Deliverable D4.1

Summer School 1

Editor:	Stuart MacLachlan – Lucideon Limited
Deliverable nature:	Other (O)
Dissemination level: (Confidentiality)	Public (PU)
Contractual delivery date:	31 December 2015
Actual delivery date:	8 – 10 February 2016
Suggested readers:	Researchers in biomaterials; Commission services; MSCA programme project leaders
Version:	1.1
Total number of pages:	18
Keywords:	Marie Skłodowska Curie Programme, Training, Antimicrobial Materials

Abstract

The first HyMedPoly Summer School was held on at Politecnico di Torino in February 2016 with an agenda that met the project brief. The Summer School had two elements; industrial training on regulations for medical products and best practices in managing collaborative R&D projects and an open scientific workshop on biodegradable polymers synthesis and functionalisation.

The meeting was also an opportunity to progress technical activities and discuss project management issues.

Disclaimer

• *This report is classed as* **PU =** Public

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement n° 604251

Impressum

[Full project title]	Drug-Free Antibacterial Hybrid Biopolymers for Medical Applications
[Short project title]	HyMedPoly
[Number and title of work-package]	WP4 Training network
[Number and title of task]	Task 4.1 Summer School 1
[Document title]	Summer School 1
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Executive Summary

HyMedPoly aims to develop new therapies based on biomedical polymers and inorganic materials.

The first Summer School was held on at Politecnico di Torino in February 2016 with an agenda that met the brief of the project plan. An industry training session focused on regulations for medical products and best practices in managing collaborative R&D projects, communication and knowledge management, and was organised specifically for the HyMedPoly Early Stage Researchers and Partners. An open scientific workshop on, was well attended and heard three presentations on “Biodegradable polymers synthesis and functionalization”.

The Summer School was also an opportunity to progress technical activities and discuss project management issues.

List of Authors

Company	Author	Contribution
Lucideon Limited	Stuart MacLachlan	Author
Eurescom	Maria Barros	Editing

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1 Introduction

1.1 The HyMedPoly Project

Infection has become one of the toughest problems in the medical world. As bacteria become more resistant to drugs, there are fewer effective antibiotics to fight against pathogens.

HyMedPoly aims to develop new therapies based on biomedical polymers and inorganic materials. 9 universities and companies from across Europe are creating a cohort of 15 European Industrial Doctorates to synthesise new biopolymers with added antibacterial functionality and develop functionalised bioactive ceramics and glasses that can act as active agents to kill bacteria and prevent their growth.

The new material systems from HyMedPoly are aimed at applications such as wound care, implants and bio film prevention.

Appendix 1 gives more details of the project group and the research projects supported.

1.2 HyMedPoly Summer Schools and Workshops

Summer schools and workshops are a key element of the training activities of HyMedPoly and are planned to take place approximately every six months, providing training both in the science of antimicrobial materials development, application and qualification, and in skills for business. The scientific training programme aims to balance aspects of basic and applied research to combine an appreciation of industry needs with an understanding of the underlying science. The skills for business training provides the Early Stage Researchers (ESRs) with an understanding of the wider issues needed to manage technical projects effectively.

These meetings of the HyMedPoly group also provide an opportunity to progress the project's technical activities. The researchers share results and seek guidance through presentations and discussions with the project partners, the Supervisory Board meets to discuss project management issues and the cohort of ESRs network and discuss general project issues.

Table 1: HyMedPoly Summer Schools and Workshops

	Main Training Events & Conferences	Lead Institution	Project Month (*estimated*)
1	Summer school 1: Science: Biodegradable polymers synthesis and functionalization Industry Training I: Regulations for medical products Industry Training II: Best practices in managing collaborative R&D projects – communication and knowledge management	PTO (Italy) EUR (DE)	12
2	Workshop 1 – scientific meeting of the network: new concept of drug-free antibacterial therapies	UoW (UK)	17
3	Summer School 2: Science: Hybrid materials development and processing technology Industry Training III: Best practices in managing collaborative R&D projects – forming good project teams	FAU (DE) EUR (DE)	21
4	Workshop 2 – scientific meeting of the network: Drug-free antibacterial hybrid polymers and clinical aspects	IK4 (ES)	27
5	Summer School 3: Science: Product development and regulations Case studies (including preclinical) Industry Training IV: Best practices in managing collaborative R&D projects – dissemination and exploitation	HKB (DE) (Provisional) EUR (DE)	34
6	Workshop 3 – scientific meeting of the network: From science to products: business plan/meeting with investors, start-ups and blue chips and exhibition of HyMedPoly outcomes	Vn (IE)	39
7	International School and Conference –drug-free antibacterial technology for medical applications	Luci (UK)	45

2 The First HyMedPoly Summer School

The first Summer School was held at Politecnico di Torino on 8 - 10 February 2016. The agenda (see Appendix 2) followed the brief specified in the HyMedPoly proposal.

Organisation of the industry training was led by Eurescom and focused had two distinctive parts; Industry Training I: Regulations for medical products and Industry Training II: Best practices in managing collaborative R&D projects – communication and knowledge management. These sessions were run for the appointed ESRs and project partners and are described in Section 2.1.2.

Organisation of the science training was led by Politecnico di Torino and focused on biodegradable polymers synthesis and functionalization. Additionally, the session was open to the public. A flyer (Appendix 3) was used to advertise the session widely through the mail contacts and electronic media channels of the HyMedPoly partners as well as through local channels at Politecnico di Torino. There were 69 delegates registered in addition to the three speakers. The meeting was successful in attracting local stakeholders as expected; the majority of delegates were graduate and post graduate students from Politecnico di Torino, however the session also attracted local industry.

The delegates heard the four presentations detailed in Section 2.1.3, which will be available from the HyMedPoly website, www.hymedpoly.eu.

The Summer School was also an opportunity to progress technical activities and discuss project management issues through introductory session for the ESRs and a meeting of the Supervisory Board, reported separately in Deliverable Report D6.3.

2.1 Overview of Each Day

2.1.1 Day 1: Introduction to the Project, the Partners, the ESRs and their Projects (full day)

The project partners and 11 appointed ESR learnt about Marie Skłodowska Curie Programme and the background to the HyMedPoly project, as well as being welcomed to Politecnico di Torino by Massimo Rossetto, Director of the Department of Mechanical and Aerospace Engineering.

Each ESR then gave a 10 minute presentation outlining:

- Personal Profile and Background
- Aims and objectives of their project
- Why they selected the project
- What they hope to achieve.

The presentation was followed by a 10 minute discussion.

Figure 1: The HyMedPoly ESRs and Project Partners

The day concluded with a networking programme. Speeches from the Coordinator and Scientific Coordinator and a networking game were aimed at encouraging the individuals to form an effective working group.

2.1.2 Day2: Workshop for ESRs (half day)

The industry training session was run as an interactive workshop combining presentations and discussions. It was spilt into two distinct parts:

Industry Training I Introduction to Regulations for Medical Products (Lucideon - Xiang Zhang)

The introduction to regulation of medical products outlined:

- what needs to be considered during the design and development stages for a medical device in order to win approval to market it into "A Country/Countries", such as USA = one country, EU = member countries;
- guidance on which regulations to follow when developing a medical device;
- good work practices that will help researchers to be compliant with these regulations.

Industry Training II Best Practices in Managing Collaborative R&D Projects– Communication and Knowledge Management (Eurescom - Milon Gupta)

The session introduced the following:

- The Nature of Collaborative R&D Projects
- Project Plans and Contractual Agreements
- Project Governance
- Intellectual Property
- Knowledge Management
- Project Communication; Internal Reporting
- Project Communication; External Reporting.

After the ESR workshop, the both presentations were stored for future reference on the HyMedPoly File sharing site.

To consolidate the communication training, the ESR cohort produced a newsletter about themselves and their projects, which is available from the HyMedPoly website, www.hymedpoly.eu.

2.1.3 Day 3: Open Workshop (half day)

The open workshop covered the scientific training of the summer school. "Biodegradable Polymers: Synthesis and Functionalisation" comprised four presentations:

- *Introduction to HyMedPoly and Welcome to Politecnico di Torino*
  Gianluca Ciardelli, Politecnico di Torino (I)
  Flavio Canavero, Director of the Doctorate School Politecnico di Torino (I)

- *Chemical Synthesis of Biodegradable Polymers*
  Paola Petrini, Politecnico di Milano (I)
  A review of biodegradable polymers and the features affecting their properties, which focused on the chemical synthesis of biodegradable polyesters and polyurethanes.

- *Bacterial Synthesis of Polymers*
  Ipsita Roy, University of Westminster (UK)
  A review of Polyhydroxyalkanoates (PHAs), which are an emerging class of biodegradable and biocompatible polymers of natural origin with huge potential in biomedical applications. PHAs are currently being produced using Gram negative bacteria for potential use in hard and soft tissue engineering, drug delivery, wound healing, stent and nerve conduit development.

- *Polymer Surface Functionalisation*
  Pietro Favia, Università di Bari (I)
  A review of the use of plasmas in life sciences, particularly surface modification plasma processes for biomaterials, highlighting applications through selected examples of plasma processing of scaffolds for Tissue Engineering, nano/bio composite PE-CVD coatings and free standing PE-CVD coatings "NanoFilms".

Figure 2: The Open Workshop; Prof Ipsita Roy Lecturing

Appendix 1 – The HyMedPoly Project Group and Research Projects

HyMedPoly aims to develop new therapies based on biomedical polymers and inorganic materials. The nine universities and companies from across Europe shown in Table 1 are creating a cohort of 15 European Industrial Doctorates. The projects, detailed in Table 2, are to synthesise new biopolymers with added antibacterial functionality and develop functionalised bioactive ceramics and glasses that can act as active agents to kill bacteria and prevent their growth.

The new material systems from HyMedPoly are aimed at applications such as wound care, implants and bio film prevention.

Table 1.1: The HyMedPoly Consortium Members

Consortium Member	Legal Entity Short Name
Beneficiaries	
1. Lucideon	Lucid
2. University of Westminster	UoW
3. Politecnico di Torino	Polito
4. University of Erlangen-Nuremberg	FAU
5. Vornia	Vornia
6. University of Southampton	Soton
7. Knappschafts-Hospital Bochum GmbH	KHB
Partner Organisations	
8. IK4 Tekniker	IK4
9. Eurescom	EUR

Table 1.2: The HyMedPoly Research Projects and Interaction between Them

Number of ESR	Individual Research Project (Title)	Link WPs	Academic Host	Non-Academic
ESR1 ESR2	Projects 1&2: Bioresorbable Antibacterial Polyesterurethanes ESR1: academic →industrial approach ESR2: industrial → academic approach Interact with Projects 4 and 7	WP1&3	PTO	Vn
ESR3 ESR4	Projects 3&4: Biodegradable and Bioresorbable Polyesters ESR3: academic → industrial approach ESR4: industrial → academic approach Interact with Projects 4 and 7	WP1&3	FAU	Luci
ESR5 ESR6	Projects 5&6: Natural Hybrid Polymers ESR5: academic → industrial approach ESR6: industrial → academic approach Interact with Projects 5 and 7	WP1&3	UoW	Vn
ESR7 ESR8 ESR9	Projects 7,8&9: (i) Bioactive Silica Glass, (ii) Bioceramic, (iii) Bioactive Phosphate Glass ESR7: academic → industrial approach (i) ESR8: industrial → academic approach (ii) ESR9: industrial → academic approach (iii) Interact with Projects 1, 2 and 7	WP1&3	FAU	Luci
ESR10 ESR11	Projects 10&11: Synthesis, Understanding and Development of Antibacterial Inhibitors of Enzymes/Proteins as Novel Antibacterial Agents ESR10: academic → clinical approach ESR11: clinical → academic approach Interact with Projects 3 and 7	WP1&3	UoW	KHB

Number of ESR	Individual Research Project (Title)	Link WPs	Academic Host	Non-Academic
ESR12 ESR13	Projects 12&13: Product Development ESR12: academic → industrial approach ESR13: industrial → academic approach Interact with Projects1-9	WP1-3	Soton	Luci
ESR14 ESR15	Projects 14&15: In Vitro and In Vivo Test ESR14: academic →industrial approach ESR15: industrial → academic approach run in parallel with Projects 1- 1	WP 1-3	PTO	KHB

Appendix 2 – HyMedPoly Summer School 1, Agenda

8 – 10 FEBRUARY 2016

Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Corso Einaudi, 40, 10129 Turin (Italy)

Coffee Breaks and Networking Lunches 8-9 February will be held in the Meeting Room at Ground Floor

Day 1* (Sala Riunioni, 3rd Floor) *Monday 8 February - Lead Lucideon/University of Westminster (SM/XZ/IR)

Start	***09:00 hours***	***Finish by 18:00 hours***
09:00	***Introduction to the Project and Partners***	***(Chair – Politecnico di Torino 2 hours)***
	– Project Objectives and Structure	(XZ/IR; 15 minutes)
	– The Marie Skłodowska-Curie Programme	(SM; 15 minutes)
	– Overview of Each Organisation in the Project from each	(All; 5 minute presentations Organisation - 45 minutes)
	– Discussions	(bring up to 11:00 hours)
11:00	***Coffee Break – 30 minutes***	
11:30	***ESR Presentations***	***(Chair – Ipsita Roy, University of Westminster)***

(10 minutes Presentation per ESR plus 10 minutes Discussions per Talk)

13:00	***Networking Lunch***	
14:00	***ESR Presentations Continued***	
17:20	***Discussions and Wrap–Up***	
18:30	***HyMedPoly ITN Networking Session and Meal***	***(4 hours)***
	Restaurant Arcadia (Piazza Castello, 29, 10123 Torino)	

Day 2 Tuesday 9 February

09:00	***Meeting of all Participants and Welcome Address by the Director of the Department, Massimo Rossetto***	***(Sala Riunioni III Piano)***
09:10	***2 Parallel Meetings***	***Lead Lucideon/University of Westminster (SM/XZ/IR)***
	- Supervisory Board Meeting	***(Sala Riunioni III Piano)***
	- ESR Meeting	***(Sala Ferrari II Piano)***

The ESR Meeting is to encourage networking between the researchers, providing an opportunity to interact and learn from one another share the context of their research, techniques that they will be using and issues that they have encountered so far.

11:00	***Coffee Break – 30 minutes***	
11:30	***Plenary Wrap-Up Meeting with Reports from Each Meeting***	
12:30	***Networking Lunch***	
13:30–17:30	***Workshop for ESRs***	***Chairs Maria Barros, Eurescom, Stuart MacLachlan, Lucideon (Sala Riunioni III Piano)***
13:30	***Industry Training II***	Best Practices in Managing Collaborative R&D Projects – Communication and Knowledge Management ***(Eurescom - Milon Gupta)***
	13:30–14:15	Collaboration in International Projects
	14:15–15:15	Project Communication and Management Reporting
	15:15–15:45	Break
	15:45–16:45	Dissemination and Knowledge Management
16:45	***Industry Training I***	Introduction to Regulations for Medical Products ***(Lucideon - Xiang Zhang)***
17:30	***END***	
19:00	***Informal Wrap-Up***	

Day 3 Wednesday 10 February

"Biodegradable Polymers: Synthesis and Functionalisation"

Open Workshop

Meeting Room (5th Floor) of the Department of Electronics and Telecommunications, Politecnico di Torino

09:00	***Registration***	
09:20	***Welcome Address***	***Flavio Canavero, Director of The Doctoral School (SCUDO) at Politecnico di Torino***
09:30	***Introduction to HyMedPoly***	***Gianluca Ciardelli, Politecnico di Torino (I)***
09:40	***Chemical Synthesis of Biodegradable Polymers***	***Paola Petrini, Politecnico di Milano (I)***
10:40	***Coffee Break – 20 minutes***	
11:00	***Bacterial Synthesis of Polymers***	***Ipsita Roy, University of Westminster (UK)***
12:00	***Polymer Surface Functionalisation***	***Pietro Favia, Università di Bari (I)***
13:00	***CONCLUSION***	
13:10–14:15	***Wrap Up of the Summer School (All)***	

HyMedPoly received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska -Curie grant agreement No 643050

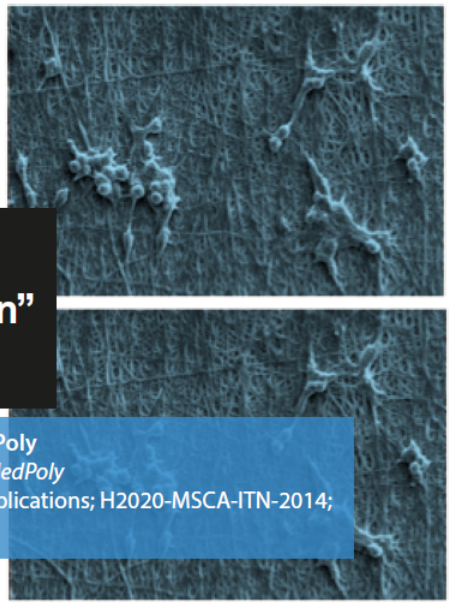
Appendix 3 – HyMedPoly Publicity Flyer for Summer School 1 Open Workshop, "Biodegradable Polymers: Synthesis and Functionalisation"

POLITECNICO DI TORINO

ScuDo
Scuola di Dottorato ~ Doctoral School
WHAT YOU ARE, TAKES YOU FAR

10 febbraio 2016 ore 9.00
Politecnico di Torino, C.so Castelfidardo
Sala Riunioni DET (5°piano)

February 10th, 2016 9.00 AM
Politecnico di Torino, C.so Castelfidardo
Meeting Room DET (5th floor)



"Biodegradable Polymers: Synthesis and Functionalisation"

Prof.Gianluca Ciardelli

Il Workshop è organizzato all'interno del progetto HyMedPoly
The workshop is organized in the framework of the project HyMedPoly
(Drug-Free Antibacterial Hybrid Biopolymers for Medical Applications; H2020-MSCA-ITN-2014; https://hymedpoly.eu/).

PROGRAMMA/PROGRAMME

9,00	Registrazione/*Registration*
9,20	Intervento di saluto **Prof. Flavio Canavero**, Direttore della Scuola di Dottorato (SCUDO) del Politecnico di Torino / *Welcome Address - Flavio Canavero, Director of the Doctoral School (SCUDO) at Politecnico di Torino*
9,30	**Prof. Gianluca Ciardelli**, Politecnico di Torino: Introduzione al Progetto HyMedPoly / *Introduction to HyMedPoly*
9,40	**Prof. Paola Petrini**, Politecnico di Milano: Sintesi di Polimeri Biodegradabili / *Chemical Synthesis of Biodegradable Polymers*
10,40	Coffee Break
11,00	**Prof. Ipsita Roy**, University of Westminster (UK): Sintesi Batterica di Polimeri / *Bacterial Synthesis of Polymers*
12,00	**Prof. Pietro Favia**, Università di Bari: Funzionalizzazione di Superfici Polimeriche / *Polymer Surface Functionalisation*
13,00	Conclusioni / *Conclusion*

Registrazione *Registration*

Il Workshop, in lingua inglese, è a numero chiuso e senza quota d'iscrizione. Per registrarsi è necessario compilare entro il 3 febbraio 2016 il modulo online al seguente link: https://hymedpoly.eu/open-workshop-science-2016
The participation to the workshop is free of charge, but a registration is required. To register, please fill in the online form before February 3rd, 2016 at: https://hymedpoly.eu/open-workshop-science-2016

HyMedPoly

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