Ⅳ　生物科学専攻・生物学

1　生物科学専攻

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1-1　専攻の理念と目標

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1-2-1　教職員

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1-2-2　教員の異動

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1-3　専攻の大学院教育

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Mechanistic analysis of position-dependent fin regeneration in zebrafish

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論文博士授与数　0件

1-3-7　TAの実績

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1-3-8　大学院教育の国際化

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1-4　専攻の研究活動

1-4-1　研究活動の概要

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○高大連携の成果

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Diversity in development of the phalanx intercalary element among anurans 3 2018

○生物科学専攻のスタッフが平成30(2018)年度に発表した論文，総説・解説，著書，学会の総数を以下に示す。

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○学術団体等からの受賞実績

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		Neuro Evo Devo *Pristionchus pacificus*		H30.9.14
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				H31.3.23

○国

Kim Wonhee National Institute of Biological Resources, ROK)

University of Bristol, Jill Harrison

Dr. Zhiyong Wang, Staff Member, Department of Plant Biology, Carnegie Institution for Science, 260 Panama street, Stanford, CA 94305, USA

Dr. Xavier Nesme (INRA Unité de recherche en ecologie microbienne, France) Dr. Céline Lavire (Claud Université Lyon, France)

Estebanez

Rob Grainger

Dan Rokhsar

Jean-François Riou pax8

AP-1

NIH

Dr. Tariq Ezaz

Dr. Nicolas Perrin

Leibniz-Institute of Freshwater Ecology and Inland Fisheries – IGB Germany

Dr. Matthias

1-4-2　研究グループ

mammalian target of rapamycin complex 1(mTORC1)

Positional memory

mTORC1

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mTORC1 →

Scientific Reports

◎発表論文

Takayama, K., Muto, A., and _____* (2018). (* corresponding author).
Leucine/glutamine and v-ATPase/lysosomal acidification via mTORC1activation are required for position-dependent regeneration.
Scientific Reports : 8278.

Hozumi, S.*, Shirai, M., Wang, J., Aoki, S., and _____* (2018). (* corresponding authors).
The N-terminal domain of Gastrulation brain homeobox 2 (Gbx2) is required for iridophore specification in zebrafish.
Biochemical and Biophysical Research Communications :104-109.

Fukuzawa, T., and _____ (2018).
Unusual light-reflecting pigment cells appear in the *Xenopus* neural tube culture system in the presence of guanosine.
Tissue and Cell : 55-58.

Mikula P., Mlnarikova M., _____, Babica P., Kuroda K., Blaha L., and Sovadinova I. (2018).
Branched Poly(ethylene imine)s as Anti-algal and Anti-cyanobacterial Agents with Selective Flocculation Behavior to Cyanobacteria over Algae.
Macromolecular Bioscience, 18, 1800187. * (page1870027).

◎特許

◎講演

Masaki Shirai, Kazuya Takayama, Ikumi Taya, Nobuyoshi Shimoda, Yutaka Kikuchi
Analysis of target genomic regions of DNA methyltransferase3aa (Dnmt3aa) in zebrafish.
70 2018 6 6

Shunya Hozumi, Hiroya Katayama, Jia Zeyuan, Yutaka Kikuchi
Study on the relationship between neural gene expression and dedifferentiation in early stage of Carcinogenesis
70 2018 6 8

Haruko Takahashi, Yutaka Kikuchi
In vitro analysisof tumor microenvironment formation process around cancer cells.
41 2018 11 29

Shunya Hozumi, Hiroya Katayama, Yukinari Haraoka, Tohru Ishitani, Yutaka Kikuchi
Study on function of neuroendocrine-like cell in cancer progression in a zebrafish melanoma model.
41 2018 11 29

Masaki Shirai, Kazuya Takayama, Ikumi Taya, Nobuyoshi Shimoda, Yutaka Kikuchi
Analysis of target genomic regions of DNA methyltransferase3aa (Dnmt3aa) in zebrafish.
41 2018 11 30

◎各種研究員と外国人留学生の

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◎学界ならび

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GTPase，middle，plekstrin homology，GTPase effector proline rich

GTPase

◎発表論文

Arii J, Watanabe M, Maeda F, Tokai-Nishizumi N, Chihara T, Miura M, Maruzuru Y, Koyanagi N, Kato A and Kawaguchi Y. “ ESCORT-III mediates budding across the inner nuclear membrane and regulates its integrity.” Nat Commun 9:3379 (2018)

◎著書・その他

◎取得

◎講演

Misako Okumura, Yuuki Ishita, Ralf J Sommer, Takahiro Chihara, Neural regulation of the predatory feeding behavior in Pristionchus pacificus, 8th Asia Pacific Worm Meeting, Seoul, Korea 2018 7 9 12 ,

_____ _____ Intra- and extracellular functions of the ER-resident protein VAP in Drosophila 2018 6 5 8

_____ _____ Exploring the intra- and extracellular functions of ER-resident protein VAP 2018 9 10 12

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_____ _____ The physiological functions of ER-resident protein VAP in the intra- and extracellular environments 2018 11 28 30

Guo Runzhao _____ -2 2018 2018 5 12

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Ralf J Sommer Neuro Evo Devo Pristionchus pacificus , 2018 9 14

Pristionchus pacificus , 2018 9 14

◎各種研究員と外国人留学生の受入状況

: Wang Wei ( )
: Nguyễn Vân Anh (PEACE)
: Simon Arango (,)
: Guo Runzhao ( )

◎研究助成金の受入状況

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CDB split GFP

Ralf J Sommer Max Planck Institute for Developmental Biology

Brandeis University

◎学界ならび

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情報生理学研究室

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◎研究活動の概要

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Vanabin

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AkFXXFa C FXXF-NH2 N FDXI

Ala

AkFXXFa

FMRFamide Pedal peptide

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NdWFa L Ca^{2+}- GTP

NdWFa G (GPCR) NdWFa

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◎発表

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43 (2018 11 9)
Ohya N. Ueki T. Obara M. Morishita F. Expression and molecular cloning of G-protein-coupled receptors in the Aplysia heart. G
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◎各種研究員と外国人留学生の受入状

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植物生物学講

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◎発表論文

Higo A., Kawashima T., Borg M., Zhao M., López-Vidriero I., Sakayama H., Montgomery S. A., Sekimoto H., Hackenberg D., Shimamura M., Nishiyama T., Sakakibara K., Tomita Y., Togawa T., Kunimoto K., Osakabe A., Suzuki Y., Yamato K. T., Ishizaki K., Nishihama R., Kohchi T., Frasco-Zorrilla J. M., Twell D., Berger F., Araki T. (2018). Transcription factor DUO1 generated by neo-functionalization is associated with evolution of sperm differentiation in plants. Nature Communications 9: 5283 DOI: 10.1038/s41467-018-07728-3.

_____ (2018). *Andreaea rupestris* Hedw. var. *rupestris*

Hikobia 17: 325–327.

Hisanaga T., Okahashi K., Yamaoka S., Kajiwara T., Nishihama R., Shimamura M., Yamato K. T., Bowman J. L., Kohchi T., Nakajima K. (2019). A cis-acting bidirectional transcription switch controls sexual dimorphism in the liverwort. The EMBO Journal : e100240 DOI: 10.15252/embj.2018100240.

_____. 2018. . 9: 178–196.

Yamaguchi T. 2018. Bryophytes of Asia. Fasc. 25. Hikobia 17: 341–242.

_____. 2018.

. 11: 317–319.

_____. 2018. , pp. 527-567. In ( )

3 . 708 pp.

_____. 2019. , pp. 245-252. In ( ),

. 568 pp. , .

◎講演

Shimamura M. The role of infection of symbiotic fungi in a primitive moss *Takakia lepidozioides*.

Plant-Environment Interaction: evolution, diversity, and utilization for crop improvement. 2018 9 14 . .

Sakakibara K., Yoro E., Nakagawa T., Frangedakis E., Shimamura M., Nishiyama T. (2018). Making

New Bryophyte Model Systems Using Genome Sequencing and Transformation Technique. EMBO Workshop “New shores in land plant evolution” 21 June 2018, Lisbon, Portugal.

Hisanaga T., Koi S., Okahashi K., Fujimoto S., Cui Y., Yamaoka S., Nishihama R., Shimamura M., Katsuyuki T., Kohchi T., Nakajima K. (2018). Functional diversification of evolutionarily conserved regulatory factors for sexual plant reproduction. EMBO Workshop “New shores in land plant evolution” 23 June 2018, Lisbon, Portugal.

Naramoto S., Trozzi N., Jones V., Shimamura M., Sato K., Ishida S., Ishizaki K., Nishihama R., Kohchi T., Dolan L., Kyozuka J. (2018). Coordination of lateral organ development and stem cell activity in Marchantia polymorpha is mediated by an ALOG family protein. EMBO Workshop “New shores in land plant evolution” 21 June 2018, Lisbon, Portugal

Ríos D. R., Shimamura M. (2018). Angle of apical cell segmentation and its relationships to the leaf arrangement. in mosses. EMBO Workshop “New shores in land plant evolution” 22 June 2018, Lisbon, Portugal.

Shimamura M., Akashi H. (2018). Ultrastructural morphology of oogenesis, fertilization and early embryogenesis in Marchantia polymorpha. EMBO Workshop “New shores in land plant evolution” 22 June 2018, Lisbon, Portugal.

Naramoto S., Trozzi N., Jones V., Shimamura M., Sato K., Ishida S., Ishizaki K., Nishihama R., Kohchi T., Dolan L., Kyozuka J. (2018). Coordination of lateral organ development and meristem activity mediated by ALOG protein in Marchantia polymorpha. JPR Apical stem cell(s): evolutionary basis for 3D body plans in land plants. 2018 9 14 .

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Diana Rios Poveda Masaki Shimamura (2018) Angle of apical cell segmentation and its relationships to the leaf arrangement in mosses 82 2018 9 16 .

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Shimamura M., Rios-Poveda D., Inoue Y., Oguri E., Deguchi H., Nabihah S., Okuda T. (2019). Spatial

◎学界ならびに社会での活動

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◎国際交流の実績

Kim Wonhee National Institute of Biological Resources, ROK)

University of Bristol, Jill Harrison

◎特記事項

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植物生理化学研究室

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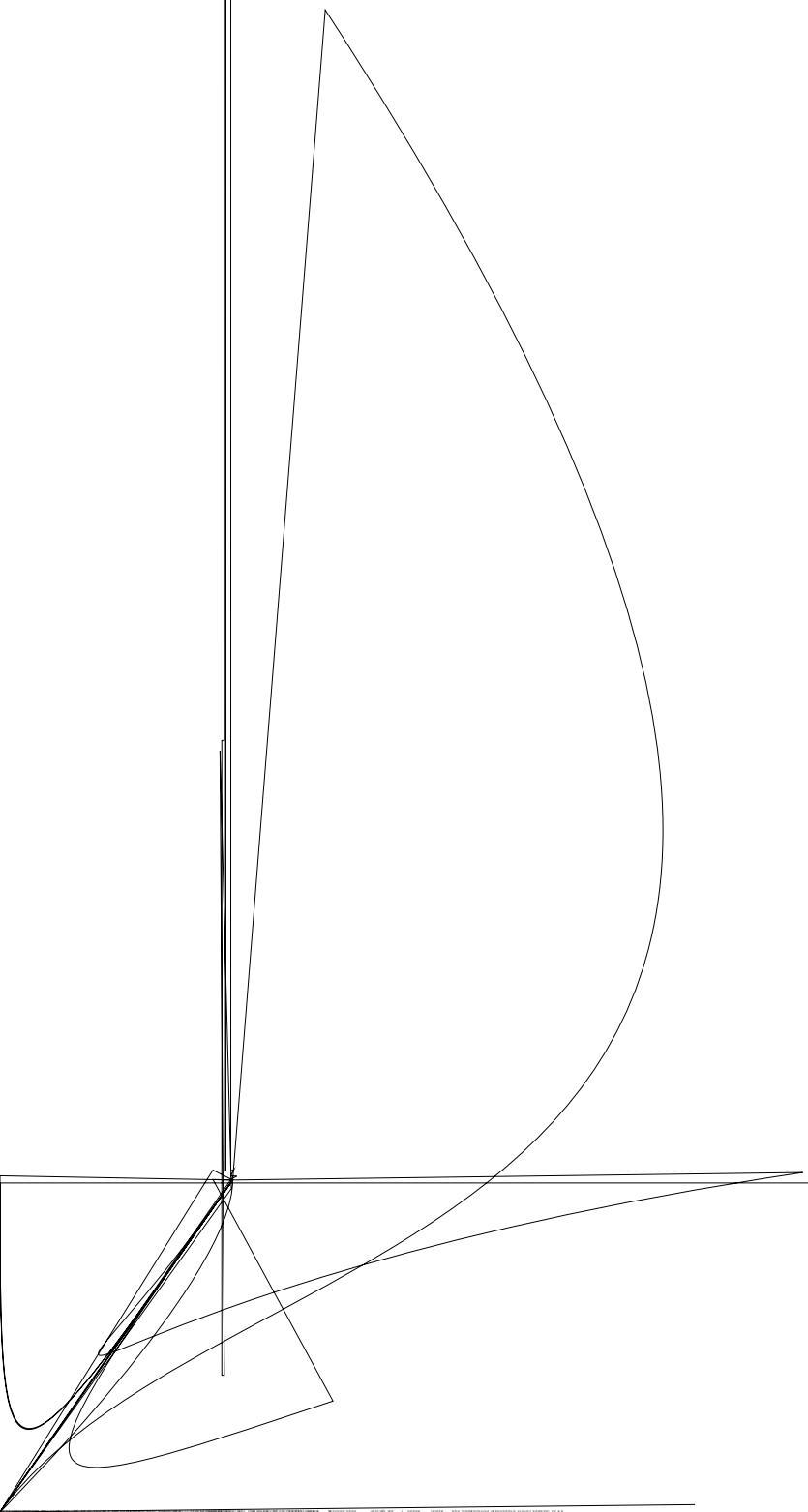
◎研究活動の



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◎研究助成金の受入状況

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Dr. Zhiyong Wang, Staff Member, Department of Plant Biology, Carnegie Institution for Science, 260 Panama street, Stanford, CA 94305, USA

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◎学界

植物分子細胞構築学研究室

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◎研究活動の概要

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PCAD *in vivo*

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radiobacter) 7 G1 5 G7

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◎発表論文

Yamamoto S, Sakai A, Agustina V, Moriguchi K, Suzuki K. (2018) Effective removal of a range of Ti/Ri plasmids using a pBBR1-type vector having a *repABC* operon and a *lux* reporter system. *Appl. Microbiol. Biotechnol.* 102, 1823–1836. (doi:10.1007/s00253-017-8721-7)

Ohmine Y, Kiyokawa K, Yunoki K, Yamamoto S, Moriguchi K, Suzuki K. (2018) Successful transfer of a model T-DNA plasmid to *E. coli* revealed its dependence on recipient RecA and the preference of VirD2 relaxase for eukaryotes rather than bacteria as recipients. Front. Microbiol. 9:895. (DOI: 10.3389/fmicb.2018.00895)

◎講演

DNA 2018

“ DNA ” 2018 8 20-21

DNA 2018

“ DNA ” 2018 8 20-21

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Fatin Iffah Rasyiqah Mohamad Zoolkefli Kazuki Moriguchi Naoki Umei, Takao Ochi, Kazuya Kiyokawa, Shinji Yamamoto, Katsunori Suzuki Genome-wide Screening and Characterization of *Escherichia coli* Chromosomal Gene(s) Responsible for the Successful Horizontal Gene Transfer to *Saccharomyces cerevisiae* 41 2018 11 28-30

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p-coumaryl alcohol *Agrobacterium*
41 2018 11 28-30

◎各種研究員と外国人留学生の受入状況

Fatin Iffah Rasyiqah Mohamad Zoolkefli (2017.10.1-2020.09.30)
He Xingjiang (2018.10.1-2019.03.31)

◎研究助成金

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多様性生物学講

Ptychodera flava

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◎発表論文

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Arimoto A, Tagawa K (2018). Regeneration in the enteropneust hemichordate, *Ptychodera flava*, and its evolutionary implications.
Development, Growth & Differentiation 60(6):400-408.

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◎講演

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◎各種研究員と外国人留学生の受入状

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附属宮島自然植物実験所・島嶼環境植物学研究室

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⑪研究活動の概要

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理念・目的・目標

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◎発表論文

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Suzuki T., Inoue Y.

◎著書・その他

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◎取得

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Mutmainnah, A., Inoue, Y. & Tsubota, H. A genetic study on two different morphotypes of *Zostera marina* in Seto Inland Sea. 82 2018 9 14-16 , .
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◎研究助成金の受入状況

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◎学会ならびに社会での活動

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植物遺伝子資

○ Yamatani, H., Ueda, H., Shimada, H., and Kusaba, M. (2019) pCYOs: Binary vectors for simple visible selection of transformants using an albino-cotyledon mutant in *Arabidopsis thaliana*. 36:39-42.

Takami, T., Ohnishi, N., Kurita Y., Iwamura, S., Ohnishi, M., Kusaba, M., Mimura, T., and Sakamoto, W. (2018) Organelle DNA degradation contributes to the efficient use of phosphate in seed plants. 4:1044-1055

Murakami H, Nobusawa T, Hori K, Shimojima M, Ohta and H. Betaine (2018) Lipid Is Crucial for Adapting to Low Temperature and Phosphate Deficiency in Nannochloropsis. 177, 181–193. 2018.

〇講

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○各種研究員と外国人留学生の受入状況

○研究助成金の受入状況

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バイオリソース研究部門
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◎研究活動の概要

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NBRP

GFP

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2009)

◎発表

Ogino H., Fujiyama A., Chitsaz H., Baharvand H. and Agata K.: Draft genome of *Dugesia japonica* provides insights into conserved regulatory elements of the brain restriction gene nou-darake in planarians. ***Zoological Lett.***, 4: 24, 2018, doi: 10.1186/s40851-018-0102-2.

Lau Q, Igawa T, Kosch TA, Satta Y. Selective constraint acting on TLR2 and TLR4 genes of Japanese Rana frogs. ***PeerJ*** 6: e4842,2018, doi: 10.7717/peerj.4842

Ono T, Kouguchi T, Ishikawa A, Nagano AJ, Takenouchi A, Igawa T, Tsudzuki M. Quantitative Trait Loci Mapping for the Shear Force Value in Breast Muscle of F2 Chickens. ***Poultry Science*** 98: 1096-1101, 2019, doi: 10.3382/ps/pey493

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) 36(16), 2806-2810, 2018.

◌著書

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◌取得特許

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ⓜ講演等

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Ừ Ogino H. and Suzuki A.: The launching of Amphibian Research Center (ARC) at Hiroshima University as the core facility of *Xenopus* resource in Japan. 17th International *Xenopus* Conference, Seattle, USA, 2018.8.12.

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Ừ Igawa T., Kashiwagi A., Kashiwagi K., Suzuki N., Watanabe A., Suzuki A., Noble A., Guille M., Simpson D. E., Horb M. E., Fujii T., Sumida M. and Ogino H.: Geneolgy and pedigrees of inbreeding strains of *Xenopus tropicalis*. 17th International *Xenopus* Conference, Seattle, USA, 2018.8.14., ˇ ☻ ♥ Ẃ .

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Ogino, H.: Current trends in *Xenopus* research. The 10th NIBB International Practical Course “Genome Editing and Imaging of Fish and Amphibians”, 2018 9 25

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Tanouchi M., Iwata Y., Igawa T., Sakagami K., Suzuki N. and Ogino H.: The functional domain-localized mutations hidden in the allotetraploid genome of *Xenopus laevis.* 41 2018.11.30.

Igawa T. and Ogino H.: Revisiting Bergmann's rule: temperature adaptation and its evolutionary significance of the Japanese and Ryukyu bell-ring frogs. 41 2018.11.29.

NBRP : 41 2018 11 28 -30

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Anna Noble David E. Simpson Marko E. Horb Tamotsu Fujii . 12 4 2018 9 20

Arid3a regulates the nephric tubule regeneration via the evolutionary conserved regeneration signal-response enhancer. 12 4 2018 9 20

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Tanouchi M., Ochi H., Kawaguchi A., Igawa T., Iwata Y., Sakagami K. and Ogino H.: The hypomorphic mutations hidden in the allotetraploid genome of *Xenopus laevis*. 70 51 2018 6 8

Igawa T., Kashiwagi A., Kashiwagi K., Tazawa I., Furuno N., Ochi H., Kato T., Mori T. and Ogino H.: The 4th National BioResource Project of *Xenopus tropicalis*. 70 51 2018 6 8

Iwata Y., Tanouchi M., Igawa T., Sakagami K., Ochi H. and Ogino H.: The wild-type *Xenopus laevis* is an asymptomatic carrier of aniridia-like *pax6* mutations. 70 51 2018 6 7

◎各種研究員と外国人留学生の受入状況

NBRP

Austin Mudd 2018 7
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◎研究助成金の受入状況

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(C) 1,300

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30 24,447 ( )
AMED NBRP
6,270

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184
NIG-JOINT (A)
111

◎学界ならびに社会での活動

XCIJ
XCIJ XCIJ-JXM
NBRP

Xenopus Gene Nomenclature Committee member

Journal of Tropical Life Science, Editor

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「発生」研究部門

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◎研究活動

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intercalation model

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2 Mos

DNA

G1,G2

Wee1A Wee1B

mos wee1a

– – 10kbp GFP

transgenic

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CRISPER/CAS

sg RNA mos wee1A myt1

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wee1b 4

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myt1 CRISPR/CAS

B2

MPF B Cdc2 M MPF

M B MPF

B1 B2

B1 B2 N

90 120 C 7 2

B2

Eg5 Cdc2 Eg2

Eg5 Cdc2

B2

Myt1

B2 Myt1

mTOR

mTOR (mammalian target of rapamycin

rapamycin)

mTOR

Small GTP binding

RagA,RagB/RagC,RagD mTOR

mTOR Ego1, Ego3 Gtr1,Gtr2

RagA beit

two hybrid system WDR35/IFT121

Sensendon 1

Hedgehog

mTORC

WDR35 Intragaragellar transport (IFT-A) complex

IFT21 mTOR

17 125 29 161 PCR

8 112 6 76

22

166

XX ZW

XX

DNA DNA

4 1

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10

UVA UVB

UVB 4

UVA

UVB 1

UVB

UVB

11 BMP/Wnt HPE

holoprosencephaly; HPE

BMP

Biz (BMP inhibitory zinc finger)/zbtb14 Biz/zbtb14 Wnt

Biz/zbtb14 Smad β-catenin

BMP Wnt

Development, Growth and Differentiation

(Takebayashi-Suzuki *et al.* 2018) Biz/zbtb14 Biz associated protein, Bap Biz Bap

Biz/zbtb14 Bap

BMP Wnt HPE

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Biz/zbtb14 Bap Hoxb9
Otx2 Rx2A
¥ Bap Biz/zbtb14
Biz Bap Bap
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Bap Biz/zbtb14

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Nsk Nsk

FGF BMP

BMP Nsk Nsk

30 FGF BMP Nsk

MAPK Smad U

Thyroid hormone receptor *α*- and *β*-knockout *Xenopus tropicalis* tadpoles reveal subtype-specific roles during development Endocrinology 2018; 159(2): 733-743

Takeshi Sekiguchi, Nobuaki Furuno, Takashi Ishii, Eiji Hirose, Fumiko Sekiguchi, Yonggang Wang, and Hideki Kobayashi (2019) RagA, an mTORC1 activator, interacts with a hedgehog signaling protein, WDR35/IFT121 Gene to Cell, 24, 151-161

Takebayashi-Suzuki K., Konishi H., Miyamoto T., Nagata T., Uchida M. and Suzuki A. "Coordinated regulation of the dorsal-ventral and anterior-posterior patterning of *Xenopus* embryos by the BTB/POZ zinc finger protein Zbtb14." ***Develop. Growth Differ.*** 2018; 60: 158-173

S. Morioka, P. Mohanty-Hejmadi, Y. Yaoita, I. Tazawa. "Homeotic transformation of tails into limbs in anurans" ***Development, Growth, and Differentiation.*** 2018; 60(6): 365-376

◎講演等

Takebayashi-Suzuki K., Uchida M., and Suzuki A. "Coordinated regulation of the dorsal-ventral and anterior-posterior patterning of *Xenopus* embryos by the BTB/POZ zinc finger protein Zbtb14" 17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

Ogino H. and Suzuki A. "The launching of Amphibian Research Center (ARC) at Hiroshima University as the core facility of *Xenopus* resource in Japan" 17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

Virgirinia R. P., Jahan N., Okada M., Takebayashi-Suzuki K., Yoshida H., Nakamura M., Akao H., Fatchiyah F., Ueno N. and Suzuki A., "Neural specific kinase (Nsk) promotes early neural development in *Xenopus* embryos" 17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

Nakamura M., Yoshida H., Horb M., Takebayashi-Suzuki K. and Suzuki A., "The role of AP-1 family genes in the caudal stem zone and tissue regeneration in *Xenopus tropicalis*" 17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

Igawa T., Kashiwagi A., Kashiwagi K., Suzuki N., Watanabe A., Suzuki A., Noble A., Guille M., Simpson D. E., Horb M. E., Fujii T., Sumida M., Ogino H. "Geneolgy and pedigrees of inbreeding strains of *Xenopus tropicalis*" 17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

Igawa T., Kashiwagi A., Kashiwagi K., Tazawa I., Furuno N., Ochi H., Kato T., Mori T. and Ogino H.:The 4th National Bioresource Project of Xenopus tropicalis. 70 51 (2018 6 5 -8)

Takebayashi-Suzuki K., Uchida M., and Suzuki A. "Coordinated regulation of the dorsal-ventral and anterior-posterior patterning of *Xenopus* embryos by the BTB/POZ zinc finger protein Zbtb14" 51 2018 6 5-8

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S. Morioka, I. Tazawa, Q. Lau, Y. Yaoita, Gene expression in the homeotic transformation of tails into limbs in anurans, 41 (2018 11 28-30)

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MMP-2 HPX 41 (2018 11 28)

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Virgirinia R. P., Jahan N., Okada M., Takebayashi-Suzuki K., Yoshida H., Nakamura M., Akao H., Yoshimoto Y., Fatchiyah F., Ueno N. and Suzuki A. “Neural specific kinase (Nsk) promotes early neural development in *Xenopus* embryos” 2019 3 7

Marko Horb AP-1 family

2019 3 7

Virgirinia R. P., Jahan N., Okada M., Takebayashi-Suzuki K., Yoshida H., Nakamura M., Akao H., Fatchiyah F., Ueno N. and Suzuki A. “Neural specific kinase promotes early neural development in *Xenopus* embryos” 41 2018 11

Marko Horb AP-1 family

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◎国際共同研究

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◎特記事項

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◎大学院教育

, , Q. Lau,
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S. Morioka, I. Tazawa, Q. Lau, Y. Yaoita, Gene expression in the homeotic transformation of tails into limbs in anurans 41 , (2018 11 28-30)

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Virgirinia R. P., Jahan N., Okada M., Takebayashi-Suzuki K., Yoshida H., Nakamura M., Akao H., Fatchiyah F., Ueno N. and Suzuki A. “Neural specific kinase promotes early neural development in *Xenopus* embryos” 41 2018 11

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Nakamura M., Yoshida H., Horb M., Takebayashi-Suzuki K. and Suzuki A., “The role of AP-1 family genes in the caudal stem zone and tissue regeneration in *Xenopus tropicalis*”
17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

Virgirinia R. P., Jahan N., Okada M., Takebayashi-Suzuki K., Yoshida H., Nakamura M., Akao H., Fatchiyah F., Ueno N. and Suzuki A., “Neural specific kinase (Nsk) promotes early neural development in *Xenopus* embryos” 17th International *Xenopus* Conference, Seattle, USA (2018.8.12-16)

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◎研究活動の概要

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◎発表論文

Jeffries DL, Lavanchy G, Sermier R, Sredl MJ, Miura I, Borzée A, Barrow LN, Canestrelli D, Crochet PA, Dufresnes C, Fu J, Ma WJ, Garcia CM, Ghali K, Nicieza AG, O'Donnell RP, Rodrigues N, Romano A, Martínez-Solano Í, Stepanyan I, Zumbach S, Brelsford A, Perrin N (2018) A rapid rate of sex-chromosome turnover and non-random transitions in true frogs. ***Nature communications*** 9(1):4088. doi: 10.1038/s41467-018-06517-2.

Ogata M, Lambert M, Ezaz T and Miura I (2018 " ` gT in d
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◎各種研究員と外国人留学生の受入状況

◎研究助成金の受入状況

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◎学界ならびに社会での活動

An expert for the international committee on amphibian and reptiles anomalies, Ural Federal University

Editorial Board member of Asian Herpetological Research
Editorial Board member of Sexual Development
Editorial Board member of Chromosome Science
Editorial Board member of Binomina

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1-4-3　各種研究員と外国人留学生の

Molecular Mechanisim of Amphibian metamorphosis and Development of Intestine

Matthias Stöck Leibniz-Institute of Freshwater Ecology and Inland Fisheries – IGB, Russia Ass. Professor

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Geographic differentiation of Japanese tree frog

Marko Horb Bell Center for Regenerative Biology and Tissue Engineering, Marine Biological Laboratory, USA Senior Scientist

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Analysis of AP-1 transcription factors in tail formation and regeneration

Quintin Lau Graduate University for Advanced Studies Postdoctoral researcher

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Understanding how Japanese frogs are resistant o a deadly worldwide fungal dosease :identification of MHC from a diverse range of Japanese frogs

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JAHAN NUSRAT (27 10)
TRI KUSTONO ADI (28 4)
FATIN IFFAH RASYIQAH (29 10)
VIRGIRINIA REGINA PUTRI (29 10)
MOHAMED NABIL BAKR ABDELRAHMAN (30 10
ZHENG TIANXIONG (30 10

JIA ZEYUAN 贾 泽远 (29 4)
GUO RUNZHAO (29 10)
DE XINY (29 10)
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PHAN QUYNH CHI 30 4
HUANG JIE 30 10
WANG WEI 30 10

1-4-4　研究助成金の受

２　生物科学科

2-1　学科の理念と目標

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2-2　学科の組織

◦生物科学科の教員

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平成30年度 生物科学科教員組織

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平成30年度の生物科学科に関わる人事異動

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2-3 学科の学士課程教育

2-3-1 アドミッション・ポリシーとその目標

〖アドミッション・ポリシー〗

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〖教育目標〗

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2-3-2 学士課程教育の理念と達成のための具体策

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2-3-4　卒業論文発表実績（個人情報保護法に留意）

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Dnmt3aa
3 A study on the characteristics of tumor cells in 3D environment.
DELLA　　ABA
Nannochloropsis
Sex chromosome evolution in the two closely related species of Japanese brown frogs, *Rana tagoi and Rana sakuraii*.
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Platinum TALEN　　Non-canonical RVD
Camptothecin　　DNA-　　1
AP-1
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Pristionchus pacificus
ELF3
G
KNOX, BLH　　GA
HLS1
GATA　　DELLA

3 *in vitro*	
	Rhizobium endoolusensis
	Nsk

2-4　その他特記事項