

ASCIDIAN NEWS*

Gretchen Lambert
12001 11th Ave. NW, Seattle, WA 98177
206-365-3734 gretchen.lambert00@gmail.com
home page: <http://depts.washington.edu/ascidian/>

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Many many thanks to the large number of AN readers who sent in contributions and for letting me know how important AN continues to be! This marks 48 years that I have been doing this newsletter! There are **143** new publications listed at the end of this newsletter! This is the largest number ever for a single issue of AN. Please keep in touch and continue to send me contributions for the next issue. To be assured of your new publications being included, always send me the pdf.

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

NEWS AND VIEWS

1. From **Ayelet Voskoboynik** (ayeletv@stanford.edu): We are excited to confirm that the next International Tunicata Meeting (ITM) will be held at **Univ. of Calif. Santa Cruz Conference Center from July 22-26, 2024**. To help us plan the program we kindly request that you complete the ITM 2024 survey using the following link: https://docs.google.com/forms/d/e/1FAIpQLSfyFnw0HeCTpC3pkAbtAiAHHGkC8Ev5ALeusPGke_d0DcWI4Q/viewform?usp=pp_url Your feedback is invaluable in ensuring that the ITM meeting is a valuable and engaging experience for all.

Please note the following dates related to the meeting:

Early registration: April 15, Abstract submission: May 20, Final Registration: June 15,
Final program Release: July 1

The ITM Organizing Committee: Alberto Stolfi, Ayelet Voskoboynik, Billie Swalla, Bill Jeffery, Brad Davidson, Emma Farley, Robert Zeller, Tony De Tomaso, Bill Smith.

2. From **Sarah Stewart-Clark** (Sarah.Stewart-Clark@DAL.CA): The **23rd International Conference on Aquatic Invasive Species** will be held in Halifax, Canada on May 12-16, 2024. Invasive tunicates are a significant issue in Atlantic Canada so we welcome hearing of your research about them! Hope to see you in May in Canada! [23rd International Conference on Aquatic Invasive Species \(fourwaves.com\)](http://fourwaves.com).

3. There will be an **Ascidian Taxonomy Workshop, June 24-28, 2024, Coastal Carolina University, Conway, South Carolina, USA**. Hosted by **Lauren Stefaniak, Susanna López-Legentil, and Marie Nydam**. Funded by NSF DEB RUI #2122475

The workshop will focus on living specimens that we will collect at local marinas. There will be lectures on ascidian phylogenetics, taxonomy, identification and ecology, as well as extensive hands-on practice with identification of living and formalin-preserved specimens.

There is no fee to attend the workshop, but participants must pay for their own travel, lodging and

meals. Financial support may be available for participants, separate from the scholarships described below. Please contact Marie Nydam (mnydam@soka.edu) for more information. Scholarships are available for two students who identify as part of groups under-represented in science.

To apply, please send a CV, a short statement explaining your interest in the workshop, and a letter of recommendation (for students only) to **Marie Nydam** (mnydam@soka.edu). If you are a student from an under-represented group in science and would like to be considered for a scholarship, please include this information in the statement of interest. **Application deadline is December 31st, 2023.** Decisions will be made in early January 2024.

4. The 1st International Symposium on Women in Tunicate Biology that was organized by **Anna Di Gregorio** (adg13@nyu.edu) and **Marie Nydam** (mnydam@soka.edu) was held online on March 28-29 (see *Ascidian News* #91). This global symposium was attended by 45-50 researchers from several countries, including Austria, Brazil, India, Italy, Japan, New Zealand, Turkey, and the United States. The 35 manuscripts in this collection include 'tribute' papers that honor women scientists who pioneered and advanced the field of tunicate biology, as well as 'In Her Words' letters, which provided a canvas for women scientists to freely illustrate their research and themselves. The proceedings are being published in a Special Issue in *genesis: The Journal of Genetics and Development*.

<https://onlinelibrary.wiley.com/page/journal/1526968x/homepage/women-tunicate-biology>

This special Issue is expected to become a resource for all scientists interested in tunicate biology, a reference for early and contemporary work in this field of science, and an inspiration for all women scientists. All of the major fields of tunicate biology are represented, including developmental and stem cell biology, regeneration biology, ecology and taxonomy. Some of the papers have already recently appeared in the journal and the references are included in the New Publications at the end of this newsletter: Cota, De Bernardi (two papers), Di Gregorio, Di Gregorio and Nydam (introduction to the symposium), Hudson, Imai, Karahan, Locascio, López-Legentil, Manni, Manni and Anselmi, Mondal, Nydam (3 papers), Oda-Ishii, Ristoratore, Rocha, Rothbacher, Saito, Stefaniak, Swalla, Wilson. More continue to be added. All of the articles in this Special Issue will be freely accessible on the *genesis* website for a period of 3 months upon publication, and the link to the Special Issue, which is currently wrapping up, will be activated over the upcoming days.

<https://onlinelibrary.wiley.com/toc/1526968x/2023/61/6>

An additional short contribution from Françoise Monniot is below. She preferred to include it in AN rather than an article in the *Genesis* journal, though her importance to ascidian biology and her influence on many women researchers is mentioned numerous times in the various *Genesis* journal articles, and she is highlighted in the one by Nydam, Saffo and Di Gregorio.

5. From Françoise Monniot (françoise.monniot@mhnn.fr). My career began with teaching at the Nancy university before joining the French CNRS to devote all my research to ascidians. I completed my Ph.D. thesis in 1965 (Monniot, F. 1965. *Ascidies interstitielles des côtes d'Europe*. Mem. Mus. natn. Hist. nat. Paris ser. A, 35: 1-154). I moved to Paris to work at MNHN (Museum national d'histoire naturelle). This was a passionate work and included much collecting in the field, diving, as on oceanographic cruises, besides in the laboratory, sharing all studies and many publications with my husband Claude who died in 2008 (see *Ascidian News* #63). Now aged with general arthritis, I have had to stop going to the laboratory. It becomes too painful to stay hours dissecting under the microscope or taking care of the collections. I am very grateful to the MNHN staff who allowed me to utilize and benefit from all the technical facilities even when I was officially retired. I thank my colleagues for their help and permanent exchanges. Of course I remain highly interested in progress in ascidian studies and will continue to be aware of programs in progress. I remain in contact with my lab in MNHN and am ready to answer any query.

6. Montpellier is home of at least two groups working on different aspects of tunicate biology around **Patrick Lemaire** (patrick.lemaire@CRBM.CNRS.FR) (imaging and genomics of ascidian development) and **Frédérique Viard** (frederique.viard@umontpellier.fr) (population genetics). They have provided an opportunity for visiting scientists to spend a few months in Montpellier to stimulate their research. Our fellowship call is open until December 13th for visiting scientists. Talented researchers from all over the world can apply and lead new research projects in all disciplines. Join the Montpellier Advanced Knowledge Institute on Transitions! This prestigious fellowship programme is specifically aimed at senior researchers from all disciplines and all over the world. If your research project is at the cutting edge of innovation and has cross-disciplinary links with the institute's areas of activity – agriculture and food, environment and health – while contributing to the mission of promoting sustainable development, we encourage you to apply! Selected researchers will have the unique opportunity to spend between 3 and 10 months conducting research in one or more research units of their choice in the magnificent city of Montpellier. Montpellier is renowned for its thriving academic community and vibrant cultural environment, making it an ideal place to collaborate and excel in your research projects. **Application deadline : 13 December 2023.** Fellowship start : 16 September 2024.

7. In June 2023, **Lauren Stefaniak**, **Susanna López-Legentil**, and **Marie Nydam** hosted an ascidian taxonomy workshop at Soka University of America in southern California, USA. The 12 participants came from Argentina, Australia, Canada, Costa Rica, Israel, and the United States. Two of the participants were graduate students, and the rest were marine biology or taxonomy professionals. All of the participants conducted field work with us, wherein they learned how to collect, relax and preserve ascidians. They learned about each of the ascidian orders and how to identify down to the genus level through Powerpoint lectures, anatomy lessons with diagrams, and hours of hands-on practice. They also learned about ascidian biology, ecology, evolution, invasive species, and microbiomes. At least four collaborations have emerged from the workshop thus far.



Ascidian workshop participants and Instructors. Back row, left to right: Philip Larkin, Peter Mandre, Zoe Scott, Karin Cram, Isabel Cordon, Janet Pett, Carol Bathie, Analia Paola. Front row, left to right: Lauren Stefaniak, Susanna López-Legentil, Marie Nydam, Janessa Fletcher, Wendy Enright, Lion Novak. Not pictured: Megan Lilly.

8. From Billie Swalla (bjswalla@uw.edu): The Univ. of Washington Friday Harbor Labs is offering several 5 week summer courses at the Labs (FHL), including Evolution and Development of Marine Invertebrates, which includes ascidians of course! during summer 2024. Numerous scholarships are available. https://fhl.uw.edu/courses/course-descriptions/course_quarter/summer-2024/

There is also money for Japanese students, postdocs and faculty to visit FHL through the Japan/U.S. - E.S. Morse Scholar Exchange program. <https://depts.washington.edu/fhl/morse/>
Please contact Dr. Billie J. Swalla for more details bjswalla@uw.edu

9. From Euichi Hirose (euichi@sci.u-ryukyu.ac.jp): My mentor **Dr. Hiroshi Watanabe** (or Nabe-san), an Emeritus Professor of the University of Tsukuba, passed away on November 9, 2023 at the age of 97. He was born in 1926 in Toyokawa City, Aich Prefecture Japan. He graduated from Tokyo Bunrika University (now Tsukuba University) in 1950, and after studying as a special research student, he was hired as an assistant professor at Tokyo University of Education (now Tsukuba University) in April 1953. His supervisor was Professor Hidemichi Oka.

Dr. Watanabe spent most of his research life at the marine station located in Shimoda, Izu Peninsula, Japan (i.e., Shimoda Marine Research Center, University of Tsukuba). There, he promoted research mainly using colonial ascidians such as *Botryllus primigenus*. His representative studies on vascular budding and colony specificity (colonial allo-recognition) continue to be developed by various researchers. The concept of phases (phases A-D) in the generation turnover of zooids in the botryllid ascidians is also due to him. He also studied modes of asexual and sexual reproduction in several colonial species, as well as working with Dr. Takashi Tokioka (Seto Marine Biological Laboratory, Kyoto University) on species descriptions. This line of study was developed by Dr. Yasunori Saito, one of Dr. Watanabe's disciples, into phylogenetic studies of botryllid ascidians based on the modes of reproduction and allo-rejection reaction.

In 1968, he stayed at the Friday Harbor Laboratories (University of Washington) and met the Lamberts (Charley & Gretchen) there. They developed a friendship that lasted long afterward. In 1971 Nabe-san and Charley published a study on light-induced larval release of *Distaplia* and *Metandrocarpa* (Biol. Bull. 144:556–566).

Dr. Watanabe was a kind of icon of the Shimoda Marine Research Center for many years, both as a professor of the embryology laboratory and as a director as well. In March 1989, he retired from the University of Tsukuba, and then served as professor and president of Tokyo Kasei Gakuin Tsukuba Junior College. Even after his retirement, he continued to visit Shimoda from time to time to appreciate ascidian colonies, have a few(?) drinks, and cheer us us.

Not only did he love colonial ascidians, Nabe-san also loved to drink. When the results of his medical check called for dietary restrictions, he restricted the amount of rice he ate in order to secure his evening drinks. There are many stories about drinking, but I cannot go into details here. He rarely got seasick, although I don't know what that had to do with drinking. I can still recall him staring at ascidians and drinking sake. I express my sincere condolences.

“Dr. Watanabe on a boat”

Illustrated by Dr. Hiromichi Koyama



10. Dr. George Mackie, retired professor and eminent researcher at the Univ. of Victoria, British Columbia, Canada passed away on August 25 of this year at the age of 93. He was born in England but spent most of his life in Canada. He produced an extensive list of publications and In 1991, he was made a fellow of the Royal Society of London. He came to the Univ. of Washington Friday Harbor Labs many times for his research, and Charley and I got to know him very well. We visited him and his wife Gillian and stayed with them several times.

From Cathy Carolsfeld: My husband (Yogi) and I were George's graduate students in the early 1980s. (In fact, I learned at our wedding, that it was George who set us up!) I have always felt honoured to have been one of his family of graduate students, and to have had the chance to do research under his supervision. George took his responsibility as a supervisor seriously, and always had his students' best interests in mind. No one else has had such a huge impact on my love of science and the importance of getting up close and really getting to know the organisms we are studying.

George was much more than an accomplished scientist and supervisor, though. Anyone he took on as a student became part of his extended family, and that never stopped. Even decades after graduating, he was still looking out for us, still cared about where our lives had taken us and continued to have a positive influence on both our professional and personal lives. I was very sad to hear about his death, but happy to know that until the very end, he was still doing all the things he loved so much and did so well - like reading, writing, preparing music and taking care of himself. Even his ground-breaking research continued well into his 80s. What more could any of us ask for?

An extensive obituary and tributes can be found at

<https://www.legacy.com/ca/obituaries/timescolonist/name/george-mackie-obituary?id=53014103>

Work in Progress

1. Development and application of genomic resources for ascidian taxonomy and holobiont evolution. Pls: Lauren Stefaniak (lstefania@coastal.edu), Marie Nydam (mnydam@soka.edu), Susanna López-Legentil (lopezlegentils@uncw.edu), Patrick Erwin (erwinp@uncw.edu).

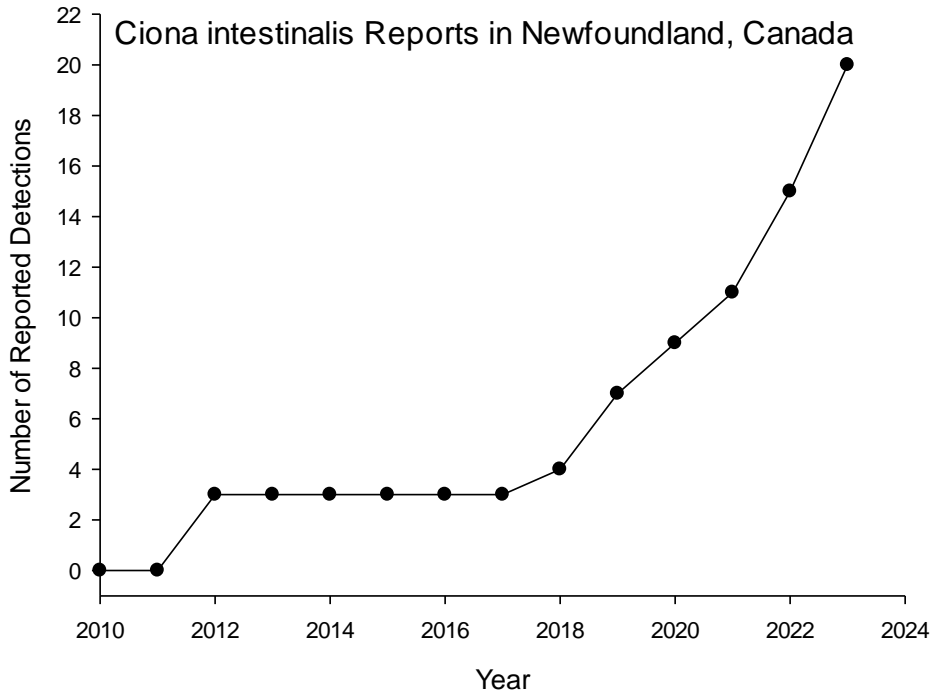
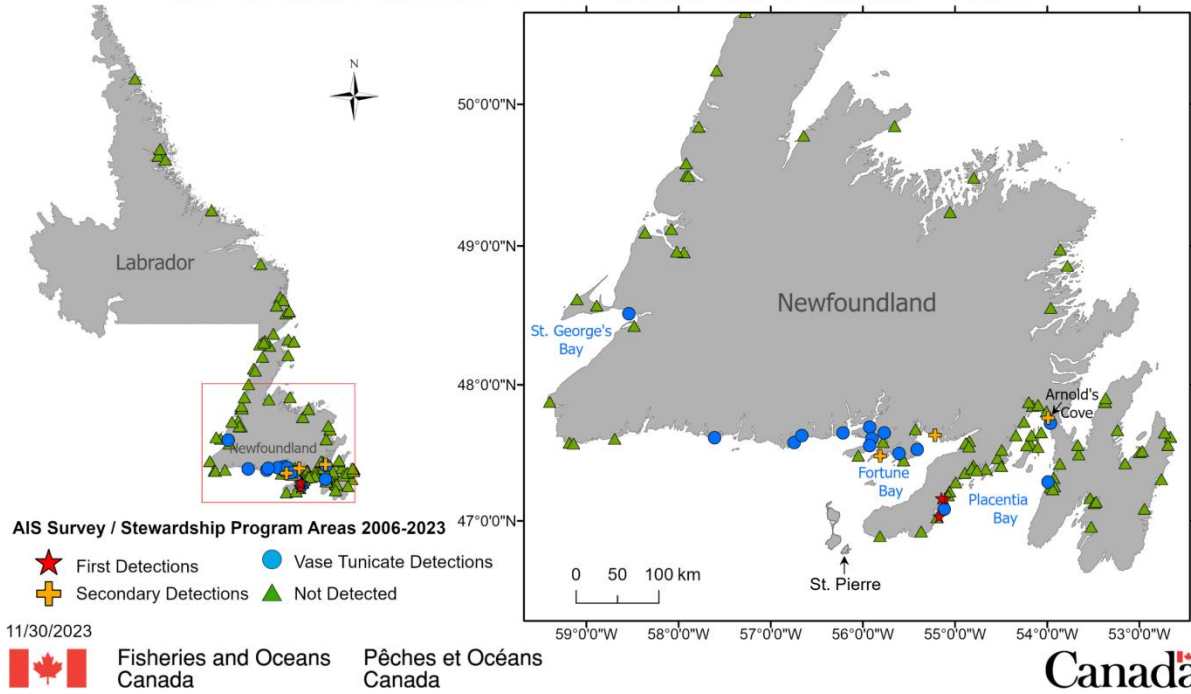
In July 2023, we travelled to Belize to continue collections of ascidians as part of our NSF-funded project to catalog the diversity of ascidians in Belize and investigate microbial symbioses of ascidians. Using Carrie Bow Cay Field Station as our base, we were able to visit mangrove cays as well as coral reef sites on the Belizean barrier reef, complementing the coastal sites we visited in 2022. (See AN #90, Work in Progress #1.) We collected 300+ additional specimens in 2023 which we are now working on identifying and processing.

2. Rapid Increase in Reports of Vase Tunicate (*Ciona intestinalis*) from Newfoundland, Canada By Philip Sargent (philip.sargent@dfo-mpo.gc.ca).

Vase Tunicate (*Ciona intestinalis*) was first reported from three locations in Newfoundland waters in 2012 within a relatively small area (< 100km²) on the south coast of the island in Placentia Bay. It was also reported in 2012 in St. Pierre, a small island that is part of an overseas collectivity of France just off the south coast of Newfoundland (see map below). Annual surveys for invasive ascidians in Newfoundland suggested vase tunicate had remained contained to that small area of Placentia Bay until 2019 when it was reported in three new locations. One of those new reports came from over 100km away in northeast Placentia Bay (Arnold's Cove) and two other reports from adjacent Fortune Bay. Since that time, reports have been increasing westward along the south coast of the island and it was even detected on the west coast in St. George's Bay. Many of these subsequent reports have come from industry, local harbour authorities, and partners outside of Canada's federal Department of Fisheries and Oceans (DFO) and were confirmed from photographs. Recent diving and settlement plate surveys conducted by DFO have yielded even more new reports in 2023. It seems reports of

this species have been increasing since 2018 as it is rapidly colonizing the south coast of Newfoundland (see figures below).

Vase Tunicate Distribution in Newfoundland and Labrador Waters



Meetings Abstracts

1. North Carolina American Society for Microbiology (NC-ASM), Raleigh NC, Nov. 4, 2023.

Kennedy GE, López-Legentil S, Tolar BB. Using molecular methods to explore host-associated ammonia-oxidizing Archaea inhabiting ascidian tissues.

Of the three domains of life, Archaea is the most understudied; thus, comparatively less is known about their ecology and impacts on the environment or other organisms. Improvements in molecular methods within the past few decades led to the discovery of *Thaumarchaeota*, a marine archaeal taxon containing all known ammonia-oxidizing archaea (AOA). Once considered ecologically insignificant, AOA have been found in every biome on the planet and are major contributors to global nitrogen cycling, especially in coastal marine environments. Yet, little is known regarding symbiotic AOA within marine invertebrate microbiomes. Though most host-associated archaeal studies have focused on marine sponges thus far, preliminary studies have identified AOA in other marine invertebrate microbiomes including ascidians. Ascidians, also known as sea squirts, are sessile filter feeders often found attached to docks and harbors. Although the specifics of the interaction remain undescribed, it has been hypothesized that AOA could provide numerous advantages for their hosts, including nitrogen waste removal, detoxification of excess nitrogen, and providing nutrition (including vitamins). In return, AOA may receive light protection and/or nutrients from ascidian hosts. Here, we used a suite of molecular techniques to survey host-associated AOA inhabiting the microbiome of various ascidian species sampled globally, including sites along coastal North Carolina. An array of PCR primer sets targeting a functional biomarker gene for ammonia oxidation, ammonia monooxygenase (*amoA*), were used to detect AOA presence among ~80 ascidian samples from 11 species. Ascidian samples were also screened with primers targeting ammonia-oxidizing bacteria (AOB) *amoA* and *Thaumarchaeota* 16S rRNA. PCR results thus far have found that all ascidian species contain AOA, with some primer sets more successful at detection than others – likely indicative of differences in AOA diversity. In total, 89.16% of ascidian individuals were positive for AOA and 13.25% were positive for AOB. qPCR data shows variation in AOA abundance among species and across spatial scales. Ascidians are critical components of coastal ecosystems, thus, contributions of host-associated AOA to marine nitrification rate estimates may be a significant yet unquantified contributor to nitrogen cycling in coastal ecosystems.

2. The 2024 Society for Integrative and Comparative Biology (SICB) meetings will be held in Seattle January 2-6. The meetings will include a symposium on **Chordate Origins: Evolution, Development and Regeneration** on January 4. The full program can be seen at: <https://www.xcdsystem.com/sicb/program/l1Kr23t/index.cfm>

Thesis Abstracts

1. Vitoria Tobias Santos Ph.D.defense. **Supervisors:** Stefano Tiozzo (stefano.tiozzo@imev-mer.fr) and Alexandre Alie' (CNRS, Laboratoire de Biologie du Développement de Villefranche Sur-mer, Sorbonne Université).

A transcriptome-level comparison of independently evolved non-embryonic development in different species of Styelidae (Tunicata).

A recent phylogeny of the family Styelidae revealed two independent acquisitions of budding. *Botryllus schlosseri* and *Polyandrocarpa zorritensis* are two species that represent each of these budding acquisitions. The former is an established laboratory model, well studied by several groups worldwide, whereas *P. zorritensis* is a newly introduced model in our laboratory.

The thesis is divided into two main projects. In the first part, I tested the effect of different salinities on the reproductive efficiency of *P. zorritensis*. *P. zorritensis* is an invasive species in the Mediterranean and has colonised coastal sites that receive an influx of freshwater (i.e. harbours). Its success in colonising these sites suggests that the animals are exposed to suitable conditions for both asexual and sexual reproduction. My study found that *P. zorritensis* colonies grown at lower

salinities of 29 or 36 ppt had higher rates of asexual reproduction compared to those grown at 40 ppt salinity. However, sexual reproduction did not appear to follow the same trend, with higher numbers of larvae actually observed at higher salinities. This suggests that *P. zorritensis* may have limited invasiveness in high salinity Mediterranean areas, explaining its abundance in coastal areas with significant freshwater inflow.

In the second part of my thesis, I performed a detailed differential gene expression analysis across seven developmental stages of *P. zorritensis* asexual budding. I found that most changes at the transcriptome level preceded changes at the morphological level, with a significant overlap in gene expression dynamics at all stages after the onset of epithelial swelling. The differentially expressed genes included a large number of genes known to be involved in key processes of embryonic development. These results are consistent with current knowledge of histology, cell proliferation dynamics (based on publicly available data) and spatio-temporal dynamics of selected genes according to whole-mount *in situ* hybridisation analysis, which I complemented with two key genes involved in bud morphogenesis. Comparison of the transcriptomic profiles with *B. schlosseri* and other species of Styelidae revealed a substantial overlap of important developmental pathways. As these data cover different types of non-embryonic development, my results suggest that the emergence of budding may rely on homologous genetic modules that are repeatedly co-opted and rewired in different species, regardless of the nature of the budding cells and tissues.

2. Lea Bastid-Solinas, Ph.D. candidate. **Supervisors:** Alexandre Alie', Stefano Tiozzo, (CNRS, Laboratoire de Biologie du Développement de Villefranche Sur-mer, Sorbonne Université).

Study of the link between the environment and asexual reproduction in salps

Salps are ubiquitous planktonic tunicates known for their ability to form large seasonal blooms that play an important role in oceanic trophic webs and biogeochemical cycles. The main driver of exponential salp blooms is their mode of asexual reproduction, called stolonial budding, in which a single individual can produce hundreds of clones in a matter of days. Asexual reproduction depends on the rate of stolonial budding, which is mainly controlled by sea surface temperature and the availability of food (phytoplankton). The exact mechanisms of stolonial budding and the quantitative impact of environmental factors remain unexplored. The present PhD project aims to study budding in salps using two complementary approaches: (i) an anatomical, cellular and molecular characterisation of budding ontogeny and (ii) an ecologically oriented approach to test the effect of environmental factors on budding mechanisms.

In the first part of the project, I will use live imaging microscopy (photonic and confocal) combined with cell labelling and proliferation assay techniques to describe the nature and behaviour of cells involved in bud formation in two species of salps, *Thalia democratica* and *Salpa fusiformis*. In particular, I will better describe the cellular conveyor belt along which populations of slow cycling stem cells give rise to progenitor cells and eventually to differentiated tissues. These anatomical and cellular descriptions will be used to guide single-cell RNA-seq transcriptomic analyses to characterise the dynamics of gene expression along the cellular conveyor belt. The data obtained will be used to further investigate the genes and pathways involved in tunicate budding and to better understand the molecular signatures underlying the plastic evolution of asexual reproduction in tunicates.

The second part will use the results obtained above to better understand how two environmental factors, i.e. temperature and food concentration (phytoplankton), affect bud production during seasonal salp blooms. The link between salp abundance and budding mechanisms will be studied by measuring cell proliferation and bud production on live salps collected in the Bay of Villefranche-sur-mer during and between bloom seasons. The effect of different temperatures and food concentrations will then be further quantified under laboratory controlled conditions by measuring changes in budding rate and mechanisms. Once conditions with a clear effect on stolonial budding have been identified, the transcriptomic profile of budding tissues under selected conditions will be compared and the

function of candidate genes will be studied in more detail to understand how environmental variation affects the molecular regulation of budding.

NEW PUBLICATIONS

- Acosta-Pachón, T. A., López-Vivas, J. M., Mazariegos-Villarreal, A. et al. 2023. Diet of the finescale triggerfish, *Balistes polylepis* (Steindachner), in the Gulf of California. *Mar. Freshwater Res.* **74**: 712-724.
- Arduini, D., Doria, L., Borghese, J., Gravina, M. F. and Giangrande, A. 2023. The ascidian-amphipod association between *Phallusia mammillata* (Cuvier, 1815) and *Leucothoe richiardii* (Lesson, 1865) in the Mar Grande of Taranto (Mediterranean Sea, Italy). *J. Mar. Sci. & Eng.* **11**: epub.
- Asano, A., Minoura, K., Yamada, T. and Doi, M. 2023. Experimental evidence for CH--pi interaction-mediated stabilization of the square form in phenylglycine-incorporated ascidiacyclamide. *RSC Advances* **13**: 2458-2466.
- Azuma, Y., Okada, H. and Onami, S. 2023. Systematic analysis of cell morphodynamics in *C. elegans* early embryogenesis. *Front. Bioinform.* **3**: epub.
- Bae, S., Lee, S. H., Kim, J. M., Choe, K. and Choi, K. H. 2023. The effects of initiation season on succession patterns of benthic fouling organisms in coastal waters from two regions. *Regional Studies in Mar. Sci.* **66**: epub.
- Ben-Hamo, O., Izhaki, I., Ben-Schlomo, R. and Rinkevich, B. 2023. The novel Orshina Rhythm in a colonial urochordate signifies the display of recurrent aging/ rejuvenation sequels. *Sci. Rep.* **13**: 1-12.
- Bento, A. A., Maciel, M. C., Bezerra, F. F., Mourão, P. A. S., Pavão, M. S. G. and Stelling, M. P. 2023. Extraction, isolation, characterization, and biological activity of sulfated polysaccharides present in ascidian viscera *Microcosmus exasperatus*. *Pharmaceuticals (Basel)* **16**: epub.
- Beyer, J., Song, Y., Lillicrap, A., Rodríguez-Satizábal, S. and Chatzigeorgiou, M. 2023. *Ciona* spp. and ascidians as bioindicator organisms for evaluating effects of endocrine disrupting chemicals: A discussion paper. *Mar. Env. Res.* **191**: epub.
- Briggs, D. E. G. and Mongiardino Koch, N. 2023. A Silurian pseudocolonial pterobranch. *Curr. Biol.* epub.
- Castro, N., Gestoso, I., Ramalhosa, P. et al. 2023. Testing differences of marine non-indigenous species diversity across Macaronesia using a standardised approach. *Mar. Pollution Bull.* **192**: 1-12.
- Chen, W. B., Wang, Y. H., Wang, M. Y., Huang, Y. and Xu, Y. Z. 2023. Effects of different fouling organisms on corrosion behavior of carbon steel in Dalian seawater. *Metals* **13**: epub.
- Chen, Y., Gao, Y., Huang, X., Li, S., Zhang, Z. and Zhan, A. 2024. Incorporating adaptive genomic variation into predictive models for invasion risk assessment. *Env. Sci. & Ecotechnol.* **18**: epub.
- Chung, J., Newman-Smith, E., Kourakis, M. J., Miao, Y., Borba, C., Medina, J., Laurent, T., Gallean, B., Faure, E. and Smith, W. C. 2023. A single oscillating proto-hypothalamic neuron gates taxis behavior in the primitive chordate *Ciona*. *Curr. Biol.* **33**: 3360-3370.
- Çinar, M. E. and Özgül, A. 2023. Clogging nets-*Didemnum vexillum* (Tunicata: Ascidiacea) is in action in the eastern Mediterranean. *J. Mar. Biol. Assoc. U.K.* **103**: 1-6.
- Cooreman, K., De Spiegeleer, B., Van Poucke, C., Vanavermaete, D., Delbare, D., Wynendaele, E. and De Witte, B. 2023. Emerging pharmaceutical therapies of ascidian-derived natural products and derivatives. *Environ. Toxicol. Pharmacol.* **102**: epub.
- Cota, C. D. 2023. Investigating cellular dynamics in tunicates. *Genesis* **epub**.
- Cottier-Cook, E. J., Bentley-Abbot, J., Cottier, F. R., Minchin, D. et al. 2023. Horizon scanning of potential threats to high-Arctic biodiversity, human health and the economy from marine invasive alien species: A Svalbard case study. *Global Change Biol.* **epub**.

- D'Aniello, S., Bertrand, S. and Escriva, H. 2023. *Amphioxus* as a model to study the evolution of development in chordates. eLife **12**: epub.
- Davies-Coleman, M. T., McPhail, K. L. and Parker-Nance, S. 2023. A quarter century of marine biodiscovery in Algoa Bay, South Africa. J. Nat. Prod. **86**: 638-652.
- de Aranzamendi, M. C. 2023. A long and winding but exciting road: Biodiversity, phylogenetic, and biogeographic relationships of ascidians in the Southwest Atlantic. Genesis epub: 1-3.
- De Bernardi, F. 2023. Giuseppina Ortolani (1951–2009): A “grande dame” in ascidian embryology. Genesis epub.
- De Bernardi, F. 2023. The story of my research with ascidians. Genesis epub: 1-3.
- de Gier, W. 2023. Polka-dotted treasures: Revising a clade of ascidian- and bivalve-associated shrimps (Caridea: Palaemonidae). Contrib. to Zool. **92**: 179-282.
- Di Gregorio, A. 2023. Searching for marine embryos, finding my path. Genesis epub.
- Di Gregorio, A. and Nydam, M. L. 2023. 1st International Symposium on Women in Tunicate Biology: Meeting report. epub: 1-4.
- Dokmegang, J., Faure, E., Lemaire, P. et al. 2023. Spectral decomposition unlocks ascidian morphogenesis. bioRxiv epub.
- Drago, L., Perin, G., Santovito, G. and Ballarin, L. 2023. The stress granule component TIAR during the non-embryonic development of the colonial ascidian *Botryllus schlosseri*. Fish & Shellfish Immunol. **141**: epub.
- Dumas, F., Mauro, M., Vazzana, M., Arizza, V. and Vizzini, A. 2023. *Ciona robusta* macrophage migration inhibitory factor (Mif1 and Mif2) genes are differentially regulated in the lipopolysaccharide-challenged pharynx. J. Fish Biol. **103**: 727-730.
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