ASCIDIAN NEWS*

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Thanks to all of you who sent in contributions and for letting me know how important AN continues to be. Nevertheless this is a much shorter newsletter than usual, with no new meetings abstracts or work in progress. Happily, there are 95 new publications listed at the end of this newsletter. Please keep in touch and continue to send me contributions for the next issue! Keep safe, keep working, and good luck to everyone.

***Ascidian News is not part of the scientific literature and should not be cited as such.**

NEWS AND VIEWS

1. Announcement of the next Intl. Conference on Marine Bioinvasions, ICMB-XI 2022: 16-20 May, Annapolis, Maryland, USA. The meeting is planned to be in-person, and registration is now open. Please see the website for registration and additional information. I hope to attend and I hope many of you will also! https://marinebioinvasions.info

2. From **Billie Swalla** (bjswalla@uw.edu): "The interviews that some of us did two years ago at the International Tunicate Meetings in Villefranche-sur-Mer, France are now available. I think that they did a great job!" The interviews were with Hiroki Nishida, Billie Swalla, Rosana Rocha, Lionel Christiaen and Christian Sardet, and your AN editor agrees, they were very interesting!
https://digital-marine.sorbonne-universite.fr/index.php/tunicates/8-model/18-the-tunicate-community

3. From **Rick Harbo** in British Columbia (rmharbo1@gmail.com) : "this interesting story about the 18th century zoologist Georg Wilhelm Steller and *Halocynthia aurantium* was that the giant orange nudibranchs *Tritonia* were being eaten... but it turns out it was the orange tunicate, *H. aurantium*."

An interesting excerpt from Korshunova, T.; Martynov, A. (2020). Consolidated data on the phylogeny and evolution of the family Tritoniidae (Gastropoda: Nudibranchia) contribute to genera reassessment and clarify the taxonomic status of the neuroscience models *Tritonia* and *Tochuina*. *PLOS ONE.* 15(11): e0242103., *available online at* https://doi.org/10.1371/journal.pone.0242103 [details]

Halocynthia aurantium (Pallas, 1787) was described (based on materials from Steller), remarkably, in the same publication of Pallas ([38]: pp. 246–247), a few pages after description of the orange nudibranch *Tritonia.tetraquetra*. *H. aurantium* shares with *T. tetraquetra* similar orange colouration and Steller definitely collected ascidian *H.aurantium* and nudibranch *T.tetraquetra* during the same expedition to the northern Kuril Islands.

Thus, Steller could be informed by Ainu people with a vernacular ascidian name (similar to totsui/togoi) because nudibranch *T.tetraquetra* has the same colour and after taken out of water was similar to ascidian, *H.aurantium*. It is also possible that a subsequent confusion arose after Steller applied the indigenous name for ascidian or nudibranch in his diaries.

Ascidian *H.aurantium* is still used for food in the neighbouring Japanese Islands and available on the modern Japanese fish markets [65], which was confirmed during our recent expeditions to Japan.

(See more about the culture and eating of this species in: Lambert, G., Karney, R. C., Rhee, W. Y. and Carman, M. R. 2016. Wild and cultured edible tunicates: a review. Management of Biological Invasions **7**: 59-66.)

4. From **Australia: Sea Squirt sculpture creating a splash in Glenelg with surreal depiction of marine** species. https://www.abc.net.au/news/2021-11-02/glenelg-sea-squirt-sculpture-causing-a-splash/100586392

A surrealist sculpture fashioned on a native marine creature is the latest public installation to raise eyebrows in Adelaide, just a year after a giant pigeon created a flutter in Rundle Mall.

The Sea Squirt, by Adelaide foothills artist Michael Kutshbach, was unveiled off Jetty Road in Glenelg over the weekend, drawing the kind of mixed responses City of Holdfast Bay Mayor Amanda Wilson expected. "It's very bold — it's surrealist art — so it's going to have people talking," she told. Installed as part of the council's $3.6 million redevelopment of what was formerly known as Chapel Street, The Sea Squirt is an interactive piece that lights up when people draw close to it, then squirts water at them if they step too close.

A sea sculpture which drizzles water when people get too close has been unveiled at the Bay – but it's the critics who are squirming. https://www.adelaidenow.com.au

5. From **Marc Rius (**mrius@ceab.csic.es **)** who has left his position at University of Southampton England, so there is no longer a researcher working there on ascidians. He has joined CEAB (The Blanes Centre for Advanced Studies) in Spain; you can find his bio and major interests at his website: https://www.ceab.csic.es/en/member/rius-viladomiu-marc/. We wish him the best in his new position.

Thesis Abstracts

1. The effects of Ultra Large Container Vessels on the introduction of non-indigenous marine species. Doron Bereza. Thesis submitted towards the M.Sc. degree in ecology and environmental protection at Tel-Aviv University, supervisor: Prof. Noa Shenkar.

This study included a voyage simulation analysis using *Microcosmus exasperatus* and *Styela plicata.*

2. Induction of regeneration in *Botrylloides diegensis*. Laura Bugada, M.Sc. thesis, Dept. of Biology, University of Fribourg, Switzerland. Advisor Dr. Simon Blanchoud.

Colonial ascidians are marine invertebrates that belong to the Tunicata subphylum, which together with Vertebrata and Cephalochordata compose the Chordata phylum. Colonial ascidians form clonal colonies of adults, known as zooids, interconnected by a shared external vascular system embedded in a transparent and gelatinous matrix, termed tunic. Ascidiacea is the only know class of chordates with the ability to regenerate their whole body.

In *Botrylloides diegensis*, regeneration is triggered by isolating a small fragment of tunic containing part of the vascular system. One single functional individual is robustly restored after around 10 days by the proliferation of circulating stem cells within discrete loci of the vascular lumen called regeneration niches. The regulation of the regenerative capacity of these stem cells is mostly unknown. In particular, how regeneration is initiated and how spontaneous regeneration is prevented in uninjured colonies remain to be determined. In this project, I investigate these two questions by combining surgical procedures, transfusions, chemical treatments and proteomics analysis. First, I tested the role of the various structures that compose the colony by comparing regeneration induction in the presence and absence of these factors. Second, I did transfusion between regenerating fragment and fragment not regenerating to determine whether inhibition is mediated by the haemolymph. Third, I chemically blocked regeneration to dissect how untreated haemocytes can rescue this process. Finally, I looked for candidate induction signals in the haemolymph using comparative proteomics.

This thesis starts with an introduction on the animals and their regenerative capacity. I then present the materials and methods that I developed, followed by a description of my experimental design. Finally, the results that were obtained are presented and interpreted. Overall, I have found that vascular connection to a developing zooid at any level (including the bud stage) is required for not inducing regeneration. Several inductions signals from haemolymph were determined and described, demonstrating the importance of the haemolymph in inducing regeneration. This thesis provides a first step towards the understanding of the molecular mechanisms underlying the induction of whole-body regeneration in *Botrylloides*.

NEW PUBLICATIONS

Andrews, T. G. R., Ponisch, W., Paluch, E. K. and et al. 2021. Single-cell morphometrics reveals ancestral principles of notochord development. Development **148**: epub.
Anselmi, C., Kowarsky, M. A., Gasparini, F., Caicci, F., Ishizuka, K. J., Palmeri, K. J. et al. 2021. Revealing conserved mechanisms of neurodegeneration in a colonial chordate. bioRxiv 1-25.
Asayesh, G., Mohebbi, G. H., Nabipour, I. and et al. 2021. Secondary metabolites from the marine tunicate "*Phallusia nigra*" and some biological activities. Biology Bulletin **48**: 263-273.
Ballarin, L., Karahan, A., Salvetti, A., Rossi, L., Manni, L., Rinkevich, B., Rosner, A. et al. 2021. Stem cells and innate immunity in aquatic invertebrates: bridging two seemingly disparate disciplines for new discoveries in biology. Frontiers in Immunol. **12**: 1-24.
Ben-Hamo, O. and Rinkevich, B. 2021. *Botryllus schlosseri*—A model colonial species in basic and applied studies. In: Boutet, A. and Schierwater, B. (ed.), Handbook of Marine Model Organisms in Experimental Biology: Established and Emerging. CRC Press, pp. 385-402.
Bilecenoglu, M. and Çinar, M. E. 2021. Alien species threat across marine protected areas of Turkey—an updated inventory. J. Mar. Sci. & Eng. **9**: 1-23.
Calatayud, S., Garcia-Risco, M., Capdevila, M., Cañestro, C., Palacios, O. and Albalat, R. 2021. Modular evolution and population variability of *Oikopleura dioica* metallothioneins. Front. Cell & Dev. Biol. **9**: 1-12.
Calatayud, S., Garcia-Risco, M., Palacios, O., Capdevila, M., Cañestro, C. and Albalat, R. 2021. Tunicates illuminate the enigmatic evolution of chordate metallothioneins by gene gains and losses, independent modular expansions, and functional convergences. Mol. Biol. Evol. **38**: 4435-4448.
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Darras, S. 2021. En masse DNA electroporation for in vivo transcriptional assay in ascidian embryos. Bio Protocol **11**: epub.
Dinoi, A., Rius, M., Tine, M. and Teske, P. R. 2021. Development of genetic tools for the redbait species *Pyura herdmani* and *P. stolonifera*, important bioengineers along African coastlines. African J. Mar. Sci. **43**: 1-7.
Farriols, M. T., Ordines, F. and Massuti, E. 2021. Discards reduction of non-commercial benthic species from a simple net modification. Fisheries Res. epub.
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Fiuza, U. M. and Lemaire, P. 2021. Mechanical and genetic control of ascidian endoderm invagination during gastrulation. Seminars in Cell & Dev. Biol. epub.
Gallo, A., Esposito, M. C., Tosti, E. and Boni, R. 2021. Sperm motility, oxidative status, and mitochondrial activity: exploring correlation in different species. Antioxidants **10**: 1-11.
Gonzalez-Sanchez, K., Flores-Alvarado, B., Montiel-Barrantes, P. and al., e. 2021. Ascidian diversity of Costa Rica, including new records for the North Pacific. Revista de Biologia Tropical **69**: S234-S245.
Hauke, R., Peart, R. A. and Ryan, K. G. 2021. An analysis of the genus *Leucothoe* Leach, 1814 (Amphipoda: Leucothoidae) in New Zealand, with the description of two new species symbiotic with ascidians and sponges. J. Crust. Biol. **41**: epub.
Hernawan, U. E., Lavery, P. S., Kendrick, G. A. et al. 2021. Predictors of marine genetic structure in the Indo-Australian Archipelago. Regional Studies in Mar. Sci. **47**: epub.
Hirose, E. and Sensui, N. 2021. Substrate selection of ascidian larva: wettability and nano-structures. J. Mar. Sci. & Eng. **9**: 1-12.
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Hudson, J., Castilla, J. C., Teske, P. R., Beheregaray, L. B., Haigh, I. D., McQuaid, C. D. and Rius, M. 2021. Genomics-informed models reveal extensive stretches of coastline under threat by an ecologically dominant invasive species. PNAS **118**: 1-7.

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Jeong, I., Kim, J. O., Yoon, S. and Kim, K. 2021. Analysis of the microbial community structure in coastal sediment of an ascidian farm in South Korea through 16S rRNA gene amplicon sequencing [*Styela clava*]. Microbiol. Resource Announc. **10**: epub.

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Kim, I. H. and Boxshall, G. A. 2021. Copepods (Cyclopoida) associated with ascidian hosts: Ascidicolidae, Buproridae, Botryllophilidae, and Enteropsidae, with descriptions of 84 new species. Zootaxa **4978**: 1-1286.

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Longo, V., Parrinello, D., Longo, A., Parisi, M. G., Parrinello, N., Colombo, P. and Cammarata, M. 2021. The conservation and diversity of ascidian cells and molecules involved in the inflammatory reaction: The *Ciona robusta* model. Fish & Shellfish Immunol. **119**: 384-396.

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Meena, B., Anburajan, L., Nitharsan, K., Vinithkumar, N. V. and Dharani, G. 2021. Existence in cellulose shelters: industrial and pharmaceutical leads of symbiotic actinobacteria from ascidian *Phallusia nigra,* Andaman Islands. World J. Microbiol. Biotechnol. **37**: epub.
Micaroni, V., McAllen, R., Turner, J. et al. 2021. Vulnerability of temperate mesophotic ecosystems (TMEs) to environmental impacts: Rapid ecosystem changes at Lough Hyne Marine Nature Reserve, Ireland. Sci. Total Environ. **789**: epub.
Monniot, F. 2021. New records of deep-sea ascidians (Tunicata, Ascidiacea) from the New Caledonia region. Zootaxa **4996**: 443–468.
Montesanto, F., Chimienti, G., Gissi, C. and Mastrototaro, F. 2021. Spread of the non-indigenous ascidian *Aplidium accarense* (Millar, 1953) in the Eastern Mediterranean Sea: morphological and molecular tools for an accurate identification. Medit. Mar. Sci. **22**: 246-254.
Moreno-Davila, B., Gomez-Gutierrez, J., Alcoverro, T. et al. 2021. Mass mortality of pen shell *Atrina maura* (Bivalvia: Pinnidae) due to abrupt population increase of tunicate (*Distaplia* sp.) in a subtropical bay, Mexico [*Distaplia* cf. *stylifera*]. Estuarine & Coastal Mar. Sci. **260**: epub.
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Olivo, P., Palladino, A., Ristoratore, F. and Spagnuolo, A. 2021. Brain sensory organs of the ascidian *Ciona robusta*: structure, function and developmental mechanisms. Front. Cell & Dev. Biol. **9**: epub
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Pereyra, P. J., de la Barra, P. and Saad, J. F. 2021. Unravelling facilitation among introduced species, a mechanistic approach. Biol. Invasions **23**: 3483-3496.
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Ramesh, C., Tulasi, B. R., Raju, M. et al. 2021. Marine natural products from tunicates and their associated microbes. Mar. Drugs **19**: epub.
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Vered, G. and Shenkar, N. 2021. Monitoring plastic pollution in the oceans. Curr. Opinion in Toxicology **27**: 60–68.
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