Raphael Aguillon, PhD
Integrative marine biologist

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Research experience

- **Post-doctoral fellow** (01/2025-now**)** IBPC, Paris-Sorbonne University, Paris (France).
  Dr Angela Falciatore
  Project: Molecular mechanism of chronobiology in Diatoms (*Phaeodactylum tricornutum*)
  Responsibilities: Elected representative of non-permanent researchers at IBPC (2025)

- **Post-doctoral fellow** (10/2019-12/2024***)** Bar Ilan University, Ramat Gan (Israel).
  Prof Oren Levy and Prof Lior Appelbaum
  Project: Molecular mechanism of chronobiology and sleep in cnidarians (*Nematostella vectensis, Cassiopea andromeda* and *Exaiptasia pallida*).
  Responsibilities: Manager of tropical and *N. vectensis* facilities.

  *Career interruption (5 months, Oct 2024-Mar 2025) due to regional conflict; research activity partially disrupted until Dec 2024.

- **Ph.D student** (09/2014-12/2017**)** Centre for Developmental Biology, Toulouse (France).
  Dr Patrick Blader and Dre Julie Batut
  Project: Deciphering olfactory epithelium development: from cell type diversity to morphogenesis in zebrafish.

Publications

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Aguillon, R†., Harduf A†., Sagi D., Simon-Blecher, N., Levy, O., and Appelbaum, L. *DNA damage modulates the sleep drive in basal cnidarians of divergent chronotype*. Nature Communications (Accepted, publication December 2025). (†co-first)

Aguillon, R*., Rinsky, M., Simon-Blecher, N., Doniger, T., Appelbaum, L., and Levy, O*. *CLOCK evolved in cnidaria to synchronize internal rhythms with diel environmental cues*. eLife. 2024 May 14; 89499.4. (*co-corresponding)

Aguillon R, Madelaine R, Aguirrebengoa M, Guturu H, Link S, Dufourcq P, Blader P and Batut J. *Morphogenesis is transcriptionally coupled to neurogenesis during peripheral olfactory organ development.* Development. 2020 Dec 21;147(24).

Aguillon R†, Batut† J, Subramanian A, Madelaine R, Dufourcq P, Schilling TF, and Blader P. *Cell-type heterogeneity in the early zebrafish olfactory epithelium is generated from progenitors within preplacodal ectoderm*. eLife. 2018 Jan 2; 7:e32041. (†co-first)

Aguillon R, Blader P, Batut J. *Patterning, morphogenesis, and neurogenesis of zebrafish cranial sensory placodes.* Methods Cell Biol. 2016 Feb 28;134:33–67.

Lay summaries of three publications of note

1. **Sleep and DNA Repair in Cnidarians (Nature Communications, publication in December 2025)**

   We discovered that jellyfish and sea anemones, despite lacking a brain, must sleep to repair neuronal DNA damage that accumulates during activity. This finding reveals that the coupling between behavioral rest and cellular maintenance is ancient and fundamental, conserved from cnidarian to vertebrates. It establishes sleep as an emergent synchronization between organismal behavior and molecular repair processes, a coordination that likely supports environmental adaptation to cellular stress across all animals.

2. **Evolution of the CLOCK Gene (eLife, 2024)**

   We traced the evolutionary origin of the circadian gene CLOCK to early branching animals, cnidarians, and showed that it already coordinated molecular timing with environmental light cycles. This demonstrates that animal biological clock originated from earlier lineages than previously thought. It provides a deep evolutionary context for how organisms integrate external cues and internal time to tune their physiological state to the environment.

3. **Neurogenesis and Morphogenesis in Zebrafish (Development, 2020)**

   We uncovered that the genetic programs controlling neuron birth and tissue morphogenesis are tightly coupled during the development of the olfactory organ. This revealed that organogenesis depends on molecular coordination of distinct cellular processes, highlighting the need for integrative frameworks to understand biological systems.

Education

2017, PhD in Developmental Biology Université Paul Sabatier, Toulouse (France)
2014, Master's degree (2nd year) in Gene, Cells, and Development (2013-2014) Université Paul Sabatier, Toulouse (France).
2013, Master's degree (1st year) Health biology: neurosciences, cell and developmental biology Université Paul Sabatier, Toulouse (France).
2012, Bachelor's degree in cellular biology and physiology, Université Paul Sabatier, Toulouse (France).
2009, Technological Baccalaureate in Social and Medical sciences (2007-2009), National Centre for Distance Education.
2007, Vocational training (CAP) in Art chair woodworking (2005-2007), Vocational high-school, Revel (France).

Grants & Fellowships

- **International Azrieli postdoctoral fellowship –** 172,000€ of salary including 18,000€ of research fees; 06/2021-06/2024).
- **International Gonda Brain Research Centre postdoctoral fellowship –** 13,000€ of salary complement (10/2020-05/2021).
- **International Kolman Tzoref Foundation postdoctoral fellowship –** 12,000€ of salary complement. (10/2019-05/2020).
- **PhD fellowship from the French higher education and research ministry –** 64,000€ of salary (09/2014-09/2017).

Teaching and Mentoring

Teaching

- Teaching Assistant, *Marine Chronobiology*, Inter-University Institute for Marine Sciences, Eilat, Israel (2019–2024). Taught physiology and chronobiology of cnidarians (MSc & PhD).
- Teaching Assistant, *Developmental Biology*, Paul Sabatier University, Toulouse, France (2014–2017). Taught embryology and model systems (undergraduate).

Mentoring

- Supervised 6 MSc and 5 PhD students.

Presentations

International Conferences & Workshops

- Selected talk - *Basal Metazoan Workshop*, Tutzing, Germany (2024).
- Selected talk - *The Organism & Its Environment*, Heidelberg, Germany (2023).
- Selected talk - *Cassiopea International Workshop*, Key Largo, USA (2022).
- Poster - *Jacques Monod Conference: Evolution of Metazoans*, Roscoff, France (2022).
- Poster - *International Society of Developmental Neurosciences*, Antibes, France (2016).

National Meetings (France & Israel)

- Selected talk - *CBI Imaging Day*, Toulouse, France (2017).
- Selected talk - *Fédération de Recherche en Biologie de Toulouse*, France (2016).
- Selected talk - *Azrieli Conference*, Tel Aviv, Israel (2022).
- Selected talk - *Gonda Brain Center Seminar*, Kfar Blum, Israel (2021–2022).

Invited Seminars

- *University of Düsseldorf* (Fraune lab, 2025).
- *Institut de Biologie Physico-Chimique* (Falciatore lab, 2024).
- *BIOM Marine Station, Banyuls* (Darras lab, 2024).
- *CBI Toulouse* (Batut lab, 2024).
- *Villefranche LBDV Marine Station* (Houliston lab, 2023).
- *Hebrew University, Jerusalem* (Moran lab, 2023).

Peer Review

Cell Host&Microbe, Communication Biology, Science Advances, Development, Science of The Total Environment, Frontiers in Marine Science, New Phytologist, Frontiers in Neuroscience.

Additional Training

- Laboratory Leadership for Postdocs (2024), EMBO Solutions Training Course, Leimen, Germany.
- Leadership, Mentoring, Communication, and Recruitment Skills for Academics (2022–2025), Azrieli training & HFP Consulting, Israel/Germany.

Societal Engagement & Scientific Dissemination

- Volunteer consultant in marine biology for *Le Monde* science journalist Nathaniel Herzberg (since 2024).
- Media portraits : *Le Monde* (2024), *Calcalist* (2024), *Aperio Magazine* (2024).
- Featured in documentary *Modèle Animal* (2024), screened at F'A'A Festival (France).
- Public engagement: "Déclic" program (2023), science dialogues with high-school students (Toulouse).

- Science communication videos : *Du Neuf Docteur?* (YouTube, 2022) and *Azrieli Fellows Program* (2022).

References

Dr Patrick Blader, IGBMC, CNRS UMR 7104 - Inserm U 1258, Strasbourg, France.
- **patrick.blader@cnrs.fr**

Dr Julie Batut, CBI, Paul Sabatier university Toulouse, France.
- **julie.batut@univ.tlse.fr**

Pr Lior Appelbaum, Gonda Brain Center, Bar Ilan university, Ramat Gan, Israel.
- **liora@mail.biu.ac.il**

Pr Sebastian Fraune, Inst. of Zoology and Organismic Interactions, HHU Düsseldorf, Germany
- **fraune@hhu.de**

Languages

French (native), English (fluent), Hebrew (limited working proficiency)