

表11. NBT①応用植物に関する文献調査結果(ZFN)

keywords: ZFN/zinc finger nuclease/plant

ID	Year	Applied plant species	Affiliation, country
Identifiers		Title	
		Description	
		Details	
1	2013	soybean	University of Minnesota, MN, USA
PMID:23996306		Targeted mutagenesis for functional analysis of gene duplication in legumes. Curtin SJ, Anderson JE, Starker CG, Baltes NJ, Mani D, Voytas DF, Stupar RM. Methods Mol Biol. 2013;1069:25-42. doi: 10.1007/978-1-62703-613-9_3.	
2	2013	Arabidopsis thaliana	University of Minnesota, MN, USA
PMID:23979943		Targeted deletion and inversion of tandemly arrayed genes in Arabidopsis thaliana using zinc finger nucleases. Qi Y, Li X, Zhang Y, Starker CG, Baltes NJ, Zhang F, Sander JD, Reyon D, Joung JK, Voytas DF. G3 (Bethesda). 2013 Oct 3;3(10):1707-15. doi: 10.1534/g3.113.006270.	
3	2013	Arabidopsis	University of Minnesota, MN, USA
PMID:23282329		Increasing frequencies of site-specific mutagenesis and gene targeting in Arabidopsis by manipulating DNA repair pathways. Qi Y, Zhang Y, Zhang F, Baller JA, Cleland SC, Ryu Y, Starker CG, Voytas DF. Genome Res. 2013 Mar;23(3):547-54. doi: 10.1101/gr.145557.112. Epub 2013 Jan 2.	
4	2013	Arabidopsis	Leiden University, Leiden, The Netherlands
PMID:23279135		ZFN-mediated gene targeting of the Arabidopsis protoporphyrinogen oxidase gene through Agrobacterium-mediated floral dip transformation. de Pater S, Pinas JE, Hooykaas PJ, van der Zaal BJ. Plant Biotechnol J. 2013 May;11(4):510-5. doi: 10.1111/pbi.12040. Epub 2012 Dec 28.	
5	2011	soybean	University of Minnesota, MN, USA
PMID:21464476		Targeted mutagenesis of duplicated genes in soybean with zinc-finger nucleases. Curtin SJ, Zhang F, Sander JD, Haun WJ, Starker C, Baltes NJ, Reyon D, Dahlborg EJ, Goodwin MJ, Coffman AP, Dobbs D, Joung JK, Voytas DF, Stupar RM. Plant Physiol. 2011 Jun;156(2):466-73. doi: 10.1104/pp.111.172981. Epub 2011 Apr 4.	
6	2011	Nicotiana tabacum	King Abdullah University of Science and Technology, Kingdom of Saudi Arabia
PMID:21262818		De novo-engineered transcription activator-like effector (TALE) hybrid nuclease with novel DNA binding specificity creates double-strand breaks. Mahfouz MM, Li L, Shamimuzzaman M, Wibowo A, Fang X, Zhu JK. Proc Natl Acad Sci U S A. 2011 Feb 8;108(6):2623-8. doi: 10.1073/pnas.1019533108. Epub 2011 Jan 24.	
7	2011	Arabidopsis	University of Minnesota, MN, USA
PMID:21181530		Targeted mutagenesis in Arabidopsis using zinc-finger nucleases. Zhang F, Voytas DF. Methods Mol Biol. 2011;701:167-77. doi: 10.1007/978-1-61737-957-4_9.	
8	2010	Arabidopsis thaliana	University of Minnesota, MN, USA
PMID:20508152		High frequency targeted mutagenesis in Arabidopsis thaliana using zinc finger nucleases. Zhang F, Maeder ML, Unger-Wallace E, Hoshaw JP, Reyon D, Christian M, Li X, Pierick CJ, Dobbs D, Peterson T, Joung JK, Voytas DF. Proc Natl Acad Sci U S A. 2010 Jun 29;107(26):12028-33. doi: 10.1073/pnas.0914991107. Epub 2010 May 27.	
9	2010	Arabidopsis	NIAS, Tsukuba, Japan
PMID:20508151		Site-directed mutagenesis in Arabidopsis using custom-designed zinc finger nucleases. Osakabe K, Osakabe Y, Toki S. Proc Natl Acad Sci U S A. 2010 Jun 29;107(26):12034-9. doi: 10.1073/pnas.1000234107. Epub 2010 May 27.	
10	2009	Arabidopsis	Leiden University, Leiden, The Netherlands
PMID:19754840		ZFN-induced mutagenesis and gene-targeting in Arabidopsis through Agrobacterium-mediated floral dip transformation. de Pater S, Neuteboom LW, Pinas JE, Hooykaas PJ, van der Zaal BJ. Plant Biotechnol J. 2009 Oct;7(8):821-35. doi: 10.1111/j.1467-7652.2009.00446.x.	
11	2009	Zea mays	Dow AgroSciences, IN, USA
PMID:19404259		Precise genome modification in the crop species Zea mays using zinc-finger nucleases. Shukla VK, Doyon Y, Miller JC, DeKolver RC, Moehle EA, Worden SE, Mitchell JC, Arnold NL, Gopalan S, Meng X, Choi VM, Rock JM, Wu YY, Katibah GE, Zhifang G, McCaskill D, Simpson MA, Blakeslee B, Greenwalt SA, Butler HJ, Hinkley SJ, Zhang L, et al. Nature. 2009 May 21;459(7245):437-41. doi: 10.1038/nature07992. Epub 2009 Apr 29.	
12	2005	Arabidopsis	University of Utah, UT, USA
PMID:15677315		Targeted mutagenesis using zinc-finger nucleases in Arabidopsis. Lloyd A, Plaisier CL, Carroll D, Drews GN. Proc Natl Acad Sci U S A. 2005 Feb 8;102(6):2232-7. Epub 2005 Jan 26.	

表12. NBT①応用植物に関する文献調査結果(TALEN)

keywords: TALEN(s)/TAL effector/plant

ID	Year	Applied plant species	Affiliation, country
Identifiers		Title	
		Description	
		Details	
1	2014	Zea mays	Chinese Academy of Sciences, Beijing, China
PMID:24576457		Targeted Mutagenesis in Zea mays Using TALENs and the CRISPR/Cas System. Liang Z, Zhang K, Chen K, Gao C. J Genet Genomics. 2014 Feb 20;41(2):63-8. doi: 10.1016/j.jgg.2013.12.001. Epub 2013 Dec 14.	
2	2014	rice	Chinese Academy of Sciences, Beijing, China
PMID:24556552		An efficient TALEN mutagenesis system in rice. Chen K, Shan Q, Gao C. Methods. 2014 Feb 17. doi:pii: S1046-2023(14)00043-7. 10.1016/j.ymeth.2014.02.013. [Epub ahead of print]	
3	2013	Arabidopsis thaliana	University of Minnesota, MN, USA
PMID:23979944		Targeted mutagenesis of Arabidopsis thaliana using engineered TAL effector nucleases. Christian M, Qi Y, Zhang Y, Voytas DF. G3 (Bethesda). 2013 Oct 3;3(10):1697-705. doi: 10.1534/g3.113.007104.	
4	2013	Brassica oleracea	Southwest University, Chongqing, China
PMID:23870552		Site-specific gene targeting using transcription activator-like effector (TALE)-based nuclease in Brassica oleracea. Sun Z, Li N, Huang G, Xu J, Pan Y, Wang Z, Tang Q, Song M, Wang X. J Integr Plant Biol. 2013 Nov;55(11):1092-103. doi: 10.1111/jipb.12091. Epub 2013 Sep 18.	
5	2013	barley	Aarhus University, Slagelse, Denmark
PMID:23689819		TAL effector nucleases induce mutations at a pre-selected location in the genome of primary barley transformants. Wendt T, Holm PB, Starker CG, Christian M, Voytas DF, Brinch-Pedersen H, Holme IB. Plant Mol Biol. 2013 Oct;83(3):279-85. doi: 10.1007/s11103-013-0078-4. Epub 2013 May 21.	
6	2013	rice	Iowa State University, IA, USA.
PMID:23430045		Designer TAL effectors induce disease susceptibility and resistance to Xanthomonas oryzae pv. oryzae in rice. Li T, Huang S, Zhou J, Yang B. Mol Plant. 2013 May;6(3):781-9. doi: 10.1093/mp/sst034. Epub 2013 Feb 21.	
7	2013	Brachypodium	Chinese Academy of Sciences, Beijing, China
PMID:23288864		Rapid and efficient gene modification in rice and Brachypodium using TALENs. Shan Q, Wang Y, Chen K, Liang Z, Li J, Zhang Y, Zhang K, Liu J, Voytas DF, Zheng X, Zhang Y, Gao C. Mol Plant. 2013 Jul;6(4):1365-8. doi: 10.1093/mp/sss162. Epub 2013 Jan 2.	
8	2013	Nicotiana tabacum	University of Electronic Science and Technology of China, Chengdu, China
PMID:23124327		Transcription activator-like effector nucleases enable efficient plant genome engineering. Zhang Y, Zhang F, Li X, Baller JA, Qi Y, Starker CG, Bogdanove AJ, Voytas DF. Plant Physiol. 2013 Jan;161(1):20-7. doi: 10.1104/pp.112.205179. Epub 2012 Nov 2.	
9	2012	rice	Colorado State University, CO, USA
PMID:23078195		Transcription activator-like (TAL) effectors targeting OsSWEET genes enhance virulence on diverse rice (Oryza sativa) varieties when expressed individually in a TAL effector-deficient strain of Xanthomonas oryzae. Verdier V, Triplett LR, Hummel AW, Corral R, Cemadas RA, Schmidt CL, Bogdanove AJ, Leach JE. New Phytol. 2012 Dec;196(4):1197-207. doi: 10.1111/j.1469-8137.2012.04367.x. Epub 2012 Oct 18.	
10	2012	rice	Iowa State University, IA, USA.
PMID:22565958		High-efficiency TALEN-based gene editing produces disease-resistant rice. Li T, Liu B, Spalding MH, Weeks DP, Yang B. Nat Biotechnol. 2012 May 7;30(5):390-2. doi: 10.1038/nbt.2199.	
11	2011	Arabidopsis	University of Minnesota, MN, USA
PMID:21493687		Efficient design and assembly of custom TALEN and other TAL effector-based constructs for DNA targeting. Cermak T, Doyle EL, Christian M, Wang L, Zhang Y, Schmidt C, Baller JA, Somia NV, Bogdanove AJ, Voytas DF. Nucleic Acids Res. 2011 Jul;39(12):e82. doi: 10.1093/nar/gkr218. Epub 2011 Apr 14.	

2014: data of 2014/1/1~3/5

表13. NBT①応用植物に関する文献調査結果(CRISPR)

keywords: CRISPR/cas9/plant/arabidopsis/nicotiana

ID	Year	Applied plant species	Affiliation, country
Identifiers			
Title			
Description			
Details			
1	2014	Zea mays	Chinese Academy of Sciences, Beijing, China
PMID:24576457		Targeted Mutagenesis in Zea mays Using TALENs and the CRISPR/Cas System. Liang Z, Zhang K, Chen K, Gao C. J Genet Genomics. 2014 Feb 20;41(2):63-8. doi: 10.1016/j.jgg.2013.12.001. Epub 2013 Dec 14.	
2	2014	Arabidopsis	Chinese Academy of Sciences, Shanghai, China
PMID:24550464		Multigeneration analysis reveals the inheritance, specificity, and patterns of CRISPR/Cas-induced gene modifications in Arabidopsis. Feng Z, Mao Y, Xu N, Zhang B, Wei P, Yang DL, Wang Z, Zhang Z, Zheng R, Yang L, Zeng L, Liu X, Zhu JK. Proc Natl Acad Sci U S A. 2014 Feb 18. [Epub ahead of print]	
3	2014	Liverwort	Kyoto University, Kyoto, Japan
PMID:24443494		CRISPR/Cas9-Mediated Targeted Mutagenesis in the Liverwort Marchantia polymorpha L. Sugano SS, Shirakawa M, Takagi J, Matsuda Y, Shimada T, Hara-Nishimura I, Kohchi T. Plant Cell Physiol. 2014 Feb 20. [Epub ahead of print]	
4	2013	crop	Chinese Academy of Sciences, Beijing, China
PMID:24277082		Targeted genome modification technologies and their applications in crop improvements. Chen K, Gao C. Plant Cell Rep. 2013 Nov 24. [Epub ahead of print]	
5	2013	wheat	Government of India, Punjab, India
PMID:24122057		RNA-guided genome editing for target gene mutations in wheat. Upadhyay SK, Kumar J, Alok A, Tuli R. G3 (Bethesda). 2013 Dec 9;3(12):2233-8. doi: 10.1534/g3.113.008847.	
6	2013	model and crop plants	The Sainsbury Laboratory, Norwich, UK
PMID:24112467		Plant genome editing made easy: targeted mutagenesis in model and crop plants using the CRISPR/Cas system. Belhaj K, Chaparro-Garcia A, Kamoun S, Nekrasov V. Plant Methods. 2013 Oct 11;9(1):39. doi: 10.1186/1746-4811-9-39.	
7	2013	rice	Peking University, Beijing, China
PMID:23999856		Targeted mutagenesis in rice using CRISPR-Cas system. Miao J, Guo D, Zhang J, Huang Q, Qin G, Zhang X, Wan J, Gu H, Qu LJ. Cell Res. 2013 Oct;23(10):1233-6. doi: 10.1038/cr.2013.123. Epub 2013 Sep 3.	
8	2013	Arabidopsis, tobacco, sorg	Iowa State University, IA, USA.
PMID:23999092		Demonstration of CRISPR/Cas9/sgRNA-mediated targeted gene modification in Arabidopsis, tobacco, sorghum and rice. Jiang W, Zhou H, Bi H, Fromm M, Yang B, Weeks DP. Nucleic Acids Res. 2013 Nov 1;41(20):e188. doi: 10.1093/nar/gkt780. Epub 2013 Sep 2.	
9	2013	(plant)	Chinese Academy of Sciences, Shanghai, China
PMID:23963532		Application of the CRISPR-Cas system for efficient genome engineering in plants. Mao Y, Zhang H, Xu N, Zhang B, Gou F, Zhu JK. Mol Plant. 2013 Nov;6(6):2008-11. doi: 10.1093/mp/sst121. Epub 2013 Aug 22.	
10	2013	rice	Pennsylvania State University, PA, USA
PMID:23956122		RNA-guided genome editing in plants using a CRISPR-Cas system. Xie K, Yang Y. Mol Plant. 2013 Nov;6(6):1975-83. doi: 10.1093/mp/sst119. Epub 2013 Aug 17.	
11	2013	Arabidopsis, rice	Chinese Academy of Sciences, Shanghai, China
PMID:23958582		Efficient genome editing in plants using a CRISPR/Cas system. Feng Z, Zhang B, Ding W, Liu X, Yang DL, Wei P, Cao F, Zhu S, Zhang F, Mao Y, Zhu JK. Cell Res. 2013 Oct;23(10):1229-32. doi: 10.1038/cr.2013.114. Epub 2013 Aug 20.	
12	2013	crop plants	Chinese Academy of Sciences, Beijing, China
PMID:23929338		Targeted genome modification of crop plants using a CRISPR-Cas system. Shan Q, Wang Y, Li J, Zhang Y, Chen K, Liang Z, Zhang K, Liu J, Xi JJ, Qiu JL, Gao C. Nat Biotechnol. 2013 Aug;31(8):686-8. doi: 10.1038/nbt.2650.	
13	2013	Nicotiana benthamiana	The Sainsbury Laboratory, Norwich, UK
PMID:23929340		Targeted mutagenesis in the model plant Nicotiana benthamiana using Cas9 RNA-guided endonuclease. Nekrasov V, Staskawicz B, Weigel D, Jones JD, Kamoun S. Nat Biotechnol. 2013 Aug;31(8):691-3. doi: 10.1038/nbt.2655.	
14	2013	Arabidopsis and Nicotiana	Massachusetts General Hospital, MA, USA
PMID:23929339		Multiplex and homologous recombination-mediated genome editing in Arabidopsis and Nicotiana benthamiana using guide RNA and Cas9. Li JF, Norville JE, Aach J, McCormack M, Zhang D, Bush J, Church GM, Sheen J. Nat Biotechnol. 2013 Aug;31(8):688-91. doi: 10.1038/nbt.2654.	

2014: data of 2014/1/1~3/5

表14. NBT①関連論文一覧(ZFN、植物への実施報告以外)

keywords: ZFN/zinc finger nuclease/plant

ID	Year	ShortDetails	Title	Identifiers
1	2014	Virus Genes. 2014	Inhibiting replication of begomoviruses using artificial zinc finger nucleases that target viral-conserved nucleotide motif.	PMID:24474330
2	2014	Plant Cell. 2014	DNA replicons for plant genome engineering.	PMID:24443519
3	2013	Plant Biotechnol J. 2013	Trait stacking via targeted genome editing.	PMID:23953646
4	2013	Sci Rep. 2013	Expanded activity of dimer nucleases by combining ZFN and TALEN for genome editing.	PMID:23921522
5	2013	Curr Protoc Mol Biol. 2013	Engineering customized TALE nucleases (TALENs) and TALE transcription factors by fast ligation-based automatable solid-phase high-throughput (FLASH) assembly.	PMID:23821439
6	2013	Plant Mol Biol. 2013	A rapid assay to quantify the cleavage efficiency of custom-designed nucleases in planta.	PMID:23625357
7	2013	Plant Physiol. 2013	Nonhomologous end joining-mediated gene replacement in plant cells.	PMID:23509176
8	2013	Nucleic Acids Res. 2013	EEENdb: a database and knowledge base of ZFNs and TALENs for endonuclease engineering.	PMID:23203870
9	2013	Plant J. 2013	Nuclear gene targeting in Chlamydomonas using engineered zinc-finger nucleases.	PMID:23137232
10	2013	Transgenic Res. 2013	Analysing patent landscapes in plant biotechnology and new plant breeding techniques.	PMID:22899309
11	2012	Dev Growth Differ. 2012	Efficient targeted mutagenesis of the chordate <i>Ciona intestinalis</i> genome with zinc-finger nucleases.	PMID:22640377
12	2012	Methods Mol Biol. 2012	Targeting DNA to a previously integrated transgenic locus using zinc finger nucleases.	PMID:22351024
13	2012	Plant Physiol. 2012	Zinc finger nuclease and homing endonuclease-mediated assembly of multigene plant transformation vectors.	PMID:22082504
14	2012	J Anim Sci. 2012	Cell Biology Symposium: Zinc finger nucleases to create custom-designed modifications in the swine (<i>Sus scrofa</i>) genome.	PMID:22038991
15	2011	Plant J. 2011	Localized egg-cell expression of effector proteins for targeted modification of the Arabidopsis genome.	PMID:21848915
16	2011	Plant Biotechnol Rep. 2011	Targeted genome engineering via zinc finger nucleases.	PMID:21837253
17	2011	Trends Biotechnol. 2011	Permanent genome modifications in plant cells by transient viral vectors.	PMID:21536337
18	2011	Yi Chuan. 2011	[The mechanism and application of zinc finger nucleases].	PMID:21377968
19	2011	BMC Genomics. 2011	ZFNGenome: a comprehensive resource for locating zinc finger nuclease target sites in model organisms.	PMID:21276248
20	2011	Nat Methods. 2011	Selection-free zinc-finger-nuclease engineering by context-dependent assembly (CoDA).	PMID:21151135
21	2011	J Mol Biol. 2011	Creating designed zinc-finger nucleases with minimal cytotoxicity.	PMID:21094162
22	2011	Nucleic Acids Res. 2011	Zinc finger protein-dependent and -independent contributions to the in vivo off-target activity of zinc finger nucleases.	PMID:20843781
22	2010	Plant Physiol. 2010	Nontransgenic genome modification in plant cells.	PMID:20876340
24	2010	Methods Mol Biol. 2010	Validation and expression of zinc finger nucleases in plant cells.	PMID:20680844
25	2010	Methods Mol Biol. 2010	A transient assay for monitoring zinc finger nuclease activity at endogenous plant gene targets.	PMID:20680843
26	2010	Plant Mol Biol. 2010	Zinc finger nuclease-mediated transgene deletion.	PMID:20454835
28	2010	PLoS One. 2010	Generation of knockout rats with X-linked severe combined immunodeficiency (X-SCID) using zinc-finger nucleases.	PMID:20111598
29	2010	Genome Res. 2010	Targeted chromosomal deletions in human cells using zinc finger nucleases.	PMID:19952142
27	2009	J Soc Biol. 2009	[Applications of genetically modified animals].	PMID:20122391
30	2009	Methods Mol Biol. 2009	Custom-designed molecular scissors for site-specific manipulation of the plant and mammalian genomes.	PMID:19488728
31	2009	Nature. 2009	High-frequency modification of plant genes using engineered zinc-finger nucleases.	PMID:19404258
32	2009	PLoS One. 2009	Rapid mutation of endogenous zebrafish genes using zinc finger nucleases made by Oligomerized Pool ENgineering (OPEN).	PMID:19198653
33	2009	Plant Mol Biol. 2009	Targeted transgene integration in plant cells using designed zinc finger nucleases.	PMID:19112554
34	2009	Plant J. 2009	A toolbox and procedural notes for characterizing novel zinc finger nucleases for genome editing in plant cells.	PMID:18980651
35	2008	Proc Natl Acad Sci U S A. 2008	Increasing cloning possibilities using artificial zinc finger nucleases.	PMID:18725642
36	2008	Mol Cell. 2008	Rapid open-source" engineering of customized zinc-finger nucleases for highly efficient gene modification."	PMID:18657511
37	2008	FEBS Lett. 2008	Ribonuclease activity is a common property of Arabidopsis CCCH-containing zinc-finger proteins.	PMID:18582464
38	2008	Arch Biochem Biophys. 2008	Redox and heavy metal effects on the biochemical activities of an Arabidopsis polyadenylation factor subunit.	PMID:18331819
39	2007	Cell Mol Life Sci. 2007	Custom-designed zinc finger nucleases: what is next?	PMID:17763826
40	2007	Nucleic Acids Res. 2007	A novel endonuclease activity associated with the Arabidopsis ortholog of the 30-kDa subunit of cleavage and polyadenylation specificity factor.	PMID:17576667
41	2006	Trends Plant Sci. 2006	Gene targeting in plants: fingers on the move.	PMID:16530459
42	2005	Plant J. 2005	High-frequency homologous recombination in plants mediated by zinc-finger nucleases.	PMID:16262717
43	2005	Nucleic Acids Res. 2005	Zinc finger nucleases: custom-designed molecular scissors for genome engineering of plant and mammalian cells.	PMID:16251401
44	2005	Biochem Biophys Res Commun. 2005	Design, engineering, and characterization of zinc finger nucleases.	PMID:16084494

2014: data of 2014/1/1~3/5

表15. NBT①関連論文一覽(TALEN、植物への実施報告以外)

keywords: TALEN(s)/TAL effector/plant

No.	Year	ShortDetails	Title	Identifiers
1	2014	PLoS Pathog. 2014	Code-Assisted Discovery of TAL Effector Targets in Bacterial Leaf Streak of Rice Reveals Contrast with Bacterial Blight and a Novel Susceptibility Gene.	PMID:24586171
2	2014	Mol Plant Pathol. 2014	The last half-repeat of transcription activator-like effector is dispensable and thereby TALE-based technology can be simplified.	PMID:24521457
3	2014	Planta. 2014	Precision genetic modifications: a new era in molecular biology and crop improvement.	PMID:24510124
4	2014	Plant Cell. 2014	The Rice TAL Effector-Dependent Resistance Protein XA10 Triggers Cell Death and Calcium Depletion in the Endoplasmic Reticulum.	PMID:24488961
5	2014	Proc Natl Acad Sci U S A. 2014	Lateral organ boundaries 1 is a disease susceptibility gene for citrus bacterial canker disease.	PMID:24474801
6	2014	Biochem Biophys Res Commun. 2014	TALE activators regulate gene expression in a position- and strand-dependent manner in mammalian cells.	PMID:24380858
7	2013	PLoS One. 2013	TAL Effector Specificity for base 0 of the DNA Target Is Altered in a Complex, Effector- and Assay-Dependent Manner by Substitutions for the Tryptophan in Cryptic Repeat -1.	PMID:24312634
8	2013	Mol Plant Pathol. 2013	The broad bacterial blight resistance of rice line CBB23 is triggered by a novel transcription activator-like (TAL) effector of <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> .	PMID:24286630
9	2013	PLoS One. 2013	ULTIMATE system for rapid assembly of customized TAL effectors.	PMID:24228087
10	2013	Int J Dev Biol. 2013	Gene targeting in plants: 25 years later.	PMID:24166445
11	2013	Int J Dev Biol. 2013	From Agrobacterium to viral vectors: genome modification of plant cells by rare cutting restriction enzymes.	PMID:24166446
12	2013	Sci Rep. 2013	Expanded activity of dimer nucleases by combining ZFN and TALEN for genome editing.	PMID:23921522
13	2013	New Phytol. 2013	Five phylogenetically close rice SWEET genes confer TAL effector-mediated susceptibility to <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> .	PMID:23879865
14	2013	PLoS One. 2013	An improved method for TAL effectors DNA-binding sites prediction reveals functional convergence in TAL repertoires of <i>Xanthomonas oryzae</i> strains.	PMID:23869221
15	2013	Curr Protoc Mol Biol. 2013	Engineering customized TALE nucleases (TALENs) and TALE transcription factors by fast ligation-based automatable solid-phase high-throughput (FLASH) assembly.	PMID:23821439
16	2013	J Genet Genomics. 2013	TALENs: customizable molecular DNA scissors for genome engineering of plants.	PMID:23790626
17	2013	Annu Rev Phytopathol. 2013	Engineering plant disease resistance based on TAL effectors.	PMID:23725472
18	2013	Trends Cell Biol. 2013	TAL effectors: highly adaptable phyto-bacterial virulence factors and readily engineered DNA-targeting proteins.	PMID:23707478
19	2013	New Phytol. 2013	Breaking the DNA-binding code of <i>Ralstonia solanacearum</i> TAL effectors provides new possibilities to generate plant resistance genes against bacterial wilt disease.	PMID:23692030
20	2013	BMC Biotechnol. 2013	Less is more: strategies to remove marker genes from transgenic plants.	PMID:23617583
21	2013	Nat Commun. 2013	Compact designer TALENs for efficient genome engineering.	PMID:23612303
22	2013	PLoS Comput Biol. 2013	Computational predictions provide insights into the biology of TAL effector target sites.	PMID:23526890
23	2013	Mol Plant. 2013	Characterization and DNA-binding specificities of <i>Ralstonia</i> TAL-like effectors.	PMID:23300258
24	2013	World J Microbiol Biotechnol. 2013	Identification of non-TAL effectors in <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> Chinese strain 13751 and analysis of their role in the bacterial virulence.	PMID:23296915
25	2013	Nucleic Acids Res. 2013	EENdb: a database and knowledge base of ZFNs and TALENs for endonuclease engineering.	PMID:23203870
26	2012	Proc Natl Acad Sci U S A. 2012	RNA-seq pinpoints a <i>Xanthomonas</i> TAL-effector activated resistance gene in a large-crop genome.	PMID:23132937
27	2012	Curr Protoc Mol Biol. 2012	Engineering designer transcription activator-like effector nucleases (TALENs) by REAL or REAL-Fast assembly.	PMID:23026907
28	2012	New Phytol. 2012	Addition of transcription activator-like effector binding sites to a pathogen strain-specific rice bacterial blight resistance gene makes it effective against additional strains and against bacterial leaf streak.	PMID:22747776
29	2012	Nucleic Acids Res. 2012	TAL Effector-Nucleotide Targeter (TALE-NT) 2.0: tools for TAL effector design and target prediction.	PMID:22693217
30	2012	PLoS One. 2012	The TAL effector PthA4 interacts with nuclear factors involved in RNA-dependent processes including a HMG protein that selectively binds poly(U) RNA.	PMID:22384209
31	2012	Plant Mol Biol. 2012	Rapid and highly efficient construction of TALE-based transcriptional regulators and nucleases for genome modification.	PMID:22271303
32	2012	Nat Protoc. 2012	A transcription activator-like effector toolbox for genome engineering.	PMID:22222791
33	2012	Science. 2012	The crystal structure of TAL effector PthXo1 bound to its DNA target.	PMID:22223736
34	2012	Microbiology. 2012	Identification of seven <i>Xanthomonas oryzae</i> pv. <i>oryzicola</i> genes potentially involved in pathogenesis in rice.	PMID:22075022
35	2011	GM Crops. 2011	TALE nucleases and next generation GM crops.	PMID:21865862
36	2011	Mol Plant Microbe Interact. 2011	Colonization of rice leaf blades by an African strain of <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> depends on a new TAL effector that induces the rice nodulin-3 Os11N3 gene.	PMID:21679014
37	2011	Mol Plant Microbe Interact. 2011	A novel regulatory role of HrpD6 in regulating hrp-hrc-hpa genes in <i>Xanthomonas oryzae</i> pv. <i>oryzicola</i> .	PMID:21615204
38	2011	Appl Environ Microbiol. 2011	Hpa2 required by HrpF to translocate <i>Xanthomonas oryzae</i> transcriptional activator-like effectors into rice for pathogenicity.	PMID:21478322
39	2011	Curr Opin Microbiol. 2011	TAL effectors are remote controls for gene activation.	PMID:21215685
40	2011	Mol Plant. 2011	Characterization of <i>Xanthomonas oryzae</i> -responsive cis-acting element in the promoter of rice race-specific susceptibility gene Xa13.	PMID:21208999
41	2010	Virulence. 2010	TAL effector-DNA specificity.	PMID:21178484
42	2010	Plant Cell. 2010	Rice xa13 recessive resistance to bacterial blight is defeated by induction of the disease susceptibility gene Os-11N3.	PMID:21098734
43	2010	Genetics. 2010	Targeting DNA double-strand breaks with TAL effector nucleases.	PMID:20660643
44	2010	Mol Plant Microbe Interact. 2010	Mutagenesis of 18 type III effectors reveals virulence function of XopZ(PXO99) in <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> .	PMID:20521952
45	2010	New Phytol. 2010	Promoter elements of rice susceptibility genes are bound and activated by specific TAL effectors from the bacterial blight pathogen, <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> .	PMID:20345643
46	2010	Annu Rev Phytopathol. 2010	<i>Xanthomonas</i> AvrBs3 family-type III effectors: discovery and function.	PMID:19400638
47	2009	Science. 2009	A simple cipher governs DNA recognition by TAL effectors.	PMID:19933106
48	2009	Science. 2009	Breaking the code of DNA binding specificity of TAL-type III effectors.	PMID:19933107
49	2009	Proc Natl Acad Sci U S A. 2009	A single plant resistance gene promoter engineered to recognize multiple TAL effectors from disparate pathogens.	PMID:19910532
50	2009	Mol Plant Pathol. 2009	Transcription activator-like type III effector AvrXa27 depends on OsTFIIAgamma5 for the activation of Xa27 transcription in rice that triggers disease resistance to <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> .	PMID:19849788
51	2007	Proc Natl Acad Sci U S A. 2007	Two type III effector genes of <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> control the induction of the host genes OsTFIIAgamma1 and OsTFX1 during bacterial blight of rice.	PMID:17563377

2014: data of 2014/1/1~3/5

表16. NBT①関連論文一覧(CRISPR、植物への実施報告以外)

keywords: CRISPR/cas9/plant/arabidopsis/nicotiana

ID	Year	ShortDetails	Title	Identifiers
1	2014	Planta. 2014	Precision genetic modifications: a new era in molecular biology and crop improvement.	PMID:24510124
2	2014	Mol Plant. 2014	Genome-Wide Prediction of Highly Specific Guide RNA Spacers for the CRISPR-Cas9-Mediated Genome Editing in Model Plants and Major Crops.	PMID:24482433
3	2014	Curr Opin Struct Biol. 2014	Fitting CRISPR-associated Cas3 into the Helicase Family Tree.	PMID:24480304
4	2014	Bioinformatics. 2014	Cas-OFFinder: a fast and versatile algorithm that searches for potential off-target sites of Cas9 RNA-guided endonucleases.	PMID:24463181
5	2014	Bioinformatics. 2014	CasOT: a genome-wide Cas9/gRNA off-target searching tool.	PMID:24389662
6	2014	Appl Environ Microbiol. 2014	CRISPRs: molecular signatures used for pathogen subtyping.	PMID:24162568
7	2013	Yi Chuan. 2013	[CRISPR/Cas: a novel way of RNA-guided genome editing].	PMID:24579309
8	2013	J Integr Plant Biol. 2013	Self-processing of ribozyme-flanked RNAs into guide RNAs in vitro and in vivo for CRISPR-mediated genome editing.	PMID:24373158
9	2013	Int J Dev Biol. 2013	Gene targeting in plants: 25 years later.	PMID:24166445
10	2013	Plant J. 2013	Synthetic nucleases for genome engineering in plants: prospects for a bright future.	PMID:24112784
11	2013	Syst Appl Microbiol. 2013	Phylogenetic position and virulence apparatus of the pear flower necrosis pathogen Erwinia piriflorinigrans CFBP 5888T as assessed by comparative genomics.	PMID:23726521
12	2013	Mol Plant. 2013	Zinc fingers, TAL effectors, or Cas9-based DNA binding proteins: what's best for targeting desired genome loci?	PMID:23718948
13	2013	PLoS Genet. 2013	Cytotoxic chromosomal targeting by CRISPR/Cas systems can reshape bacterial genomes and expel or remodel pathogenicity islands.	PMID:23637624
14	2012	PLoS One. 2012	In vivo protein interactions and complex formation in the Pectobacterium atrosepticum subtype I-F CRISPR/Cas System.	PMID:23226499
15	2012	Int J Microbiol. 2012	Advances in bacteriophage-mediated control of plant pathogens.	PMID:22934116
16	2012	PLoS One. 2012	Erwinia amylovora CRISPR elements provide new tools for evaluating strain diversity and for microbial source tracking.	PMID:22860008
17	2012	Mol Plant Pathol. 2012	Lipopolysaccharide biosynthesis genes discriminate between Rubus- and Spiraeoideae-infective genotypes of Erwinia amylovora.	PMID:22583486
18	2012	PLoS One. 2012	Identification and characterization of small RNAs in the hyperthermophilic archaeon Sulfolobus solfataricus.	PMID:22514725
19	2012	J Biotechnol. 2012	Insights into the completely annotated genome of Lactobacillus buchneri CD034, a strain isolated from stable grass silage.	PMID:22465289
20	2011	Annu Rev Genet. 2011	CRISPR-Cas systems in bacteria and archaea: versatile small RNAs for adaptive defense and regulation.	PMID:22060043
21	2011	Acta Biochim Biophys Sin (Shanghai). 2011	Characterization of the multiple CRISPR loci on Streptomyces linear plasmid pSHK1.	PMID:21705768
22	2011	RNA Biol. 2011	Csy4 is responsible for CRISPR RNA processing in Pectobacterium atrosepticum.	PMID:21519197
23	2011	Appl Environ Microbiol. 2011	Diversity, evolution, and functionality of clustered regularly interspaced short palindromic repeat (CRISPR) regions in the fire blight pathogen Erwinia amylovora.	PMID:21460108
24	2010	BMC Genomics. 2010	Pyrosequencing-based comparative genome analysis of the nosocomial pathogen Enterococcus faecium and identification of a large transferable pathogenicity island.	PMID:20398277
25	2009	FEMS Microbiol Lett. 2009	Analysis of CRISPR system function in plant pathogen Xanthomonas oryzae.	PMID:19459963
26	2009	Immunol Rev. 2009	RNA-based viral immunity initiated by the Dicer family of host immune receptors.	PMID:19120484
27	2008	BMC Genomics. 2008	Genome sequence and rapid evolution of the rice pathogen Xanthomonas oryzae pv. oryzae PXO99A.	PMID:18452608

2014: data of 2014/1/1~3/5

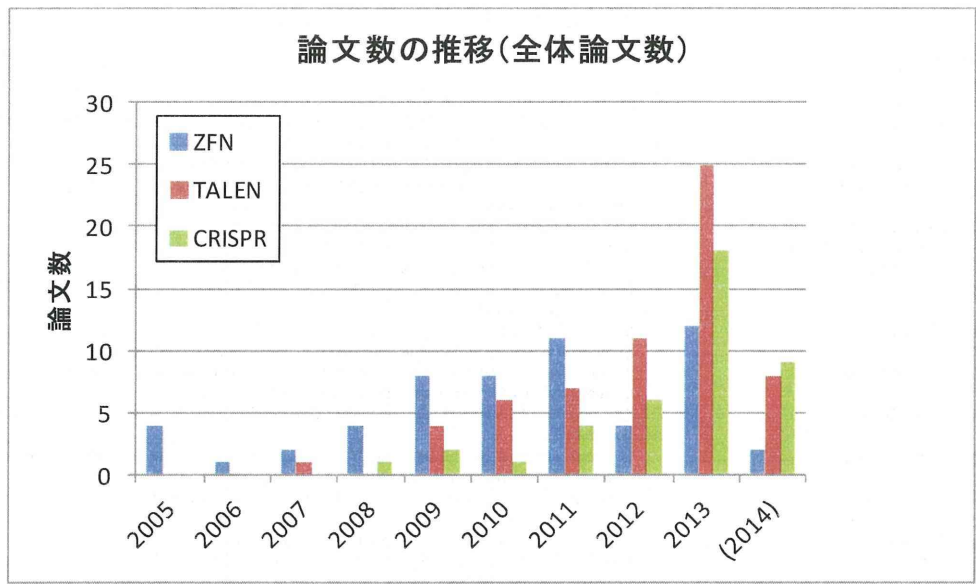


図2. NBT①の植物関連論文数の推移 (全体論文数)

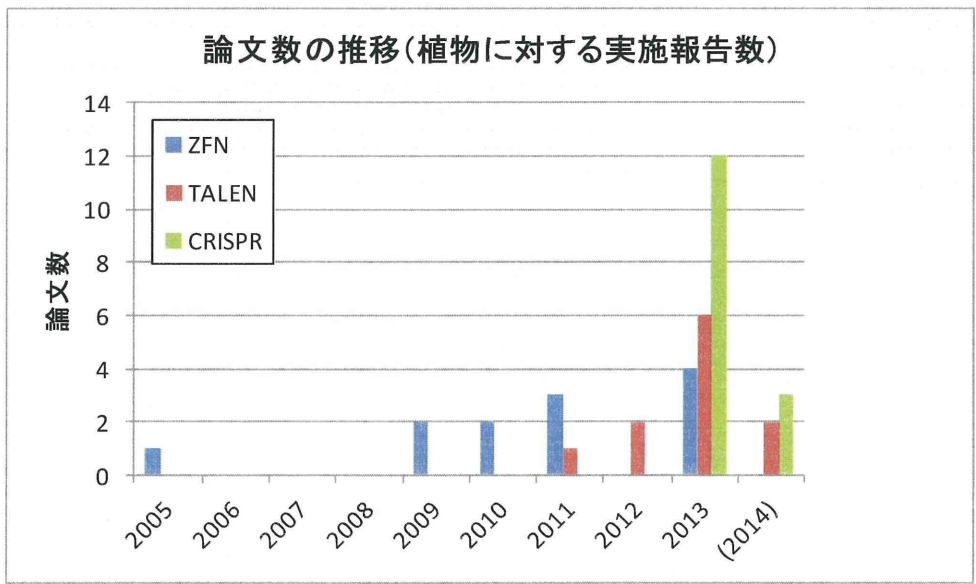


図3. NBT①の植物関連論文数の推移 (植物に対する実施報告数)

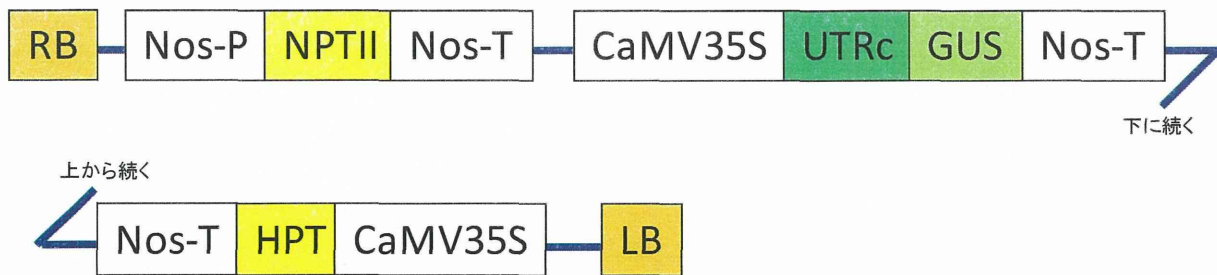


図3. UTRc::GUS riceに導入されたコンストラクトの構造 (概略)

RB, LB:アグロバクテリウム由来T-DNA境界配列; NOS-P:アグロバクテリウム由来ノパリン合成酵素遺伝子プロモーター; NPTII:大腸菌由来カナマイシン耐性遺伝子; HPT:大腸菌由来ハイグロマイシン耐性遺伝子; NOS-T:アグロバクテリウム由来ノパリン合成酵素遺伝子ターミネーター; CaMV35S:カリフラワーモザイクウイルス(CaMV)由来35Sプロモーター; UTRc:イネ由来OsMacI遺伝子5'非翻訳領域(セルフクロニング); GUS:大腸菌由来β-グルクロニダーゼ遺伝子

平成25年度 研究成果の刊行に関する一覧表

書籍

著者氏名	論文タイトル名	書籍全体の編集者名	書籍名	出版社名	出版地	出版年	ページ
なし							

雑誌

発表者氏名	論文タイトル名	発表誌名	巻名	ページ	出版年
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Nakamura, K., Minamitake, Y., Nakamura, K., Kobayashi, T., Noguchi, A., Takabatake, R., Kitta, K., Hashimoto, H., Kawakami, H., Kondo, K., Teshima, R., Akiyama, H.	Development of PCR primers designed for sensitive detection of genetically modified potato DNA in processed foods.	Jap J Food Chem	20	161-169	2013
Nakamura, K., Sakagami, H., Asanuma-Date, K., Nagasawa, N., Nakahara, Y., Akiyama, H., Ogawa, H.	Immobilized glycosylated Fmoc-amino acid for SPR: comparative studies of lectin-binding to linear or biantennary diLacNAc structures.	Carbohydrate Research	382	77-85	2013
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Nakamura, K., Maeda, Y., Morimoto, K., Katayama, S., Kondo, K., Nakamura, S.	Functional expression of amyloidogenic human stefins A and B in Pichia pastoris using codon optimization.	Biotech Appl Biochem	60	283-288	2013
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Takabatake, R., Noritake, H., Noguchi, A., Nakamura, K., Kondo, K., Akiyama, H., Teshima, R., Mano, J., Kitta, K.	Comparison of DNA extraction methods for sweet corn and processed sweet corns.	Food Hyg Saf Sci	54	309-315	2013
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Akiyama, H., Minegishi, Y., Makiyama, D., Mano, J., Sakata, K., Nakamura, K., Noguchi, A., Takabatake, R., Futo, S., Kondo, K., Kitta, K., Kato, Y., Teshima, R.	Quantification and Identification of Genetically Modified Maize Events in Non-Identity Preserved Maize Samples in 2009 using an Individual Kernel Detection System.	Food Hyg Saf Sci	53	157-165	2012
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Mano, J., Harada, M., Takabatake, R., Furui, S., Kitta, K., Nakamura K., Akiyama, H., Teshima, R., Noritake, H., Hatano, S., Futo, S., Minegishi, Y., Iizuka T.	Comprehensive GMO detection using real-time PCR array: single-laboratory validation	J AOAC Int	95	508-516	2012
Tokumasu D, Sakuma T, Hayashi Y, Hosoi S, Hiyama E and Yamamoto T.	FAST-id system for enrichment of cells with TALEN-induced mutations and large deletions	Genes Cells	in press		
Ochiai H, Miyamoto T, Kanai A, Hosoba K, Sakuma T, Kudo Y, Asami K, Ogawa A, Watanabe A, Kajii T, Yamamoto T and Matsuura S.	TALEN-mediated single-base -pair editing identification of an intergenic mutation upstream of BUB1B as causative of PCS (MVA) syndrome.	Proc Natl Acad Sci U S A	111	1461-1466	2014
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Treen N, Yoshida K, Sakuma T, Sasaki H, Kawai N, Yamamoto T and Sasakura Y.	Tissue-specific and ubiquitous gene knockouts in Ciona by electroporating TALENs provide new versatile strategy for isolating	Development	141	481-487	2014
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Hayashi T, Sakamoto K, Sakuma T, Yokotani N, Inoue T, Kawaguchi E, Agata K, Yamamoto T and Takeuchi T.	TALENs efficiently disrupt the target gene in Iberian ribbed newts (Pleurodeles waltl), an experimental model animal for regeneration.	Dev Growth Differ	56	115-121	2014
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