Lee-Yung Shih, Seishi Ogawa, Jaroslaw P. Maciejewski. International Conference on Myelodysplastic Syndromes (ESH) ,2016/4/14, 国外
3. Impact of Somatic Mutations on Outcome in Patients with MDS after Stem-Cell Transplantation,口頭・ポスター, Tetsuichi Yoshizato, Yusuke Shiozawa, Kenichi Yoshida, Yoshiko Atsuta, Nannya Yasuhito, Hiromichi Suzuki, Makoto Onizuka, Keisuke Kataoka, Kenichi Chiba, Hiroko Tanaka, Yuichi Shiraishi, Kousuke Aoki, Masashi Sanada, Hidehiro Itonaga, Yoshinobu Kanda, Yasushi Miyazaki, Hideki Makishima, Satoru Miyano, and Seishi Ogawa, The 5th International Conference on Myelodysplastic Syndromes, 2016/4/14, 国外

4. Landscape of genetic lesions in MDS, 口頭, Seishi Ogawa, 5th International Conference On Myelodysplastic Syndrome, 2016/4/14, 国外
5. Aplastic anemia and preleukemia, 口頭, Seishi Ogawa, ２０１６ Ｊｕｓｔｅｎ Ｐａｓｓ ｗｅｌｌ Ｓｙｍｐｏｓｉｕｍ, 2016/4/29, 国外
6. Toward exosome-based cancer therapy: rejuvenation of exosomes derived from normal bone stroma cells. Umezu T, Imanishi S, Azuma K, Kobayashi C, Ohyashiki K, Ohyashiki JH: International symposium for Extra-cellular Vesicles 2016/5/4-7, Rotterdam.国外
7. Teriflunomide restores 5-azacytidine sensitivity via inhibition of DNA methyltransferase. 7th JSH International Symposium. Imanishi S, Takahashi R, Katagiri S, Ohsuga M, Umezu T, Ohyashiki K, Ohyashiki JH: 7th JSH International Symposium (2016/5/13-14, Awajishima). 国内
8. Double inactivation of Tet2 and Tet3 induces hypomethylating agent-sensitive acute myeloid leukemia, 口頭, Koichiro Maie, Mamiko Sakata-Yanagimoto, Motohiko Ohshima, Takayasu Kato, Hideharu Muto, Atsushi Iwama, Shigeru Chiba, The 14th Stem Cell Research Symposium 第 14 回 幹細胞シンポジウム, 2016/5/20-21,国内
9. MDS Genomics and its Clincial Implication. 口頭, Hideki Makishima, 第五届全国血液肿瘤学术大会, 2016/5/21, 国外
10. Clinical and biological landscape of driver mutations in pediatric acute lymphoblastic leukemia, ポスター, Hiroo Ueno, Yuka Yamashita Kenichi Yoshida, Yusuke Shiozawa, Satomi Ishida, Hiroyuki Tsukamoto, Mayumi Kibe, Yuichi Shiraishi, Hiroko Tanaka, Kenichi Chiba, Takao Deguchi, Atsushi Sato, Yoshiko Hashii, Toshihiko Imamura, Satoru Miyano, Seishi Ogawa, Keizo Horibe, Masashi Sanada, The 21st European Hematology Association congress, 2016/6/9, 国外
11. Impact of somatic mutations on outcome in patients with MDS after stem-cell transplantation, ポスター, Tetsuichi Yoshizato, Yusuke Shiozawa, Kenichi Yoshida, Yoshiko Atsuta, Nannya Yasuhito, Hiromichi Suzuki, Makoto Onizuka, Keisuke Kataoka, Kenichi Chiba, Hiroko Tanaka, Yuichi Shiraishi, Kousuke Aoki, Masashi Sanada, Hidehiro Itonaga, Yoshinobu Kanda, Yasushi Miyazaki, Hideki Makishima, Satoru Miyano, and Seishi Ogawa, The 21st Congress of European Hematology Association, 2016/6/10, 国外
12. GENETIC PREDISPOSITIONS TO SPORADIC MYELOID NEOPLASMS CAUSED BY GERMLINE DDX41 MUTATIONS IN ASIAN AND CAUCASIAN POPULATIONS., ポスター, June Takeda, Kenichi Yoshida, Hideki Makishima, Tetsuichi Yoshizato, Yusuke Shiozawa, Hiromichi Suzuki, Yuichi Shiraishi, Yusuke Okuno, Ayana Kon, Keisuke Kataoka, Kenichi Chiba, Hiroko Tanaka, Masashi Sanada, Chantana Polprasert, Jaroslaw P. Maciejewski, and Seishi Ogawa, 21st Congress of the European Hematology Association, 2016/6/10, 国外
13. Genetic landscape of primary central nervous system lymphoma, 口頭, Kenichi Yoshida, Kenichi Chiba, Yusuke Okuno, Nobuyuki Kakiuchi, Shingo Suzuki, Hiromichi Suzuki, Rie Nakamoto-Matsubara, Shunichi Koriyama, Yuichi Shiraishi, Yusuke Sato, Tetsuichi Yoshizato, Yusuke Shiozawa, Keisuke Kataoka, Hiroo Ueno, Yasunobu Nagata, Hiroko

Tanaka, Azusa Hayano, Jumpei Homma, Junya Fukai, Koji Kajiwara, Makoto Ideguchi, Yoshihiro Komohara, Naoki Yajima, Naoto Tsuchiya, Masakazu Sano, Masayuki Nitta, Yoshihiro Muragaki, Mamiko Sakata-Yanagimoto, Yasuo Iwadate, Hiroaki Hondoh, Koichi Kashiwase, Takashi Shiina, Satoru Miyano, Shigeru Chiba, Ryuya Yamanaka, Seishi Ogawa, 21st Congress of the European Hemathology Association, 2016/6/11, 国外

14. Dynamics of Clonal Evolution in Myelodysplastic Syndromes., 口頭, Hideki Makishima, Tetsuichi Yoshizato, Kenichi Yoshida, Thomas LaFramboise, Matthew Ruffalo, Mikkael Sekeres, Hiromichi Suzuki, Bartlomiej Przychodzen, Yasunobu Nagata, Manja Meggendorfer, Masashi Sanada, Yusuke Okuno, Yusuke Sato, Aiko Sato-Otsubo, Tomas Radivoyevitch, Naoko Hosono, Yuichi Shiraishi, Kenichi Chiba, Claudia Haferlach, Wolfgang Kern, Hiroko Tanaka, Yusuke Shiozawa, Inés Gómez-Seguí, Holleh Husseinzadeh, Swapna Thota, Kathryn Guinta, Brittney Dienes, Tsuyoshi Nakamaki, Shuichi Miyawaki, Yogen Saunthararajah, Shigeru Chiba, Satoru Miyano, Lee-Yung Shih, Torsten Haferlach, Seishi Ogawa, Jaroslaw Maciejewski., 21st Congress European Hematology Association, 2016/6/11, 国外
15. Cohesin mutations and their functional implications,口頭, Seishi Ogawa, 21st Congress European Hematology Association, 2016/6/11, 国外
16. A Novel Genetic Mechanism of Evading Anti-tumor Immunity In Multiple Human Cancers, 口頭, Seishi Ogawa, The 5th JCA–AAACR Special Joint conference, 2016/7/14, 国内
17. がんにおけるゲノム異常と腫瘍免疫回避のメカニズムについて, 口頭, Seishi Ogawa, 第２０回日本がん免疫学会総会, 2016/7/29, 国内
18. Clonal Dynamics in Myelodysplastic Syndromes, 口頭, Hideki Makishima, 第 14 回日本臨床腫瘍学会学術集会, 2016/7/29, 国内
19. A Novel Genetic Mechanism of Evading Anti-tumor Immunity In Multiple Human Cancers, 口頭, Seishi Ogawa, The Cancer Genomics Symposium, 2016/8/21, 国外
20. Prognostic Relevance of Integrated Molecular Profiling in Adult T-cell Leukemia/Lymphoma, 口頭, Yotaro Ochi, Keisuke Kataoka, Yasunobu Nagata, Akira Kitanaka, Jun-ichiro Yasunaga, Masako Iwanaga, Kisato Nosaka, Hidehiro Itonaga, Yositaka Imaizumi, Kotaro Shide, Yasushi Miyazaki, Akifumi Takaori-Kondo, Kazuya Shimoda, Masao Matsuoka, Toshiki Watanabe, Seishi Ogawa, 第 3 回日本 HTLV-1 学会学術集会, 2016/8/27, 国内
21. ATL および T 細胞リンパ腫における遺伝子変異プロファイルの解析, 口頭, Yosaku Watatani, Yasuharu Sato, Kenji Nishida, Hiroaki Miyoshi, Yuichi Shiraishi, Kenichi Chiba, Hiroko Tanaka, Hiroo Ueno, Nobuyuki Kakiuchi, Yusuke Shiozawa, Tetsuichi Yoshizato, Kenichi Yoshida, Masashi Sanada, Satoru Miyano, Koichi Ohshima, Tadashi Yoshino, Seishi Ogawa, Keisuke Kataoka, 第 3 回日本 HTLV-1 学会学術集会, 2016/8/27, 国内
22. A Unique mechanism of cancer immune evasion, 口頭, Seishi Ogawa, QOL–ONE MDS and AML MEETING, 2016/9/14, 国外
23. Double inactivation of tet2 and tet4 induces hypomethylating agent-sensitive acute myeloid leukemia. ポスター, Koichiro Maie, Mamiko Sakata-Yanagimoto, Motohiko Oshima,

Takayasu Kato, Hideharu Muto, Enguerran Mouly, Olivier A Bernard, Haruhiko Koseki, Atsushi Iwama, Shigeru Chiba, 21th Congress of EHA 2016, 2016/6/9-12, Copenhagen, Denmark

24. A Novel Genetic Mechanism of Evading Anti-tumor Immunity In Multiple Human Cancers, 口頭, Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/5, 国内
25. Differential role of mutations in clonal evolution in esophaegal mucosal in high-risk individuals for cancer, ポスター, Akira Yokoyama, Hiromichi Suzuki, Tetsuichi Yoshizato, Yusuke Shiozawa, Yusuke Sato, Kosuke Aoki, Nobuyuki Kakiuchi, Yasuhide Takeuchi, Shigeru Tsunoda, Masashi Sanada, Satoru Miyano, Manabu Muto, Seishi Ogawa, The 75th Annual Meeting of the Japanese Cancer Association, 2016/10/6, 国内
26. Mutational Panel for Following Clonal Evolution in Myelodysplastic Syndromes., 口頭, Hideki Makishima, Tetsuichi Yoshizato, Kenichi Yoshida, Yasunobu Nagata, Mikkael Sekeres, Yusuke Okuno, Yuichi Shiraishi, Shigeru Chiba, Satoru Miyano, Lee-Yung Shih, Torsten Haferlach, Seishi Ogawa, Jaroslaw Maciejewski. The 75th Annual Meeting of the Japanese Cancer Association, 2016/10/6, 国内
27. Prognostic Relevance of Integrated Molecular Profiling in Adult T-cell Leukemia/Lymphoma, 口頭, Yotaro Ochi, Keisuke Kataoka, Yasunobu Nagata, Akira Kitanaka, Jun-ichiro Yasunaga, Masako Iwanaga, Yuichi Shiraishi, Kenichi Chiba, Aiko Sato-Otsubo, Masashi Sanada, Hiroko Tanaka, Hiromichi Suzuki, Yusuke Sato, Yusuke Shiozawa, Tetsuichi Yoshizato, Kenichi Yoshida, Kisato Nosaka, Masakatsu Hishizawa, Hidehiro Itonaga, Yositaka Imaizumi, Tomonori Hidaka, Tsuyoshi Nakamaki, Shuichi Miyawaki, Kensei Tobinai, Kotaro Shide, Yasushi Miyazaki, Akifumi Takaori-Kondo, Shibata Tatsuhiro, Satoru Miyano, Kazuya Shimoda, Masao Matsuoka, Toshiki Watanabe, Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/6, 国内
28. Impact of somatic mutations on outcome in patients with MDS after stem-cell transplantation, 口頭, Tetsuichi Yoshizato, Yusuke Shiozawa, Kenichi Yoshida, Yoshiko Atsuta, Nannya Yasuhito, Hiromichi Suzuki, Makoto Onizuka, Keisuke Kataoka, Kenichi Chiba, Hiroko Tanaka, Yuichi Shiraishi, Kousuke Aoki, Masashi Sanada, Hidehiro Itonaga, Yoshinobu Kanda, Yasushi Miyazaki, Hideki Makishima, Satoru Miyano, and Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/6, 国内
29. Landscape of MDS genomes as revealed by whole genome sequencing, 口頭, Yasuhito Nannya, Kenichi Yoshida, Keisuke Kataoka, Yasunobu Nagata, Tetsuichi Yoshizato, Shigeru Chiba, Norio Aso, Yasushi Miyazaki, Hiroko Tanaka, Kenichi Chiba, Yuichi Shiraishi, Satoru Miyano, and Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/6, 国内
30. Prognostic relevance of integrated genetic profiling in pediatric acute lymphoblastic leukemia, 口頭, Hiroo Ueno, Kenichi Yoshida, Yuka Yamashita-Iijima, Yusuke Shiozawa, Tomomi Ishida, Hiroyuki Tsukamoto, Mayumi Kibe, Yuichi Shiraishi, Hiroko Tanaka, Kenichi Chiba, Takao Deguchi, Atsushi Sato, Yoshiko Hashii, Sadao Tokimasa, Junichi Hara, Yoshiyuki Kosaka, Koji Kato, Toshihiko Imamura, Satoru Miyano, Seishi Ogawa, Keizo Horibe, Masashi Sanada, 第 75 回日本癌学会学術総会, 2016/10/6, 国内

31. Prognostic Relevance of Integrated Molecular Profiling in Adult T-cell Leukemia/Lymphoma, 口頭, Yotaro Ochi, Keisuke Kataoka, Yasunobu Nagata, Akira Kitanaka, Jun-ichiro Yasunaga, Masako Iwanaga, Yuichi Shiraishi, Kenichi Chiba, Aiko Sato-Otsubo, Masashi Sanada, Hiroko Tanaka, Hiromichi Suzuki, Yusuke Sato, Yusuke Shiozawa, Tetsuichi Yoshizato, Kenichi Yoshida, Kisato Nosaka, Masakatsu Hishizawa, Hidehiro Itonaga, Yositaka Imaizumi, Tomonori Hidaka, Tsuyoshi Nakamaki, Shuichi Miyawaki, Kensei Tobinai, Kotaro Shide, Yasushi Miyazaki, Akifumi Takaori-Kondo, Shibata Tatsuhiro, Satoru Miyano, Kazuya Shimoda, Masao Matsuoka, Toshiki Watanabe, Seishi Ogawa, 第 75 回日本癌学会, 2016/10/6, 国内
32. Genetic landscape of primary central nervous system lymphoma, 口頭, Kenichi Yoshida, Kenichi Chiba, Yusuke Okuno, Hiromichi Suzuki, Yuichi Shiraishi, Hiroko Tanaka, Yoshihiro Muragaki, Takashi Shiina, Satoru Miyano, Shigeru Chiba, Ryuya Yamanaka, Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/7, 国内
33. Molecular profiling across different subtypes of B-cell lymphoma, 口頭, Yasunori Kogure, Keisuke Kataoka, Kenichi Yoshida, Yuichi Shiraishi, Kenichi Chiba, Hiroko Tanaka, Masashi Sanada, Motohiro Kato, Tadashi Yoshino, Kengo Takeuchi, Yuichi Ishikawa, Satoru Miyano, Seishi Ogawa, 第 75 回日本癌学会学術集会, 2016/10/7, 国内
34. Molecular basis of splicing factor-mutated myeloid neoplasms, 口頭, Yusuke Shiozawa, Luca Malcovati, Anna Galli, Aiko Sato-Otsubo, Keisuke Kataoka, Yusuke Sato, Hiromichi Suzuki, Tetsuichi Yoshizato, Kenichi Yoshida, Masashi Sanada, Hideki Makishima, Yuichi Shiraishi, Kenichi Chiba, Eva Hellström Lindberg, Satoru Miyano, Mario Cazzola, and Seishi Ogawa, 第 75 回　日本癌学会学術集会, 2016/10/7, 国内
35. Clonal evolution following azacitidine therapy in patients with high-risk my elodysplastic syndromes, ポスター, 竹田　淳恵、吉田　健一、牧島　秀樹、白石　友一、千葉　健一、千葉　滋、麻生 範雄、宮﨑　泰司、直江　知樹、清井　仁、宮野　悟、小川　誠司, 第 75 回日本癌学会学術総会, 2016/10/7, 国内
36. Biological roles and potential therapeutic targeting of spliceosome mutations in myelodysplasia, 口頭, Ayana Kon, Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/8, 国内
37. Clonal architecture in acquired aplastic anemia, 口頭, Tetsuichi Yoshizato, Bogdan Dumitriu, Kohei Hosokawa, Hideki Makishima, Kenichi Yoshida, Danielle Townsley, Aiko Sato, Yusuke Sato, Delong Liu, Hiromichi Suzuki, Colin Wu, Yuichi Shiraishi, Michael Clemente, Keisuke Kataoka, Yusuke Shiozawa, Yusuke Okuno, Kenichi Chiba, Hiroko Tanaka, Yasunobu Nagata, Takamasa Katagiri, Ayana Kon, Masashi Sanada, Phillip Scheinberg, Satoru Miyano, Jaroslaw Maciejewski, Shinji Nakao, Neal Young, Seishi Ogawa, 第 75 回日本癌学会学術総会, 2016/10/8,　国内
38. Clinical Impact of Somatic Mutations on Clonal Evolution in Myelodysplastic Syndromes., 口頭, Hideki Makishima, Tetsuichi Yoshizato, Kenichi Yoshida, Mikkael Sekeres, Hiromichi Suzuki, Bartlomiej Przychodzen, Yasunobu Nagata, Manja Meggendorfer, Masashi Sanada, Yusuke Okuno, Yuichi Shiraishi, Kenichi Chiba, Claudia Haferlach, Wolfgang Kern, Yusuke

Shiozawa, Shigeru Chiba, Satoru Miyano, Lee-Yung Shih, Torsten Haferlach, Seishi Ogawa, Jaroslaw Maciejewski., 第 78 回日本血液学会学術集会, 2016/10/13, 国内

39. Biomarkers in AML., 口頭, Hideki Makishima, 第 78 回日本血液学会学術集会, 2016/10/13, 国内
40. The biological characterization of Srsf2 P95H mutation in the pathogenesis of myelodysplasia, 口頭, Ayana Kon, Satoshi Yamazaki, Yusuke Shiozawa, Keisuke Kataoka, Yasunori Ota, Maiko Morita, Tetsuichi Yoshizato, Masashi Sanada, Kenichi Yoshida, Hideki Makisima, Yasuhito Nanya, Shinichi Kotani, June Takeda, Yosaku Watatani, Yotaro Ochi, Manabu Nakayama, Haruhiko Koseki, Hiromitsu Nakauchi, Seishi Ogawa, 第 78 回日本血液学会学術集会, 2016/10/13, 国内
41. Prognostic Relevance of Integrated Molecular Profiling in Adult T-cell Leukemia/Lymphoma ATL における網羅的遺伝子プロファイルが予後に与える影響の解析, 口頭, Yotaro Ochi, Keisuke Kataoka, Yasunobu Nagata, Akira Kitanaka, Jun-ichiro Yasunaga, Masako Iwanaga, Yuichi Shiraishi, Kenichi Chiba, Aiko Sato-Otsubo, Masashi Sanada, Hiroko Tanaka, Hiromichi Suzuki, Yusuke Sato, Yusuke Shiozawa, Tetsuichi Yoshizato, Kenichi Yoshida, Kisato Nosaka, Masakatsu Hishizawa, Hidehiro Itonaga, Yositaka Imaizumi, Tomonori Hidaka, Tsuyoshi Nakamaki, Shuichi Miyawaki, Kensei Tobinai, Kotaro Shide, Yasushi Miyazaki, Akifumi Takaori-Kondo, Shibata Tatsuhiro, Satoru Miyano, Kazuya Shimoda, Masao Matsuoka, Toshiki Watanabe, Seishi Ogawa, 第 78 回日本血液学会学術集会, 2016/10/13, 国内
42. Comparative mutational profiling of ATL and other PTCLs, 口頭, Yosaku Watatani, Yasuharu Sato, Kenji Nishida, Hiroaki Miyoshi, Yasunobu Nagata, Akira Kitanaka, Kotaro Shide, Yuichi Shiraishi, Kenichi Chiba, Hiroko Tanaka, Tetsuichi Yoshizato, Kenichi Yoshida, Masashi Sanada, Yasushi Miyazaki, Akifumi Takaori-Kondo, Tatsuhiro Shibata, Satoru Miyano, Masao Matsuoka, Toshiki Watanabe, Kazuya Shimoda, Koichi Ohshima, Tadashi Yoshino, Seishi Ogawa, Keisuke Kataoka, 第 78 回日本血液学会学術集会学術総会, 2016/10/13, 国内
43. Mutation analysis of bone marrow stromal cells derived from AML and MDS.Azuma K, Umezu T, Imanishi S, Asano M, Yoshizawa S, Katagiri S, Ohyashiki K, Ohyashiki JH: 第 78 回日本血液学会総会,2016/1013-15、横浜.国内
44. Clonal evolution following azacAzuma K, Umezu T, Imanishi S, Asano M, Yoshizawa S, Katagiri S, Ohyashiki K, Ohyashiki JH: Mutation analysis of bone marrow stromal cells derived from AML and MDS. 第 78 回日本血液学会総会.2016/10/13～15、横浜.国内
45. Distinct histone modification patterns in 5-azacitidine sensitive human leukemia cells.Imanishi S, Takahashi R, Umezu T, Kobayashi C, Asano M, Ohyashiki K, Ohyashiki JH:第 78 回日本血液学会総会,2016/10/13～15,横浜.国内.
46. Clonal evolution in AML which relapsed 15 years after BMT.Katagiri S, Azuma K, Umezu T, Akahane D, Wataya Y, Yoshida K, Makishima H, Ogawa S, Ohyashiki JH, Ohyashiki K: 第 78 回日本血液学会総会.2016/10/13～15,横浜.国内

47. Tauchi T, Okabe S, Katagiri S, Tanaka Y, Tohyama K, Ohyashiki K: Hedgehog signaling pathway inhibitor, PF-04449913 limits the self-renewal of MDS-derived iPSC. 第 78 回日本血液学会総会.2016/10/13～15.横浜.国内
48. Clonal evolution in AML which relapsed 15 years after BMT.Katagiri S, Azuma K, Umezu T, Akahane D, Wataya Y, Yoshida K, Makishima H, Ogawa S, Ohyashiki JH, Ohyashiki K: 第 78 回日本血液学会総会.2016/10/13～15,横浜.国内
49. Anti-angiogenic effect of normal bone marrow stromal cell-derived exosomes rejuvenated by miR-340. Umezu T, Imanishi S, Azuma K, Yoshizawa S, Ohyashiki K, Ohyashiki JH:第 78 回日本血液学会総会.2016/10/13～15,横浜.国内
50. itidine therapy in patients with high-risk myelodysplastic syndromes, 口頭, June Takeda, Kenichi Yoshida, Tetsuichi Yoshizato, Yusuke Shiozawa, Hideki Makishima, Yasuhito Nannya, Hiromichi Suzuki, Yuichi Shiraishi, Yusuke Okuno, Kenichi Chiba, Satoru Miyano, Masashi Sanada, Toru Kiguchi, Nobuaki Dobashi , Kensuke Usuki, Shigeru Chiba, Norio Asou, Yasuyuki Miyazaki, Tomoki Naoe, Hitoshi Kiyoi, 第 78 回日本血液学会学術集会, 2016/10/13, 国内
51. Landscape of MDS genomes as revealed by whole genome sequencing., 口頭, Yasuhito Nannya, Kenichi Yoshida, Keisuke Kataoka, Yasunobu Nagata, Tetsuichi Yoshizato, Toru Kiguchi, Nobuaki Dobashi, Kensuke Usuki, Tomoki Naoe, Yukio Kobayashi, Hitoshi Kiyoi, Shigeru Chiba, Norio Aso, Yasushi Miyazaki, Hiroko Tanaka, Kenichi Chiba, Yuichi Shiraishi, Satoru Miyano, and Seishi Ogawa, 第 78 回日本血液会学術集会, 2016/10/13, 国内
52. A Novel Genetic Mechanism of Evading Anti-tumor Immunity In Multiple Human Cancers, 口頭, Seishi Ogawa, 第 78 回日本血液学会学術集会, 2016/10/13, 国内
53. Landscape of driver mutations and its clinical significance in pediatric acute lymphoblastic leukemia, 口頭, Hiroo Ueno, Kenichi Yoshida, Yuka Yamashita-Iijima, Yusuke Shiozawa, Tomomi Ishida, Hiroyuki Tsukamoto, Mayumi Kibe, Yuichi Shiraishi, Hiroko Tanaka, Kenichi Chiba, Takao Deguchi, Atsushi Sato, Yoshiko Hashii, Sadao Tokimasa, Junichi Hara, Yoshiyuki Kosaka, Koji Kato, Toshihiko Imamura, Satoru Miyano, Seishi Ogawa, Keizo Horibe, Masashi Sanada, 第 78 回日本血液学会学術集会, 2016/10/13,国内
54. Impact of somatic mutations on outcome in patients with MDS after stem-cell transplantation, 口頭, Tetsuichi Yoshizato, Yusuke Shiozawa, Kenichi Yoshida, Yoshiko Atsuta, Nannya Yasuhito, Hiromichi Suzuki, Keitaro Matsuo, Makoto Onizuka, Keisuke Kataoka, Kenichi Chiba, Hiroko Tanaka, Yuichi Shiraishi, Kousuke Aoki, Masashi Sanada, Hidehiro Itonaga, Yoshinobu Kanda, Yasushi Miyazaki, Hideki Makishima, Satoru Miyano, and Seishi Ogawa, 第 78 回日本血液学会学術集会, 2016/10/14, 国内
55. The transcriptional and alternative splicing landscape of myelodysplastic syndromes, 口頭, Yusuke Shiozawa, Luca Malcovati, Anna Galli, Aiko Sato-Otsubo, Keisuke Kataoka, Yusuke Sato, Hiromichi Suzuki, Tetsuichi Yoshizato, Kenichi Yoshida, Masashi Sanada, Hideki Makishima, Yuichi Shiraishi, Kenichi Chiba, Eva Hellström Lindberg, Satoru Miyano, Mario Cazzola, and Seishi Ogawa, 第 78 回　日本血液学会学術集会, 2016/10/14, 国内

56. Genetic landscape of primary central nervous system lymphoma, 口頭, Kenichi Yoshida, Kenichi Chiba, Yusuke Okuno, Nobuyuki Kakiuchi, Shingo Suzuki, Hiromichi Suzuki, Rie Nakamoto-Matsubara, Shunichi Koriyama, Yuichi Shiraishi, Yusuke Sato, Tetsuichi Yoshizato, Yusuke Shiozawa, Keisuke Kataoka, Hiroo Ueno, Yasunobu Nagata, Hiroko Tanaka, Azusa Hayano, Jumpei Homma, Junya Fukai, Koji Kajiwara, Makoto Ideguchi, Yoshihiro Komohara, Naoki Yajima, Naoto Tsuchiya, Masakazu Sano, Masayuki Nitta, Yoshihiro Muragaki, Mamiko Sakata-Yanagimoto, Yasuo Iwadate, Hiroaki Hondoh, Koichi Kashiwase, Takashi Shiina, Satoru Miyano, Shigeru Chiba, Ryuya Yamanaka, Seishi Ogawa, 第 78 回日本血液学会学術集会, 2016/10/15, 国内
57. Molecular profiling across different subtypes of B-cell lymphoma, 口頭, Yasunori Kogure, Keisuke Kataoka, Kenichi Yoshida, Yuichi Shiraishi, Kenichi Chiba, Hiroko Tanaka, Tetsuichi Yoshizato, Yasunobu Nagata, Masashi Sanada, Motohiro Kato, Hiraku Mori, Yasuharu Sato, Tadashi Yoshino, Kengo Takeuchi, Yuichi Ishikawa, Satoru Miyano, Seishi Ogawa, 第 78 回日本血液学会学術総会, 2016/10/15, 国内
58. Clonal evolution underlying the progression from MDS to Ph-positive ALL. 口頭 Masataka Taguchi, Tomoko Kohno, Hiroyuki Mishima, Hiroaki Taniguchi, Hidehiro Itonaga, Takeharu Kato, Shinya Sato, Akira Kinoshita, Tomoko Hata, Yukiyoshi Moriuchi, Koh-Ichiro Yoshiura, Yasushi Miyazaki：第 78 回日本血液学会学術集会：パシフィコ横浜（横浜市）：2016 年 10 月 15 日（土)、国内.
59. Progress in diagnosis and therapy in myelodysplastic syndromes., Yasuhito Nannya, 第 78 回日本血液会学術集会, 2016/10/15, 国内
60. 様々な悪性腫瘍における PD-L1 を介する新たな免疫逃避機構の解明, 口頭, Seishi Ogawa, 第５６回国際治療談話会総会, 2016/11/10, 国内
61. Cancer immune evasion via the disruption of PD-L1 3'-UTR, 口頭, Seishi Ogawa, 第 32 回京都賞記念ワークショップ, 2016/11/12, 国内
62. A Novel Genetic Mechanism of Evading Anti-tumor Immunity in Multiple Human Cancers, 口頭, Seishi Ogawa, The 1st Meeting of Taiwan YLH Symposium, 2016/11/26, 国外
63. がんにおけるクロマチン構造制御因子の異常, 口頭, 吉田　健一, 第 39 回日本分子生物学会年会, 2016/11/30, 国内
64. Distinct genetic events in PNH and AA., 口頭, Hideki Makishima, 2016 Annual Scientific Meeting, The International PNH Interest Group, 2016/12/2, 国外
65. Clinical significance of mutations and copy number lesions on prognosis of patients with MDS after unrelated bone marrow transplantation, ポスター, Tetsuichi Yoshizato, Yoshiko Atsuta, Yusuke Shiozawa, Kenichi Yoshida, Yasuhito Nannya, Hiromichi Suzuki, Keitaro Matsuo, Makoto Onizuka, Keisuke Kataoka, Kenichi Chiba, Hiroko Tanaka, Yuichi Shiraishi, Kosuke Aoki, Masashi Sanada, Hidehiro Itonaga, Yoshinobu Kanda, Yasushi Miyazaki, Hideki Makishima, Satoru Miyano, and Seishi Ogawa, The 58th American Society of Hematology Annual Meeting, 2016/12/3, 海外
66. Landscape of Driver Mutations and Their Clinical Impacts in Pediatric Acute Lymphoblastic Leukemia, 口頭, Hiroo Ueno, Kenichi Yoshida, Yuka Yamashita-Iijima,

Yusuke Shiozawa, Tomomi Ishida, Hiroyuki Tsukamoto, Mayumi Kibe, Yuichi Shiraishi, Hiroko Tanaka, Kenichi Chiba, Takao Deguchi, Atsushi Sato, Yoshiko Hashii, Sadao Tokimasa, Junichi Hara, Yoshiyuki Kosaka, Koji Kato, Toshihiko Imamura, Satoru Miyano, Seishi Ogawa, Keizo Horibe, Masashi Sanada, The 58th American Society of Hematology, 2016/12/5, 海外

67. Whole-Genome Sequencing of Primary Central Nervous System Lymphoma and Diffuse Large B-Cell Lymphoma, ポスター, Kenichi Yoshida, Yuichi Shiraishi, Kenichi Chiba, Yusuke Okuno, Rie Nakamoto-Matsubara, Shunichi Koriyama, Tetsuichi Yoshizato, Yusuke Shiozawa, Keisuke Kataoka, Hiroo Ueno, June Takeda, Hiroko Tanaka, Azusa Hayano, Jumpei Homma, Junya Fukai, Koji Kajiwara, Makoto Ideguchi, Yoshihiro Komohara, Naoki Yajima, Naoto Tsuchiya, Masakazu Sano, Masayuki Nitta, Yoshihiro Muragaki, Mamiko Sakata-Yanagimoto, Yasuo Iwadate, Hiroaki Hondoh, Koichi Kashiwase, Takashi Shiina, Satoru Miyano, Shigeru Chiba, Ryuya Yamanaka, Seishi Ogawa, 58th ASH Annual Meeting & Expositionnual meeting, 2016/12/5, 国外
68. The Impact of Clonal Dynamics on Prognosis and Outcome in Myelodysplastic Syndromes, ポスター, Hideki Makishima, Tetsuichi Yoshizato, Kenichi Yoshida, Mikkael A. Sekeres, Tomas Radivoyevitch, Hiromichi Suzuki, Bartlomiej P. Przychodzen, Yasunobu Nagata, Manja Meggendorfer, Masashi Sanada, Yusuke Okuno, Cassandra M. Hirsch, Teodora Kuzmanovic, Yusuke Shiozawa, Yusuke Sato, Aiko Sato-Otsubo, Thomas LaFramboise, Naoko Hosono, Yuichi Shiraishi, Kenichi Chiba, Claudia Haferlach, Wolfgang Kern, Hiroko Tanaka, Ines Gómez-Seguí, Holleh Husseinzadeh, Swapna Thota, Kathryn M. Guinta, Brittney Dienes, Tsuyoshi Nakamaki, MD18, Shuichi Miyawaki, Yogen Saunthararajah, Shigeru Chiba, Satoru Miyano, Lee-Yung Shih, Torsten Haferlach, Seishi Ogawa, Jaroslaw P Maciejewski, The 58th American Society of Hematology Annual Meeting, 2016/12/5, 国外
69. Genetic landscape of childhood acute myeloid leukemia, 口頭, Kenichi Yoshida, 第 58 回日本小児血液・がん学会学術集会, 2016/12/15, 国内
70. Aberrant RNA Splicing in splicing facto-mutated Myelodysplastic Syndromes, 口頭, Seishi Ogawa, mRNA Processing and Human Disease, 2017/3/5, 国外
71. Prognostic Relevance of Integrated Molecular Profiling in Adult T-cell Leukemia/Lymphoma, 口頭, Yotaro Ochi, Keisuke Kataoka, Yasunobu Nagata, Akira Kitanaka, Jun-ichirou Yasunaga, Masako Iwanaga, Yuichi Shiraishi, Kenichi Chiba, Aiko Sato-Otsubo, Masashi Sanada, Hiroko Tanaka, Hiromichi Suzuki, Yusuke Sato, Yusuke Shiozawa, Tetsuichi Yoshizato, Kenichi Yoshida, Kisato Nosaka, Masakatsu Hishizawa, Yoshitaka Imaizumi, Tomonori Hidaka, Tsuyoshi Nakamaki, Shuichi Miyawaki, Kensei Tobinai, Yasushi Miyazaki, Akifumi Takaori-Kondo, Tatsuhiro Shibata, Satoru Miyano, Masao Matsuoka, Kazuya Shimoda, Masao Matsuoka,Toshiki Watanabe and Seishi Ogawa, 第 18 回国際ヒトレトロウイルス HTLV 会議, 2017/3/8, 国内

（３）「国民との科学・技術対話社会」に対する取り組み

該当なし

（４）特許出願

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