

CA15216 Newsletter

July 2019

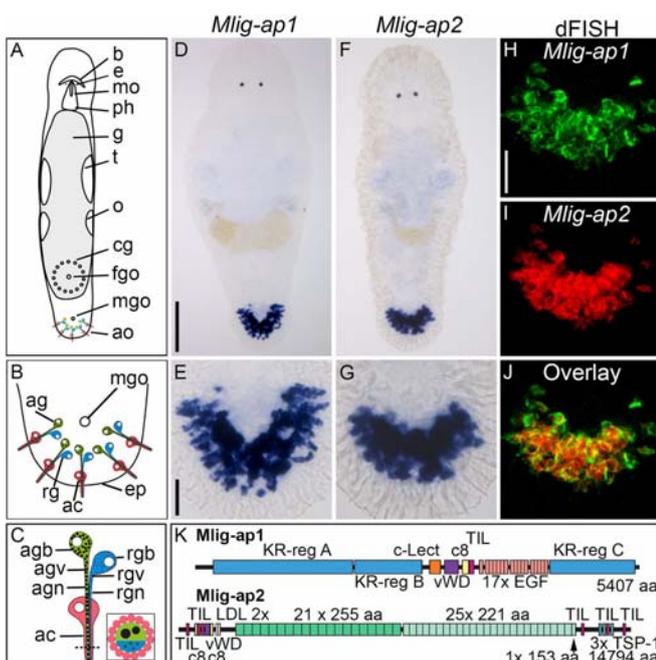
Dear Action member,

Welcome to the COST Action 15216 newsletter. As an Action participant you receive this periodically to update you about Action activities, provide direction for how you can contribute to delivering the goals of the Action and to disseminate information relating to events, research highlights and opportunities. A copy will also be available on the ENBA website (www.enba4.eu) where all other Action-related information can be found.

This newsletter is the primary platform for circulation of Action-related information designed to stimulate interactions and promote networking and inclusivity within the Action. Space can be made available for any members who wish to publicise their novel research findings, relevant events or vacant positions. To discuss this, please contact the most relevant Task Leader, as presented on the ENBA website.

Research Highlights

Your research highlights can be presented here alongside other exciting bioadhesion news from the media. Please contact the most relevant Task Leader with a brief, exciting summary of your findings and a relevant graphic if you would like to participate:



ENBA researchers from the Universities of Innsbruck and Linköping recently published their work on the temporary adhesion system of flatworms in the Proceedings of the National Academy of Sciences of the USA. Two adhesion proteins were identified which, when knocked-down, reduced the ability of the flatworms to attach to a surface. Charge interactions were found to be important, with a negatively charged medium inhibiting attachment and a positively charged medium inhibiting detachment.

Wunderer et al., 2019. A mechanism for temporary bioadhesion. PNAS.

(<https://doi.org/10.1073/pnas.1814230116>)

Research Highlights

Researchers at Georgia Tech. have described the adhesion system used by honeybees to bind pollen particles together for transportation back to the colony. The system is based on sugars and lipids derived from the plant material (<https://www.nature.com/articles/s41467-019-09372-x>)

Researchers from U Pennsylvania, the Korea Institute of Science and Technology and Lehigh University have developed a bio-inspired glue based upon the protective epiphragm secretion of snails. The soft gel can adapt to surfaces before drying and delivering bond strengths on the order of Superglue (up to 892 N.cm^{-2} : <https://www.pnas.org/content/116/28/13774.short>)

BioSMART

The joint UK meeting in association with BioSMART (A Marie Curie ITN) was held at Jesus College Cambridge between the 18th and 19th of March 2019. Sessions included *Biological and Bio-inspired Glues*, *Control of Adhesion*, *Surface Wetting* and *Biofouling*.

In total the meeting was attended by 40 delegates from a range of countries, including: Austria, Belgium, France, Germany, Turkey, Netherlands, UK, Italy, Portugal, Sweden, USA, Greece and New Zealand.

Industrial sponsorship was kindly provided by BASF, URGO and AkzoNobel, whose representatives also attended the event. Consequently, networking activities were strongly encouraged and resulted directly in arrangements for Short Term Scientific Missions between e.g. Universities of Mons and Cambridge.



TERMIS

In May 2019 ENBA was privileged to support a bioadhesion-focussed session at the meeting of the Tissue Engineering and Regenerative Medicine International Society (TERMIS) in Rhodes, Greece.

The trans-disciplinary session heard presentations on a variety of topics, from the fundamental biology of adhesion in sea stars and barnacles, to technical applications for medicine and beyond, presented by industrial partners.

The composition of the society and conference, which included researchers, clinicians and companies provided a stimulating forum for interactions and promotion of the Action aims.

For further information about this and future TERMIS events, please contact the Action local organiser Sylvia Nürnbergger (sylvia.nuernberger@meduniwien.ac.at).



Forthcoming Action Events

Training Schools:

- All training schools planned for GP3/4 have now been completed. Please contact relevant task or WG leaders with suggestions or recommendations for future training schools! (<http://www.enba4.eu/2019/06/22/3455/>)

Workshops:

- **Analytical and numerical methods for adhesion and friction, Trento, Italy.** (21st – 22nd October 2019). (<http://www.enba4.eu/2019/07/18/workshop-advances-in-numerical-modelling-of-adhesion-and-friction/>)
- **Biofouling: Academic and industry perspectives on biofouling prevention and management, Liverpool, UK.** (22nd November 2019; contact marcelo.rodriques@brookesbell.com).

Focus Group Meetings:

Biomolecular Focus Group Meeting, Lisbon, Portugal: Integrative ‘-omics’ for bioadhesion research. (15th October 2019: contact Romana Santos – rlasantos@fc.ul.pt; <http://www.enba4.eu/2019/07/23/fifth-mc-meeting/>).

Catechol Focus Group Meeting, Lisbon Portugal: Catechol-inspired adhesives and functional coatings. (15th October 2019: contact Daniel Ruiz – dani.ruiz@icn2.cat)

MC Meeting:

- **Annual Managing Committee Meeting, Lisbon, Portugal:** (16th October 2019: contact Romana Santos – rlasantos@fc.ul.pt & Ana Viana – anaviana@fc.ul.pt). **More details to follow.**

ADHESION '19

FOURTEENTH INTERNATIONAL TRIENNIAL CONFERENCE ON
THE SCIENCE AND TECHNOLOGY OF ADHESION AND ADHESIVES

3–5 September 2019

WE THE CURIOUS, ANCHOR ROAD, HARBOURSIDE,
BRISTOL, BS1 5DB



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Opportunities within this Action

- **An open Task Leader position** – Task 1.3 properties/performance (Contact Nick Aldred; nicholas.aldred@ncl.ac.uk)
- **Opportunities to organise Training Schools and Workshops** (Contact the relevant Task Leader)
- **An open-call for Short-term Scientific Missions** (Patrick Flammang; Patrick.Flammang@umons.ac.be)

External Opportunities

- Please inform your relevant Task Leader of any opportunities that you wish to advertise.

Publications

Philosophical Transactions B, Theme Issue:

In September 2019 a Theme Issue of *Philosophical Transactions of the Royal Society B: Biological Sciences* will be published entitled '*Transdisciplinary approaches to the study of adhesion and adhesives in biological systems*'. The issue has been edited by Nick Aldred (UK) and Herb Waite (USA), and includes 15 papers; 8 from ENBA members and 7 from international experts around the globe. The topics cover the range of techniques currently applied to studying bioadhesion systems in all kingdoms of life, from bacteria to plants and animals. The intended publication date will be mid-September.

Papers from ENBA Short Term Scientific Missions:

Rebora M, Salerno G, Piersanti S, Michels J, Gorb S. 2019. Structure and biomechanics of the antennal grooming mechanism in the southern green stink bug *Nezara viridula*. *Journal of Insect Physiology* 112: 57-67.

Bekhta P, Sedliačik J, Kačík F, Noshchenko G, Kleinová A. 2019. Lignocellulosic waste fibers and their application as a component of urea-formaldehyde adhesive composition in the manufacture of plywood. *European journal of wood and wood products*. 10.1007/s00107-019-01409-8.

Others:

Bozuyuk U, Gokulu I, Dogan NO, Kizilel S. 2019. A Novel Method for PEGylation of Chitosan Nanoparticles through Photopolymerization. *RSC Advances*, 10.1039/C9RA00780F.

von Byern J, Chandler P, Merritt D et al. 2019. Biomechanical properties of the fishing lines of the glowworm *Arachnocampa luminosa* (Diptera; Keroplatidae). *Scientific Reports* 3082.

Wunderer J, Lengerer B, Pjeta R et al. 2019. A mechanism for temporary bioadhesion. *Proceedings of the National Academy of Sciences USA* 116: 4297-4306.

Short-Term Scientific Missions (STSMs)

Applications for STSMs are particularly encouraged in areas that address the Action Scientific Objectives (above) and from/between early-career investigators and inclusiveness target countries.

Please check the Action website (<http://www.enba4.eu/activities/short-term-scientific-missions/>) or contact Patrick Flammang (Patrick.Flammang@umons.ac.be) for further information.

Here are a few examples of recent STSMs:

- *Surface functionalisation as a tool to investigate pad secretion properties in insects*
(19 days, UK to NL)
- *Agro-based bioadhesive biocomposite for footwear* (21 days, CZ to SI)
- *Catechol-based free-standing film for tissue regeneration* (63 days, ES to AT)

The next deadline for applications is **September 1st** for STSMs taking place between 01/10/2019 and 30/04/2020. **This will be the last call until the end of the Action.**

The application, comprising **1)** a work plan, **2)** a letter of support from the Home Institution (especially for PhD students), **3)** a written agreement from the Host Institution, and **4)** a CV, should be submitted online (<http://www.cost.eu/STSM>).

Resources

Do not forget our Action social media profiles!!!



Twitter: @ENBAbioadhesion

Facebook: European Network of Bioadhesion ENBA

The Facebook logo, consisting of the word "facebook" in white lowercase letters on a blue rectangular background.

Research Gate: European Network of Bioadhesion (ENBA)

Scientific Objectives

Every year the Action must submit a Work and Budget Plan, in which the primary Action Activities are described and costed. One important element is the list of Scientific Objectives. These objectives should be proposed and delivered by Action members, preferably those formed into Focus Groups. Below are some of the new Scientific Objectives that the Action must address within the current Grant Period (until April 2020). The full list can be located on the ENBA intranet. We would be particularly interested to hear about your work, collaborations, publications and other activities relating to these:

- Identify convergent themes in the biology, chemistry and mechanics of biological adhesion systems throughout the kingdoms of life.
- Bridge gaps in current knowledge of antifouling technologies and biofouling management.
- Identify requirements of tissue glues in the medical field in order to streamline our research towards beneficial new adhesives.
- Comparison of bioadhesive model organisms with yet unknown or poorly characterized species and families.
- Development of a web resource to enable the community to locate publicly available molecular/compositional data.

Focus Groups

The objectives of the Action are defined in a 'bottom-up' direction from the Action Focus Groups. Currently there are four, as outlined below. If you wish to initiate a Focus Group and have between 6 and 12 interested individuals, you can propose this to the most relevant Task Leader. Focus groups can then bid for Workshop/Training School support to further the Action objectives:

Biofouling

*Nick Aldred
(Leader)
Thomas Ederth
Anne Marie Power
Marco Faimali
Mattias Berglin
Sheelagh Conlan
Claire Hellio
Patrick Flammang
Nicole Poulsen
Marleen
Kamperman
Päivi Laaksonen*

Wood Adhesives

*Janek von Byern
(Interim Leader)
Pavlo Bekhta
Tomasz
Krystofiak
Eleftheria
Athanasiadou*

Biomolecular

*Romana Santos
(Leader)
Patrick Flammang
Païvi Laaksonen
Nick Aldred
Peter Ladurner
Janek von Byern
Anne Marie Power
Peter Davey*

Catechols

*Daniel Ruiz
João F. Mano
Marleen
Kamperman
Klaus Rischka
Henrik Birkedahl
Seda Kizilel*