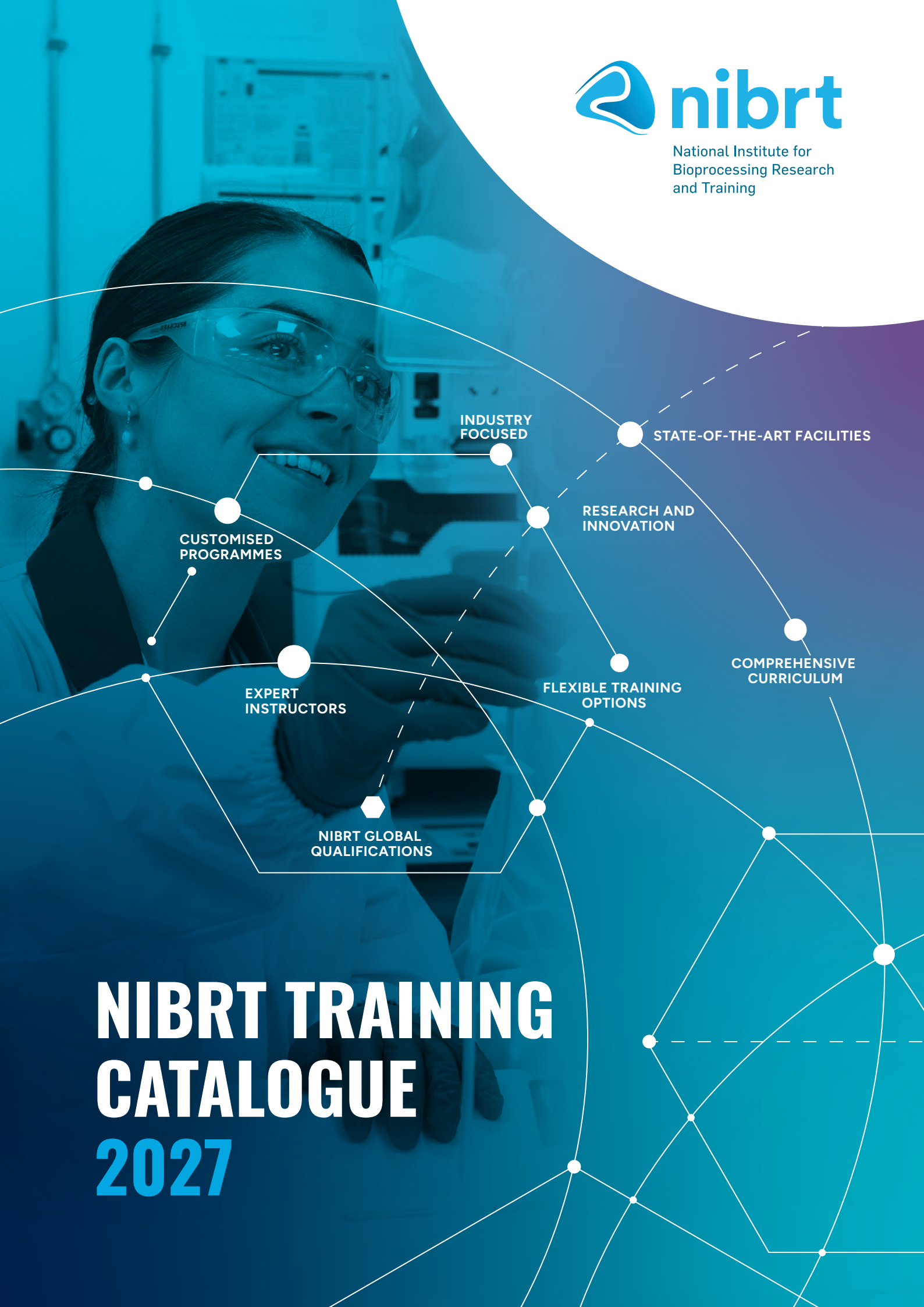


NIBRT TRAINING CATALOGUE 2027

CONTENTS

Why Train with NIBRT?	4
Facilities and Equipment	6
NIBRT Training Facilities	7
NIBRT Training Options	10
Customised Training	11
Short Courses	13
NIBRT Global Qualifications (NGQs)	17
NIBRT Online Academy (NOA)	18
University Programmes	20
Springboard+	24
NIBRT Digital Academy	26
GLP-1 Training at NIBRT	28
Coming Soon	29
NIBRT Global Partner Programme	30
Case Study - Bristol Myers Squibb	33
NIBRT Testimonals	34
Contact Us	35
Appendix 1 - Curriculum 2027	36
Appendix 2 - Training Equipment List	41



ABOUT US

The National Institute for Bioprocessing Research and Training (NIBRT) is a global centre of excellence for training and research in biopharmaceutical manufacturing. NIBRT is located in a world-class facility in Dublin, Ireland. This facility is purpose built to closely replicate a modern bioprocessing plant with state-of-the-art equipment and enables NIBRT to offer the highest quality training and research solutions. NIBRT's mission is to strengthen Ireland's position as a location of choice for the manufacture of medicines.



NIBRT Training by Numbers 2026

9.1/10
Average Trainee Satisfaction

9.4/10
Average Facility Rating

4,784
Trainees

28,034
Training Days Delivered

145
Employees

10,190
NIBRT Online Academy (NOA) Users

600
Springboard+ Students

98
Countries using NOA



WHY TRAIN WITH NIBRT?

Time to Competence
Reduced onboarding time and fewer errors before entering live production

State-of-the-Art Facilities
8,300m^2 simulated GxP plant, 9.4/10 average facility rating

Customised Training
Tailored to your organisation's needs

Bespoke Content
Built around your processes and products

Subject Matter Experts
Training team with deep biopharma expertise

Proven Track Record
5,000 trainees per annum, 9.1/10 average trainee satisfaction

Comprehensive Curriculum
GMP fundamentals through to mRNA, ATMPs and digitalisation

Flexible Delivery
At NIBRT, at your facility, online, or a combination (blended)

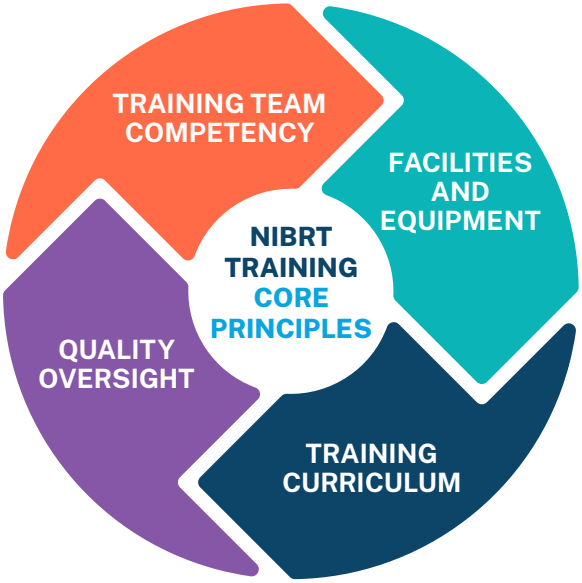
NIBRT Global Qualifications (NGQ)
Accredited, ECTS-rated credentials

Globally Recognised
A renowned leader in biopharma training

NIBRT TRAINING CORE PRINCIPLES

Four guiding principles shape every NIBRT training programme, delivering high-quality training matched to training needs analysis and trainee profiles:

- **Training Team Competency:** qualified trainers delivering every programme
- **Facilities and Equipment:** hands-on, competency-based training on industry equipment
- **Training Curriculum:** content that meets the needs of industry and academia
- **Quality Oversight:** consistent, controlled delivery across every programme



TRAINING TEAM AND COMPETENCY

NIBRT has a dedicated team of 40+ full-time training professionals, combining specialist expertise with rigorous trainer development and qualification processes.

40+
Full-time training professionals

20+
Specialist trainers

Specialist Expertise

- Trainers with deep technical and industry experience

Trainer Competency

- Structured qualification and ongoing capability assessment

Training Delivery Excellence

- Learner-centred training and effective knowledge and skills transfer

FACILITIES AND EQUIPMENT

Hands-on, competency-based training on industry-relevant equipment

NIBRT's state-of-the-art, 8,300m^2 training facility in Dublin, Ireland, is purpose built to closely replicate a modern bioprocessing plant. It is equipped with industry-relevant equipment to enable practical, hands-on training in a simulated GxP environment.

8,300m^2	20+	Production-representative equipment	Hands-on practical training
Simulated GxP plant	Specialist Training Labs		

TAKE A VIRTUAL TOUR →

EXPLORE EQUIPMENT LIST →



UPSTREAM PILOT PLANT



DOWNSTREAM SUITE



FILL FINISH SUITE



SINGLE USE SUITE



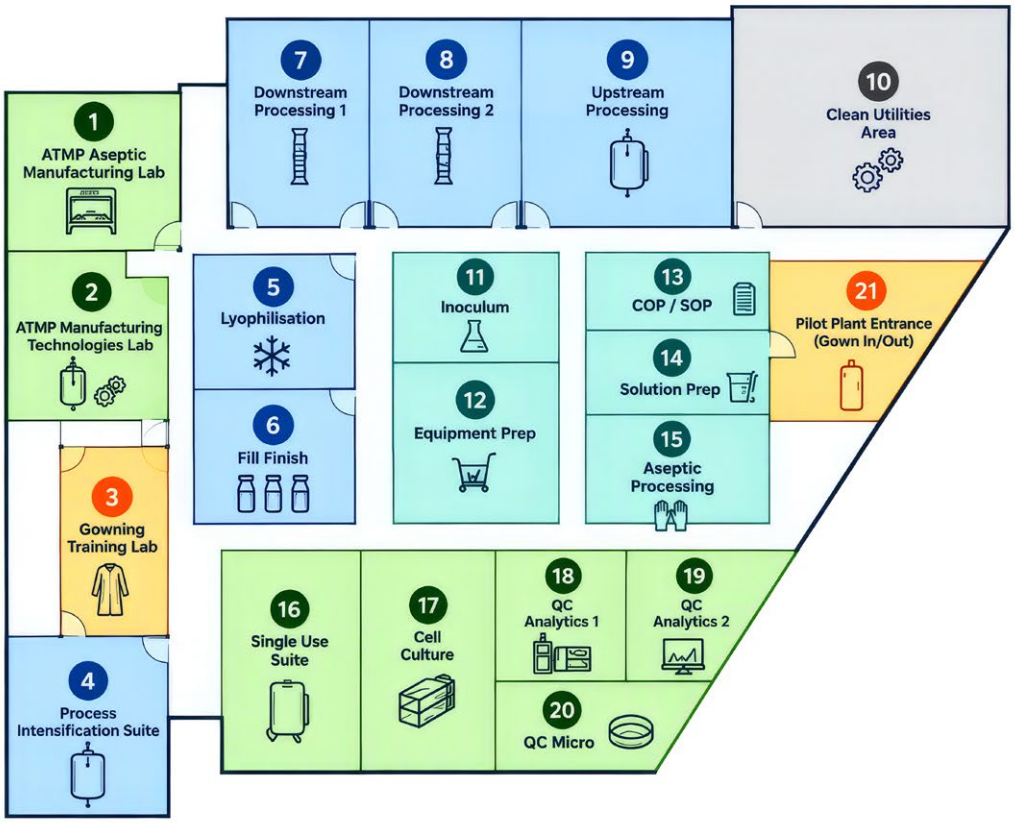
ADVANCED THERAPY MANUFACTURING LAB



QC MICRO SUITE

NIBRT TRAINING FACILITIES

First floor training areas



Area Directory

1	ATMP Aseptic Manufacturing Lab
2	ATMP Manufacturing Technologies Lab
3	Gowning Training Lab
4	Process Intensification Suite
5	Lyophilisation
6	Fill Finish
7	Downstream Processing 1
8	Downstream Processing 2
9	Upstream Processing
10	Clean Utilities Area
11	Inoculum
12	Equipment Prep
13	COP / SOP
14	Solution Prep
15	Aseptic Processing
16	Single Use Suite
17	Cell Culture
18	QC Analytics 1
19	QC Analytics 2
20	QC Micro
21	Pilot Plant Entrance (Gown In/Out)

Process Suites — Bioprocessing & manufacturing
Gowning Areas — Training & changing
Laboratories — Development & analysis
Utilities — Building services
Preparation & Support — Materials & solutions

Not to Scale

TRAINING QUALITY ASSURANCE

Quality is embedded throughout the NIBRT training lifecycle, ensuring consistent delivery, effective learning outcomes and continuous improvement across NIBRT and our Global Partners.

NIBRT has a comprehensive quality framework that ensures every training experience is controlled, effective and continuously improving. It draws on our competency-assessed trainers, facility, equipment and curriculum.

CONSISTENT DELIVERY

- Competency-assessed trainers
- Quality controlled curriculum
- Controlled training materials

TRAINING EFFECTIVENESS

- Knowledge assessment
- Skills evaluation
- Learner feedback

CONTINUOUS IMPROVEMENT

- Quality metrics
- Trend analysis
- Corrective actions

TRAINING CURRICULUM

NIBRT designs, develops and manages its own extensive curriculum, built to meet the learning needs of academic and industry clients. Our content supports every level of experience, from operator training through to senior management, and each course is designed to improve real-life performance in the workplace.



General Biologics Manufacturing

GMP fundamentals, facility and cleanroom operations, aseptic manufacturing, guidance and regulations, CQV, automation and digitalisation.

Recombinant Protein Manufacturing

Cell culture, upstream, harvest and downstream processing, drug product and fill finish, and QC analytics and microbiology.

Antibody Drug Conjugate Manufacturing

Bioreactor operation, conjugation, filtration and formulation, fill finish and barrier systems, and QC analytics for ADCs.

Advanced Therapies

Cell therapy, gene therapy, and ATMP manufacturing processes, regulations and QC testing.

mRNA Manufacturing

Plasmid production, mRNA synthesis and capping, purification, LNP formulation, and fill finish and lyophilisation.

Other Modalities: Peptides (GLP-1) and Vaccines

Peptide manufacturing with a focus on GLP-1 therapeutics, and vaccine manufacture from cell culture through to fill finish and lyophilisation.

New for 2027: Process Intensification and Continuous Manufacturing



TRUSTED BY INDUSTRY LEADERS

Our Customised Training Clients 2026

abbvie | ALEXION | AMGEN | astellas | BCG Boston Consulting Group

Biogen | BIOMARIN | Bristol Myers Squibb | CPC Biotech | DATAWORKS

EY Shape the future with confidence | GALDERMA EST. 1981 | GENSPARK AI Learn AI the easy way | GRIFOLS | Inspired Pharma Training

IQC Irish Quality Centre | Johnson&Johnson | keenova™ | Lilly | Linesight

MEISSNER | Pfizer | The Pirbright Institute | PSG a Dover company | PURDUE UNIVERSITY

Roche | sanofi | SARTORIUS | STADA | STERIS

TERUMO | ThermoFisher SCIENTIFIC | Virtual Quality Partners | WATSON MARLOW Fluid Technology Solutions | Zifo

NIBRT TRAINING OPTIONS

Customised Training

Tailored biopharma training programmes customised to meet the unique requirements of our clients.

NIBRT creates customised biopharma training with content fully aligned to a team's goals and delivered through flexible options — at NIBRT, online, at your facility, or blended. Programmes range from focused 1–2 day workshops to comprehensive, long-running courses.

Short Courses

Short (1-5 days) classroom, practical, or live online sessions focusing on specific biopharma topics.

These courses are open for all to book on predetermined dates, subject to availability.

NIBRT Global Qualification (NGQ)

An internationally recognised, ATU-accredited qualification, available as an optional add-on to select Short Courses and Customised Training programmes.

On Demand E-Lessons (NOA)

Access pre-recorded modules covering a broad range of fundamental biopharma topics.

Learn at your own pace and convenience, with course modules typically spanning 45 minutes to 1 hour.

University Courses

NIBRT offers a selection of certificate, degree, and master's programmes in partnership with various Irish universities.

Course content is delivered by these universities, with practical components conducted at the NIBRT facility.

Funded University Courses – Springboard+

These programmes, funded at a rate of 90-100%, focus on high-demand biopharma skills areas. Course content is delivered by universities with practical elements at the NIBRT facility.

Springboard+ is co-funded by the Government of Ireland and the European Union.

SPRINGBOARD+
www.springboardcourses.ie

CUSTOMISED TRAINING



Tailored to your organisation's needs

Every organisation has different training challenges. NIBRT designs, develops and delivers customised biopharma training programmes built specifically around your team's goals, skill levels and operational requirements.

YOUR COURSE. YOUR WAY

CUSTOMISED CONTENT

Designed around your technologies, processes and organisational objectives.

FLEXIBLE DELIVERY

Delivered at NIBRT, online, onsite at your facility, or through a blended approach.

CUSTOMISED SCHEDULING

A schedule that works for your team, aligned to your operational requirements.

TRAINING DELIVERY OPTIONS



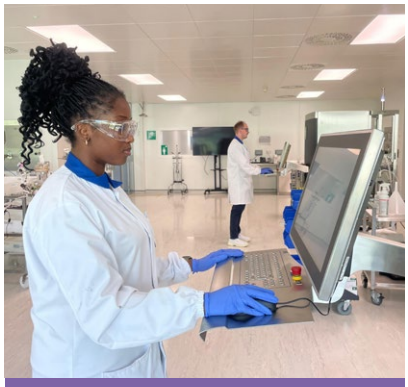
AT NIBRT

Train in our world-class, 8,300m^2 GxP-simulated facility in Dublin, Ireland, with state-of-the-art equipment.



TRAINING AT YOUR FACILITY

Our trainers come to you, delivering training tailored to your site and processes.



ONLINE/ BLENDED

Combine training at NIBRT, online or at your own facility.

WHY CHOOSE NIBRT CUSTOMISED TRAINING?

Training needs assessment by the NIBRT team

Training tailored to company operations, processes and products

Content customised to trainee profiles and job functions

Courses developed from NIBRT's extensive curriculum

Company processes incorporated into training materials

Flexible scheduling, delivered at NIBRT, at your site or online

Hands-on training across NIBRT's 21 pilot plant and lab training suites

OUR APPROACH

We follow a structured and collaborative process:

1. **UNDERSTAND** — Understand your training needs and objectives.
2. **DESIGN** — Design a tailored programme with relevant content and delivery format.
3. **DELIVER** — Deliver training using expert instructors and industry-relevant equipment.
4. **EVALUATE** — Evaluate outcomes and support continuous development.

LET'S PARTNER ON YOUR TRAINING NEEDS

Get in touch with our team to discuss how we can design a customised training programme for your organisation.

CONTACT US: training@nibrt.ie



SHORT COURSES



NIBRT's short courses are designed to meet the evolving training needs of the biopharma industry. We offer a wide range of open enrolment courses that anyone can book on scheduled dates. These intensive programmes combine expert instruction with practical, hands-on experience in our world-class facilities. Flexible delivery options include in person, online and blended formats.

Select courses also offer the option to earn a NIBRT Global Qualification (NGQ), an internationally recognised qualification accredited by Atlantic Technological University (ATU) which carries 5 ECTS credits. Look for the NGQ symbol to see which courses are eligible, and find out more **here.**

All courses can be scheduled for delivery for private client groups and customised to a company's training needs.

Biopharma Manufacturing Operations, Guidance and Regulations

COURSE	DELIVERY METHOD	ENROL
Annex I: A Practical Perspective	Onsite	More Info
An Introduction to Biopharma Manufacturing	Onsite	More Info
Cleanroom Behaviour in Biopharma Manufacturing	Blended (online + onsite, online-only option)	More Info NGQ
Introduction to Commissioning, Qualification, and Validation (CQV) for Biopharma	Onsite	More Info
Introduction to Upstream Processing Operations	Blended (online + onsite, online-only option)	More Info NGQ
Introduction to Downstream Processing Operations	Blended (online + onsite, online-only option)	More Info NGQ
Introduction to Fill Finish Operations	Blended (online + onsite, online-only option)	More Info NGQ
Introduction to Lyophilisation for Biopharma Fill-Finish Operations	Onsite	More Info
Process Intensification of Biologics: A Practical Introduction	Onsite	More Info

Quality Control, Advanced Therapies and Additional Modalities

COURSE	DELIVERY METHOD	ENROL
QC Micro Skills for Biopharma	Blended (online + onsite, online-only option)	More Info
Introduction to QC Testing for Protein-Based Therapies	Blended (online + onsite, online-only option)	More Info
GLP-1 Receptor Agonists: Trends, Therapeutics and Manufacturing	Onsite and online options available	More Info
An Introduction to Antibody Drug Conjugate Manufacturing	Onsite	More Info
Introduction to ATMP Manufacturing	Onsite	More Info
Introduction to Cell Therapy Manufacturing	Onsite	More Info

Additional Course Dates available on Request

Biopharma Manufacturing Operations, Guidance and Regulations

- Operator Inspection Readiness: A Practical Perspective
- Pharmaceutical Quality Systems: A Risk-Based Perspective
- Good Manufacturing Practice for Biopharma Manufacturing NGQ
- Harvest Operations for Biopharma Manufacturing
- Biodecontamination of Isolators for Biopharma
- Manual Visual Inspection Essentials

Quality Control, Advanced Therapies and Additional Modalities

- Introduction to Quality Control Lab Skills for Biopharma NGQ
- QC Analytics for Antibody Drug Conjugates
- Introduction to QC Analytics for Cell Therapy Manufacturing
- Fundamentals of Vaccine Manufacture
- Introduction to mRNA Manufacturing Operations
- Introduction to Gene Therapy Manufacturing
- Flow Cytometry for Advanced Therapy Manufacturing

Digitalisation Courses

COURSES	DELIVERY METHOD	ENROL
AI for Biopharma Manufacturing — with GenSpark	Onsite	More Info
Validate Smarter: CSV & CSA for Biopharma	Onsite	More Info
Practical Power BI for Biopharma (Foundations) — with Dataworks	Onsite or Online	More Info
Expert-in-the-Loop AI Quality Risk Management for GxP Validation & Data Integrity with Risk Cortex	Onsite or Online	More Info
Design of Experiment (DoE) — with Sartorius	Onsite	More Info
Multivariate Data Analysis (MVDA) — with Sartorius	Onsite	More Info

Additional Course Dates available on Request

Digitalisation Courses

- Digital Foundations for Biopharma Operations
- Power Platform for Biopharma: Build Apps, Automations & Dashboards with Dataworks
- Data Literacy for Biopharma Professionals
- Excel & Power Query Foundations for Biopharma (Cleaner, Faster Reporting) with Dataworks
- Get Started with Digitalisation in Biopharma (Power Platform) with Dataworks



Short Courses with NIBRT Partners

COURSES	DELIVERY METHOD	ENROL
STERIS Master Class: Applied Cleaning Validation Practices	Onsite	More Info
Leadership & Management for the Biopharmaceutical Industry with UCD Professional Academy	Online	More Info
Inspired Pharma – Pharmaceutical GMP Auditor/Lead Auditor Training	Onsite	More Info

Additional Course Dates available on Request

Short Courses with NIBRT Partners

- Bioprocess Optimisation and Scale-Up for Downstream Operations with **Avantor**
- Technical Writing (+Regulatory Aspects) with **Irish Quality Centre**
- Managing Asset Reliability: Biopharma Process Equipment with **Pro-Reliability Solutions**
- Equipment Reliability with **SCRI-IS**
- Introduction to Biopharma Operations with **Engineers Ireland**
- Introduction to Bioprocessing for Engineers with **Engineers Ireland**
- Good Distribution Practices with **Virtual Quality Partners**
- CELLT2: Advanced Cell Therapy Technology with **Cytiva**



NIBRT GLOBAL QUALIFICATIONS (NGQs)



Turn your NIBRT training into an accredited qualification

NIBRT Global Qualifications (NGQs) are internationally recognised training qualifications that set a new benchmark for biopharmaceutical education and workforce development. They link practical, industry-led training with university credits that professionals can stack and carry throughout their career.

Every NGQ module is accredited by Atlantic Technological University (ATU). ATU is a designated awarding body on Ireland's National Framework of Qualifications, with quality assured by QQI.

AT A GLANCE

- 5 ECTS per module
- Stack credits towards a Special Purpose Award
- Train at NIBRT in Dublin or at a NIBRT Global Partner Site
- Hands on training in a realistic GMP environment

HOW TO EARN AN NGQ

1. **TRAIN:** Complete an eligible practical course at NIBRT or a Global Partner Site.
2. **REGISTER:** Apply to ATU for the matching NGQ module within 12 months of finishing your course. The NGQ fee is €500, separate from the course fee.
3. **ASSESS:** Complete a series of short assessments to earn the accreditation.
4. **ACHIEVE:** Receive your results after the ATU Examination Board.

ELIGIBLE COURSES

- Introduction to Upstream Processing Operations
- Introduction to Downstream Processing Operations
- Introduction to Fill Finish Operations
- Cleanroom Behaviours in Biopharma Manufacturing
- Introduction to Quality Control Lab Skills for Biopharmaceuticals
- Good Manufacturing Practice for Biopharmaceutical Manufacturing

GET STARTED

Visit nibrt.ie/ngqs or email **info@nibrt.ie**

NIBRT ONLINE ACADEMY (NOA)



Your gateway to excellence in biopharma training

The NIBRT Online Academy (NOA) is NIBRT's on-demand biopharma training platform. Our own trainers develop and deliver every NIBRT course from our bioprocessing training facility in Dublin. With over 55 courses across key areas of biopharma manufacturing, NOA lets you learn in your own time, at your own pace and from anywhere in the world.

Whether you are building your own skills or upskilling an entire team, NOA delivers training that is practical, relevant and grounded in real industry experience.

BROWSE BY TOPIC

General Overview

1. Upstream Processing
2. Downstream Processing
3. Formulation, Fill/Finish and Aseptic Processing
4. Quality and Risk Management
5. Advanced Therapies
6. Viral Vector Manufacturing
7. Vaccine Manufacturing
8. AI in Biopharma
9. Cytiva Catalogue

Browse the full course catalogue at **noa.nibrt.ie/learn**

55+ Courses

10,190 Users

98 Countries



FOR INDIVIDUALS

Build the skills that matter in a competitive industry. Learn on any device, wherever you are.

- Self-paced learning
- Certificate on completion
- Buy individual courses at Foundation, Intermediate and Advanced level

FOR ORGANISATIONS

Train your whole team at a group discount. Onboard employees with ease and ensure consistent knowledge across your workforce.

- Group licence discounts
- Simple team onboarding
- Real-time progress reporting
- Enterprise wide licensing available

How it works

1. Choose a course or bundle at **noa.nibrt.ie**
2. Pay by credit card online
3. Receive your registration email
4. Begin learning

How it works

1. Choose courses at **noa.nibrt.ie**
2. Email **support.noa@nibrt.ie** with your course list and number of trainees
3. Receive a quote with discounts applied
4. Licences go live once payment is received

> *When it comes to online biopharma manufacturing training, NOA is the clear leader. The courses are developed within NIBRT's state-of-the-art facility, ensuring an authentic learning experience. We trust NOA to deliver high-quality training.*

Simon Covey, *Training Lead, WuXi Biologics*

UNIVERSITY PROGRAMMES



Academic programmes at NIBRT

NIBRT works with leading Irish universities to deliver undergraduate, certificate and masters programmes in bioprocessing and biopharmaceutical manufacturing. Each programme combines academic study with practical, hands-on training at NIBRT's facility in Dublin. Graduates gain skills that are directly relevant to industry.

Programmes are available full-time or part-time. Most are delivered online, with a period of practical laboratory work at NIBRT. Students gain direct experience with the equipment and processes used across the biopharma industry and can study around their existing work commitments.

Masters Programmes (NFQ Level 9, 90 credits)

PROGRAMME	UNIVERSITY	SCHEDULE	DELIVERY	LINK
MSc in ATMP Cell Manufacturing	ATU Sligo	Part-time, 2 years	Online	More Info
MSc in ATMP Technology and Manufacturing	ATU Sligo	Part-time, 2 years	Online	More Info
MSc in ATMP Vector Manufacturing	ATU Sligo	Part-time, 2 years	Online	More Info
MSc in BioIndustry 4.0	ATU Sligo	Part-time, 2 years	Online	More Info
MSc in Biopharmaceutical Processing	ATU Sligo	Part-time, 2.5 years	Online, with a workplace research project	More Info

PROGRAMME	UNIVERSITY	SCHEDULE	DELIVERY	LINK
MSc in Biopharmaceutical Science	ATU Sligo	Part-time, 2.5 years	Online	More Info
MSc in Commissioning, Qualification and Validation for Biologics Manufacturing	ATU Sligo	Part-time, 2 years	Online	More Info
MSc in Validation and Digitalisation Technologies	ATU Sligo	Part-time, 3 years	Online	More Info
MSc in Bioprocess Engineering	DCU	Full-time, 1 year or part-time, up to 4 years	Blended	More Info
MEngSc in Biopharmaceutical Engineering	UCD	Full-time, 1 year or part-time, 2 to 3 years	Blended	More Info
MSc in Biopharmaceutical Technology	TUS Athlone	Full-time, September to August	Lectures and labs at TUS, with training at NIBRT and site visits	More Info
MEngSc in Pharmaceutical and Biopharmaceutical Engineering	UCC	Part-time, modular	Blended, with practical training at NIBRT	More Info

Certificate Programmes (ATU Sligo, 1 year, online with practical work at NIBRT unless stated)

PROGRAMME	UNIVERSITY	NFQ LEVEL	CREDITS	DURATION	DELIVERY	LINK
Certificate in Biopharmaceutical Processing	ATU Sligo	6	30	1 year	Online, with practical sessions at NIBRT	More Info
Certificate in Aseptic Biopharmaceutical Operations	ATU Sligo	6	30	1 year	Online, with practical sessions at NIBRT	More Info
Certificate in Bioprocess Engineering	ATU Sligo	7	30	1 year	Online, with practical work at NIBRT	More Info

PROGRAMME	UNIVERSITY	NFQ LEVEL	CREDITS	DURATION	DELIVERY	LINK
Certificate in Biopharmaceutical Processing	ATU Sligo	7	30	1 year	Online, with practical sessions at NIBRT each semester	**More Info**
Certificate in Biopharmaceutical Science	ATU Sligo	8	30	1 year	Online	**More Info**
Certificate in Bioprocessing Technologies	ATU Sligo	8	30	1 year	Online	**More Info**
Certificate in ATMP Cell Manufacturing	ATU Sligo	9	30	1 year	Online	**More Info**
Certificate in ATMP Vector Manufacturing	ATU Sligo	9	30	1 year	Online	**More Info**
Certificate in Bioanalytical Techniques	ATU Sligo	9	10	One semester	Online, with a practical laboratory module at NIBRT	**More Info**
Certificate in Bioindustry 4.0	ATU Sligo	9	30	1 year	Online	**More Info**
Certificate in Biopharmaceutical Processing	ATU Sligo	9	30	1 year	Online	**More Info**
Certificate in Biopharmaceutical Science	ATU Sligo	9	30	1 year	Online	**More Info**
Certificate in Commissioning, Qualification and Validation for Biologics	ATU Sligo	9	30	1 year	Online	**More Info**

Undergraduate and Postgraduate Diploma Programmes (ATU Sligo)

PROGRAMME	UNIVERSITY	NFQ LEVEL	CREDITS	LINK
BSc in Biopharmaceutical Science	ATU Sligo	7	60	More Info
BSc (Hons) in Biopharmaceutical Science	ATU Sligo	8	60	More Info
Postgraduate Diploma in Science in ATMP Technology and Manufacturing	ATU Sligo	9	60	More Info
Postgraduate Diploma in Science in Validation and Digitalisation Technologies	ATU Sligo	9	60	More Info
Postgraduate Diploma in Biopharmaceutical Science	ATU Sligo	9	60	More Info

FIND THE RIGHT PROGRAMME FOR YOU

Our team can help you find the right programme for your career stage and goals, whether you are taking your first step into biopharma or progressing with an advanced qualification.

CONTACT US: training@nibrt.ie



WHAT OUR GRADUATES SAY

I could not recommend this course enough to any body looking to get in to the pharma industry. The practicals and lectures are full of detail and broken down perfect so very easy to follow! The lecturers themselves are very understanding and easy to approach and deal with. 10/10 course and lecturers.

Daniel Langford, *CQV for Biologics, ATU and NIBRT*

The course in Biologics Manufacturing provided a clear and well-structured curriculum, which strengthened my understanding of the pharmaceutical industry as a whole and has supported me in my current role.

Ciara Barry, *Level 9 Commissioning, Qualification and Validation for Biologics, ATU and NIBRT*

SPRINGBOARD+

Springboard+ offers free and heavily subsidised higher education courses in biopharma. It supports people who are employed, unemployed, previously self-employed or returning to work after time away. Participants gain the skills needed for a career in one of Ireland's largest and fastest growing industries.

NIBRT develops its Springboard+ programmes with the biopharmaceutical industry, and delivers them with ATU. Each course gives you the practical knowledge and hands-on experience needed to launch or grow a career in biopharma.

Why Choose NIBRT?

- A strong track record of graduates securing jobs in pharma and biopharma
- Hands-on practical training in NIBRT's facility
- Career support and development built into every course
- Instructors with direct experience training the biopharma industry
- Flexible online learning that fits around work and family commitments

WHAT OUR STUDENTS SAY

"The quality of instruction has been excellent, with lecturers providing timely, constructive, and insightful feedback that greatly enhances the learning process. The courses themselves are well-designed, engaging, and relevant to industry needs, making them highly applicable to my role as a Process Specialist."

Ross Slevin, *Process Specialist, Springboard+ Funded Course*

"The course was excellent. I was studying biopharmaceutical processing and the delivery of the course perfectly blended the theory and the practical elements I needed to move from medical device manufacturing into biopharmaceuticals. The online lectures made it easy to balance my work and study time."

Shane Ward, *Student*

Springboard+ is co-funded by the Government of Ireland and the European Union.
See **www.eufunds.ie** for further details.

Springboard+ is co-funded by the Government of Ireland and the European Union.
Rialtas na hÉireann Government of Ireland
Arna chomhchistiú ag an Aontas Eorpach Co-funded by the European Union
HEA An tÚdarás um Ard-Oideachas The Higher Education Authority



How much do the courses cost?

COURSE LEVEL	UNEMPLOYED (QUALIFYING PAYMENT)	EMPLOYED OR SELF-EMPLOYED
Level 6	Free	Free
Level 7 to Level 9	Free	10% of course cost (90% funded)

Who Is Eligible?

Employed: You work for an employer or are self-employed.

Unemployed: You are not working, you are actively seeking work and you receive a qualifying payment from the Department of Social Protection. This payment is not required if you were previously self-employed.

Returners: You have been a homemaker, a carer, or financially dependent on a partner or spouse for at least nine of the last twelve months.

All applicants must meet nationality, visa and residency requirements.

How to apply

Applicants should apply directly on the Springboard+ website. If you have any questions or need further assistance, contact us at **springboard@nibrt.ie**. View **NIBRT Courses**.

NIBRT Springboard+ Courses

COURSE	LEVEL
Certificate in Aseptic Biopharmaceutical Operations	6
Certificate in Biopharmaceutical Processing	6
Certificate in Commissioning, Qualification and Validation for Biologics	9

Level 9 courses suit candidates with an honours degree in science, engineering or a related discipline.

NIBRT DIGITAL ACADEMY



Digitalisation training designed for biopharma

The NIBRT Digital Academy offers a complete digitalisation curriculum for biopharma professionals at every level. It serves everyone from people taking their first steps with data tools to senior leaders shaping AI strategy for their organisation.

Courses are delivered with industry partners including Dataworks, Genspark and Sartorius. Many use NIBRT's GMP-simulated facilities and real biopharma datasets.

HOW THE CURRICULUM WORKS

The Digital Academy curriculum is structured across four levels, allowing learners to build their knowledge and skills progressively, from foundational concepts to advanced and specialist topics.

FOUNDATION

Build core knowledge of biopharma manufacturing principles.

INTERMEDIATE

Develop practical understanding of key processes and technologies.

ADVANCED

Explore specialist topics in greater depth.

LEADERSHIP

Strategic insights for leaders and decision-makers.

FEATURED COURSE:

AI for Biopharma Manufacturing

A two-day course in partnership with GenSpark.

Explore the practical application of artificial intelligence in biopharma manufacturing, with real-world case studies and hands-on learning.

MORE INFO



Digitalisation Curriculum

IN PERSON COURSES

Course	Level	Format	Link
AI for Biopharma Manufacturing, with GenSpark	Intermediate	In person	More Info
Design of Experiments (DoE), with Sartorius	Intermediate	In person	More Info
Multivariate Data Analysis (MVDA), with Sartorius	Intermediate	In person	More Info
Validate Smarter: CSV and CSA in Biopharma	Intermediate	In person	More Info

BLENDED COURSES

Course	Level	Format	Link
Digital Foundations for Biopharma Operations	Foundation	In person or Online	More Info
Expert-in-the-Loop AI Quality Risk Management for GxP Validation & Data Integrity with Risk Cortex	Intermediate	In person or Online	More Info
Practical Power BI for Biopharma, with Dataworks	Foundation	In person or Online	More Info
Power Platform for Biopharma: Build Apps, Automations and Dashboards, with Dataworks	Intermediate	In person or Online	More Info

ONLINE ONLY COURSES

Course	Level	Format	Link
AI Essentials for Biopharma Professionals	Foundation	E-learning	More Info
Data Analytics: Descriptive Statistics for Biopharmaceutical Manufacturing	Foundation	E-learning	More Info
Regulatory Compliance for AI in GxP Environments	Foundation	E-learning	More Info
Data Integrity and AI Governance in GMP	Foundation	E-learning	More Info
AI-Powered Upstream Process Optimisation	Intermediate	E-learning	More Info
AI Downstream Purification	Intermediate	E-learning	More Info
AI in Aseptic Processing and Fill-Finish	Intermediate	E-learning	More Info
AI-Enhanced Quality Control in Biopharma	Intermediate	E-learning	More Info
AI Predictive Maintenance and Process Analytics	Advanced	E-learning	More Info
AI for Batch Review and Deviation Management	Advanced	E-learning	More Info
Building an ISO/IEC 42001 AI Management System in Biopharma	Leadership	E-learning	More Info
Implementing ISO/IEC 42001 Controls in a GMP Environment	Leadership	E-learning	More Info
Auditing, Certification & Inspection Readiness for AI Management Systems	Leadership	E-learning	More Info
Building an AI Roadmap for Your Biopharma Organisation	Leadership	E-learning	More Info

For course dates, full details and booking, visit **www.nibrt.ie** or contact **training@nibrt.ie**.
Any course can be customised and scheduled for your team on request.

GLP-1 TRAINING AT NIBRT



Building the knowledge and skills for a fast-growing therapeutic class

Why GLP-1 matters

GLP-1 receptor agonists (GLP-1 RAs) have become a transformative therapeutic class. Their use now extends beyond metabolic disease into new therapeutic areas.

This growth brings new demands. Manufacturers need people with specific knowledge and practical skills to develop, produce and regulate these products. NIBRT is responding with a dedicated GLP-1 training pathway.

AVAILABLE NOW

GLP-1 Receptor Agonists: Trends, Therapeutics and Manufacturing Strategies | 1-day | Foundational course | Classroom based

NIBRT recently launched its first GLP-1 course. It is grounded in the current market and covers:

- The biochemistry of GLP-1 RAs
- Manufacturing strategies
- The regulatory landscape
- Technological developments in the field

Who should attend: Professionals in scientific, regulatory, technical or strategic roles.

The course will run throughout 2027. View available dates and book your place at **LINK**.

COMING SOON IN 2027

NIBRT is developing new curricula on the practical side of GLP-1 peptide manufacture. The courses will cover the two main production routes:

- Recombinant expression
- Chemical synthesis

Further details will be announced during 2027. To register your interest, contact **training@nibrt.ie**

> *It was a great course the team put together, and was delivered greatly. I found it particularly beneficial to reinforce my own scientific understanding, having spent the last number of years working on the manufacturing side. I would definitely be recommending it to colleagues both on the manufacturing front and for those to deepen their scientific knowledge of GLPs.*
>
> ***Mark McMackin,*** *Senior Principal Technical Representative, Clinical Trial Drug Product Supply, Eli Lilly*

COMING SOON



NIBRT and Sartorius Training Centre for Intensified and Continuous Bioprocessing

SARTORIUS

nibrt
National Institute for Bioprocessing Research and Training

NIBRT and Sartorius are launching the world's most comprehensive training centre for intensified and continuous bioprocessing, located at NIBRT in Dublin.

The centre will be equipped with the Sartorius Pionic® Platform, an end-to-end modular cGMP system for integrated continuous bioprocessing, including advanced analytics and digital tools.

WHAT THE CENTRE WILL OFFER

- Practical, hands-on training in intensified, continuous and digitalised biomanufacturing
- Training on an integrated cGMP platform in a realistic manufacturing environment
- Exposure to the advanced analytics and digital tools that support continuous processing
- Courses delivered by NIBRT's expert training team in partnership with Sartorius

Equipment List

Process Stage	Quantity	Description
USP	1	Biostat RM 20/50
USP/DSP/ MP&BP	3	Storage Palletank 50L, 200L, 500L
USP	1	Biostat STR 200L ATF
DSP / MP&BP	1	TFI Skid for Final Filtration and MP/BP
Auxiliaries	1	Biowelder TC
Auxiliaries	1	Biosealer TC
Auxiliaries	1	Sartocheck 5+ Universal
DSP	1	Pionic Flow + Quad
DSP	1	Pionic Spin
DSP	3	Pionic Flow + Dual
DSP	1	Pionic Flow + Cross
MP&BP	1	Promixer Drive Unit
MP&BP	1	Palletank for Mixing, 200L, WG
Automation	1	BioBrain Supervise
Automation	1	BioBrain Operate

Available now:

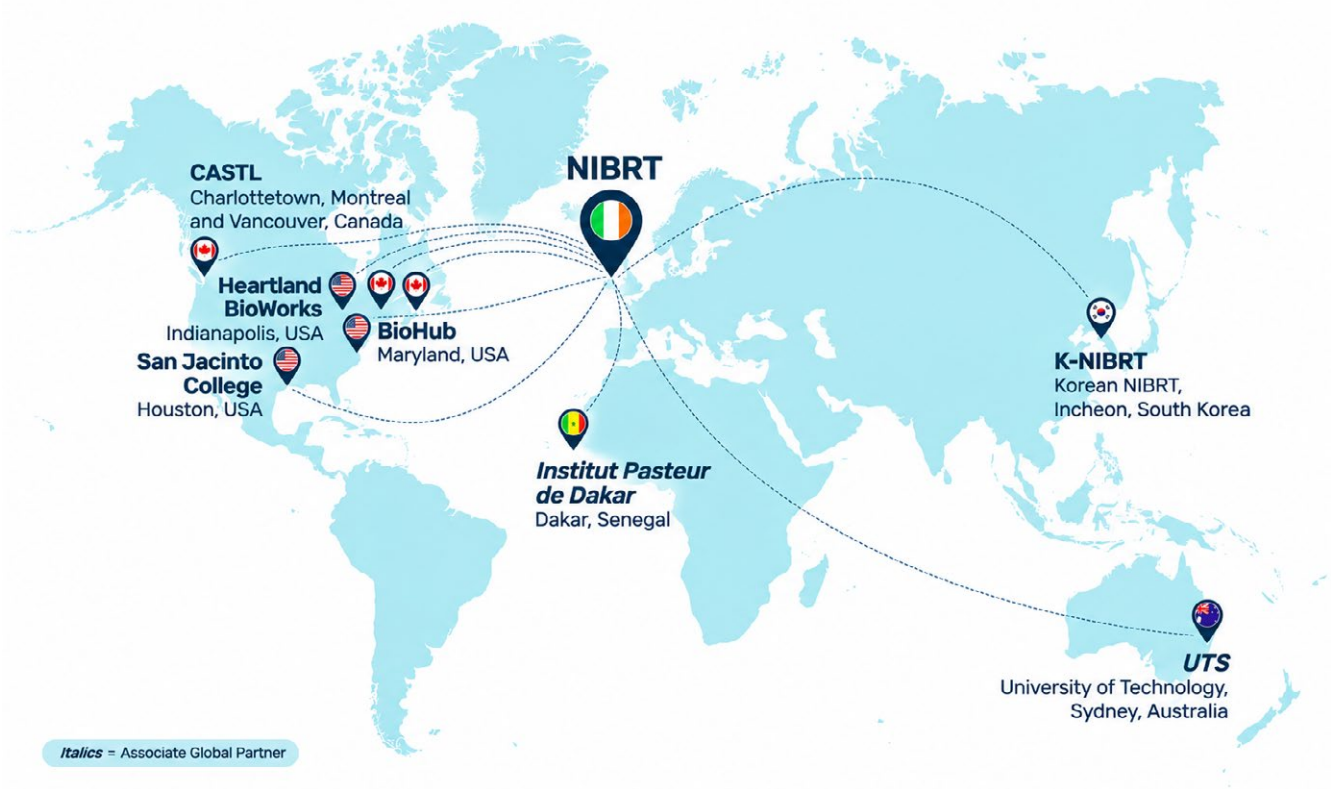
Process Intensification of Biologics: A Practical Introduction.
Register **https://www.nibrt.ie/product/piofbiologics/**

The full course programme is coming soon. For more information, contact **training@nibrt.ie**.

NIBRT GLOBAL PARTNER PROGRAMME

Building the global biopharma workforce

The NIBRT Global Partner Programme supports an international alliance of leading training and education organisations to help address the global shortage of a skilled biopharma workforce. The programme enables qualified organisations to license NIBRT's expertise and deliver biopharma training and education in their region in accordance with NIBRT's quality standards.



WHAT NIBRT PROVIDES TO PARTNERS

01 Licence of NIBRT's award-winning curriculum

02 Accreditation via NIBRT Global Qualifications

03 Facility design and operation guidance

04 Equipment consultancy, planning and procurement

05 Branding, marketing and business development

06 Strategic advisory and consulting services

07 Curriculum design, development and delivery

08 Priority access to new curricula

09 Train-the-Trainer and capability development

10 Training programme audited to NIBRT standards

11 Global community of practice

12 Annual Global Partners Summit

MEET OUR GLOBAL PARTNERS



BioHub Maryland

USA

BioHub Maryland, the workforce initiative of the Maryland Tech Council, helps trainees of all backgrounds pursue rewarding careers in life sciences by offering biopharma manufacturing skills training and career resources.



Biologics Innovation Facility

Australia

The Biologics Innovation Facility is NIBRT's partner in Australia, delivering biopharma training and supporting the growth of the country's biomanufacturing capability.



CASTL

Canada

The Canadian Alliance for Skills and Training in Life Sciences (CASTL) helps people put science to work: training teams to manufacture safely, helping academic institutions bridge the gap from classroom to industry, and equipping learners with skills for life sciences careers.



Heartland BioWorks

USA

Heartland BioWorks connects Indiana's workforce, manufacturing, research, and commercialisation assets to assist biotechnology production, strengthen national security, and expand economic opportunity across the state.



Institut Pasteur de Dakar

Senegal

Institut Pasteur de Dakar is NIBRT's partner in Senegal, delivering biopharma training programmes to build workforce capability and support biomanufacturing development across the region.



K-NIBRT

South Korea

K-NIBRT, based in Incheon, is NIBRT's partner in South Korea, delivering biopharma training programmes to support the growth of the country's biomanufacturing sector.



San Jacinto College

USA

The Center for Biotechnology is a specialised training facility at San Jacinto College dedicated to biomanufacturing and the life sciences workforce development in the Houston, Texas region.

GLOBAL PARTNERSHIPS
IMPACT AND RECOGNITION



NIBRT & WHO RTC kick-off meeting, Dublin, August 2026

World Health Organization

WHO REGIONAL TRAINING CENTRE FOR BIOMANUFACTURING

In April 2026, the World Health Organization (WHO) designated NIBRT as its Regional Training Centre (RTC) for biomanufacturing for the European region. Working closely with the WHO, NIBRT delivers training solutions that help Lower to Middle Income countries build the skilled workforce needed to manufacture vaccines, biologics and other health technologies locally.



NIBRT Global Partner Summit 2026, NIBRT Facility Dublin

> *Through this partnership with NIBRT in Indianapolis, we are establishing a world-class biomanufacturing training programme. The NIBRT licence will give Hoosiers and talent from across the region access to globally recognised hands-on training, preparing them for in-demand careers in biomanufacturing.*

Edgardo Hernandez, *Executive Vice President and President of Lilly Manufacturing Operations*

> *For us, NIBRT is such an incredible partner, because they have a stunning amount of resources available in their curriculum.*

Brad Stewart, *Chair, Maryland Tech Council, Life Sciences National Leader at BDO*

CASE STUDY

Bristol Myers Squibb™

BMS Workforce Training Partnership with NIBRT

NIBRT partnered with Bristol Myers Squibb Cruiserath Biologics to deliver a bespoke workforce training programme for the new sterile drug product facility in Dublin.

Average Feedback Scores

9.4/10
NIBRT trainers

9.7/10
NIBRT facility

9.2/10
Overall training experience

Strategic Expansion Meets Workforce Innovation

At the heart of this partnership is a bespoke workforce development programme, meticulously crafted by NIBRT in close collaboration with BMS Cruiserath.

- **Hybrid Delivery Model:** Training is delivered through a mix of half day live, instructor led virtual classroom sessions and full day, hands on practical training at NIBRT's advanced bioprocessing facility.
- **Curriculum Depth:** The courses are designed to closely replicate the equipment, operations, and processes of the new Drug Product Facility at BMS.
- **Immersive Practical Experience:** Participants engage in five days of intensive hands on training at NIBRT, working with state of the art syringe filling lines equipped with isolator and RABS technology.
- **Operational Alignment:** Training schedules are coordinated with BMS production teams to ensure seamless integration with ongoing operations.

> *"NIBRT training is an integral part of building a team with the right capabilities to deliver the products that will transform patients' lives into the future."*
>
> ***Gavin Doyle,*** *Associate Director Operations*

> *"At Cruiserath, we pride ourselves on being uniquely positioned with both Drug Substance and Drug Product capabilities co-located on our campus. In line with our 'One Campus' talent strategy, we are committed to providing our colleagues with developmental opportunities within the new Sterile Drug Product Facility. NIBRT training has been pivotal in this transition, equipping our team with essential DP process knowledge that effectively complements their existing skills. As our organization continues to grow, we will leverage NIBRT to establish foundational DP process knowledge for new talent joining us from various industries."*
>
> ***Eoghan Greene,*** *Associate Director Operations*

NIBRT TESTIMONIALS

This collaboration has enabled Grifols to maintain high standards of quality and compliance while fostering a culture of continuous improvement. NIBRT's support has been a key driver in helping us build a skilled, resilient workforce ready to meet the challenges of a dynamic industry.

***David Roche**, Quality Manager, Grifols*

A great day of hands-on learning at NIBRT! I had the opportunity to attend 2 practical sessions at NIBRT, focusing on Cell Culture and Bioreactors within the upstream bioprocessing stage. A valuable experience combining theoretical knowledge with practical skills and a deeper understanding of bioprocessing. Thanks to the NIBRT team for a informative and engaging day!

***Pat Doody,** Level 6 Certificate in Biopharmaceutical Processing, ATU and NIBRT*

Excellent theory and practical demonstration and the content was very relevant to our requirements. Trainers were very helpful with questions and content delivery.

***Mick McKeown,** Bioanalytics training, Gilead*

I would like to acknowledge the wonderful partnership we have with NIBRT over the last decade. They have consistently provided us with a variety of courses both standard and be-spoke to accommodate our training needs for a highly regulated Aseptic manufacturing environment. This has been particularly evident in the support they have provided whilst we grow the team in our greenfield fill finish facility here in the Astellas Tralee Plant. Additionally, their two-day introduction course for our graduates has been a great success. The feedback on the quality of their courses has been overwhelmingly positive, which reinforces our decision to collaborate with them. I look forward to continuing this partnership into the future.

***Sheila Counihan,** Team Lead Pharma Manufacturing Learning & Development - Astellas Ireland*

I recently had the opportunity to spend a week at NIBRT completing manufacturing training, gaining valuable hands-on experience across several key areas of biopharmaceutical manufacturing. Throughout the week, I gained practical experience working with bioreactors, column packing, cell culture and UF/DF (Ultrafiltration/Diafiltration). It was a great opportunity to develop my technical knowledge, get a better understanding of both upstream and downstream processes, and see first-hand how these processes contribute to biopharmaceutical production.

***Caoimhe McEnerney,** Student, Royal College of Surgeons in Ireland*



CONTACT US

Training Team

Book a course directly via:
www.nibrt.ie/training-and-education

Email training team at **training@nibrt.ie**

Call training team at **+353 (0) 1 215 8100**

NIBRT Online Academy (NOA)

Enrol on a NOA course directly at:
noa.nibrt.ie

Email NOA team at **support.noa@nibrt.ie**

Further Information

For more information, please visit our website at:
www.nibrt.ie

Here you will find up-to-date information about course schedules, descriptions, registration, location and contact information.

Please sign up to our NIBRT newsletter to receive updates throughout 2027.

www.nibrt.ie/contact

Visit NIBRT

Clients are very welcome to arrange a visit at:

NIBRT
Foster Avenue,
Mount Merrion, Blackrock, Co. Dublin,
Ireland, A94 X099.

Web: **www.nibrt.ie**
Phone: **+353 (0) 1 215 8100**
Email: **training@nibrt.ie**

APPENDIX 1
CURRICULUM 2027

General Biologics Manufacturing Curriculum

General and Support

Lectures
- Introduction to Bioprocessing
- Biopharma Utilities
- Conceptual Design and Site Planning
- Facility Design
- Facility and Cleanroom Design
- Modular Design and Single-use Technologies
- Drug Development Cycle
- Latest Trends in the Biopharma Industry
- New & Emerging Technologies in Biomanufacturing
- Aseptic Manufacturing
- Contamination Control
- Decontamination
- Cleanroom Classification
- Environmental Monitoring
- Single-use Technologies
- Buffers and Their Application in Bioprocessing

Practicals
- NIBRT Facility Tours
- Buffer Prep
- Media Prep
- Inline Dilution
- Autoclaves and Equipment Prep
- Partswasher
- COP/SOP &CIP/SIP
- SIP Setup
- Weigh and Dispense
- Clean Utilities Walkdown
- Biokill and Waste neutralisation
- Filter Integrity Testing
- Contamination Control
- Cleanroom Gowning
- Disposable Technologies Overview
- SU-Bag Inspection and FIT

Guidance & Regulations

Lectures
- Intro to Regulation of Medicines
- Intro to Reg Affairs and Quality Systems
- Regulatory Affairs Quality Systems and Annex I
- Introduction to Annex I
- Audits and Inspections
- Raw Material Management and Cold Chain
- GxP - GDP, GLP, GMP
- Deviation Handling
- Quality & GMP
- Overview of ICH
- Pharmaceutical Quality Systems
- ICH Q9: Quality Risk Managment
- GMOs in Bioprocessing
- GMO Licensing and Legislation
- Intro to Regulatory Bodies and Inspections
- Regulator Inspection Process
- Regulations for Visible Particulate Inspection

Practicals
- GMO Risk Assessment Tour
- Remote Interactive Tour & GMO
- Risk Assessment Workshop
- Deviation Workshop
- Annex I - PUPSIT
- Annex I – Environmental Monitoring
- Annex I – Drug Product Manufacturing
- Before an Inspection
- During an Inspection
- Good Documentation Practices

CQV

Lectures
- Intro to CQV
- Process Validation Lifecycle
- Validation Planning, Documentation, and Risk Management

Practicals
- URS & Commissioning
- FAT/SAT
- Installation Qualification (IQ)
- Operational Qualification (OQ)
- Utilities Tour with P&IDs and Standard Plant Tour

Digitalisation

Lectures
- Digital Transformation in Biopharma
- Introduction to Data Analytics in Biopharma
- Digital System in a Biopharma Plant
- Data Integrity Fundamentals
- AI Literacy for Biopharma Operations
- Digital Process Monitoring & PAT
- Automation and Control Literacy for Operators
- AI and Machine Vision in Inspection
- Data and Integrity & ALCOA+ in a Digital Lab
- Statistical Trending for QC

Practicals
- Data Integrity Workshop
- Data Trending Workshop

Recombinant Protein Manufacturing Curriculum

Cell Culture

Lectures
- Introduction to Biological Safety Cabinets
- Cell Line Development
- Cell Banking
- Cell Line Handling and Cell Culture
- Cell Culture
- Cell Culture and Aseptic Processing
- Adherent Cell Culture Techniques
- Microbiology for Microscopes

Practicals
- Cell Thaw (Suspension and Adherent)
- Cell Culture (Suspension and Adherent)
- Microscopes in Cell Culture
- BSC Setup
- Aseptic Transfer
- Working in the BSC
- BSC Spill Scenarios and Post-Use Clean
- Fermentation - Cell Thaw and Scale Up using Isolator

Upstream

Lectures
- Bioreactor Control
- Bioreactor Design & Operations
- Overview of Upstream Processing
- Introduction to Ventilation Cabinets
- Adherent Cell Culture Techniques
- Microbiology for Microscopes
- Fermentation
- Plasmids and Fermentation
- Plasmids and Fermentation for CGT
- Single-Use in Upstream

Practicals
- Bioreactor P&ID Review
- Bioreactor Set Up & Operation (SIP)
- Bioreactor Operation and Troubleshooting
- Single-Use Bioreactor Set Up & Operation
- Small Scale Autoclavable Bioreactor (7L Bioreactor)
- Perfusion Bioreactor Operation
- Alternating Tangential Flow (Continuous Operation)
- Bioreactor (SS + SU) walkdown
- Single-Use Wave Bioreactors
- Single-Use 200L Bioreactor Setup
- Autoclave & 30L Fermenter Sampling
- 150L Fermenter
- 30L Fermenter Inoculation and Sampling

Harvest

Lectures
- Centrifugation
- Filtration
- Harvest Technologies
- Microfiltration

Practicals
- Harvest - Centrifugation and Depth Filtration
- Small Scale Centrifuge with P&ID of Large-Scale Centrifuge
- Depth Filtration
- Homogenisation
- ATF

Recombinant Protein Manufacturing Curriculum

Downstream

Lectures
- Overview of Downstream Processing Operations
- Introduction to Downstream Challenges and Design
- Protein Structure and Stability
- Introduction to Chromatography
- Chromatography Types
- Optimisation and Scale-up of Chromatographic Operations
- Column Packing
- Filtration
- Filtration in Downstream
- Viral Clearance
- Single-Use in Downstream

Practicals
- Column Packing
- Large Scale Chromatography (Stainless Steel and Single-Use)
- Column Efficiency Testing and Troubleshooting
- Column Packing (Flow-Pack I Pack-in-Place)
- Chromatogram Interpretation
- Axichrom Chromatography Operations
- Small scale UF/DF
- Large scale UF/DF (Stainless Steel and Single-Use)
- Large Scale UFDF P&ID Walk Down
- Protein Structure and Stability
- Viral Clearance
- In-line Dilution

Bulk Drug Substance

Lectures
- Formulation and Bulk Filling
- Cold Chain Management

Practicals
- Bulk Filling in the BSC (Bottles and Bags)
- Automated BDS Filling (Bottles and Bags)
- Formulation and BDS Filling (Bottles and Bags)
- Freeze-Thaw Operations for BDS

Drug Product Manufacturing

Lectures
- Introduction to Aseptic Processing
- Filling Process Overview
- Barrier Systems
- Isolators in Fill Finish Operations
- Aseptic Process Simulations
- Filling System Design
- Overview of Lyophilisation
- Lyophilisation Equipment and Scale-Up
- Bioprocess Parameters and Lyo Product Quality
- Formulation
- Micro and EM for Fill Finish
- QC in Fill Finish
- Product Release Testing
- Regulations for Visible Particulate Inspection
- Introduction to VHP Decontamination
- Regulatory Expectations for Isolator Biodecontamination
- Filling System Design
- Lyophilisation Cycle
- Isolator Design and Components
- Visual Inspection

Practicals
- Fill Finish Overview
- Filling Line Set-Up
- Aseptic Process Simulations
- Filling Line Troubleshooting
- Barrier Systems (RABS and Isolator)
- HPV Decontamination Set-up and Run
- HPV Decontamination Validation
- Container Inspection (Vial and Syringe)
- Single-Use in Fill Finish
- Lyophilisation Equipment Overview
- Lyophilisation Workshop
- Lyophilisation Cycle Pre-checks, Set-Up and Run
- Lyophilisation Unloading, Product Inspection and Troubleshooting
- Drug Product Filtration (PUPSIT)
- OEB and Containment Practices
- Manual Vial Inspection
- Manual Syringe Inspection

Recombinant Protein Quality Control Curriculum

General QC Curriculum

Lectures
- QC Testing of Biologics
- Lab skills
- Sample Management
- Quality Management Systems
- Lab Safety
- Introduction to Regulation of Medicines
- Method Qualification and Validation
- Introduction to Biosimilars

Practicals
- Lab skills (Gravimetric measurements, buffer prep)
- Micropipette Training
- Common lab calculations
- Lab safety
- Best Practice

QC Analytics

Lectures
- Metrology (pH, Conductivity, osmolality, Karl Fischer)
- Protein Estimation
- Immunoassays
- ELISA
- Gel Electrophoresis
- Capillary Electrophoresis (CE)
- CE-SDS
- Capillary Isoelectric focusing
- HPLC/UPLC
- Size Exclusion Chromatography
- Peptide Mapping
- Glycan Analysis
- Bioassays (Methods, Validation, Regs, Data Analysis, Reference Standard Management.
- Vaccine Potency Assays
- PCR
- Mass Spectrometry
- Raw Materials Testing: Osmometry, Polarimetry, Refractometry, Viscometry
- Raw Materials Testing: UV, IR, NIR, Raman Spectroscopy
- Troubleshooting Exercises (Peptide Mapping, SEC, CE-SDS and cIEF)
- Glycobiology

Practicals
- pH, Conductivity & Osmolality measurements
- Karl Fischer titration
- Protein Estimation (Bradford, Solo VPE, Gravimetric A280)
- Electrophoretic Methods (SDS Page, Capillary Electrophoresis)
- ELISA (Competitive, Protein A, Direct HCP, Indirect HCP)
- Chromatography (Size exclusion, Peptide Mapping, Glycan Analysis)
- qPCR (Method and Data Analysis)
- Cell-Based Bioassay
- Subvisible Liquid Particle Counting

QC Microbiology

Lectures
- Intro to Micro for Biopharma
- Endotoxin Testing
- Support Testing (Growth Promotion and BIs)
- Audits & Regulations for Micro
- Environmental Monitoring
- Results Workshop
- Water Systems & Water Sampling
- Microbial Identification Methods
- Virus and Mycoplasma Testing
- Rapid Mycoplasma Testing

Practicals
- Microbial Identifications
- Bioburden Testing (with sterility demo)
- Growth Promotion Testing
- Biological Indicators Testing
- Water Sampling
- EM Location & Sampling
- Endotoxin Testing
- Sterility Testing
- Rapid Mycoplasma Testing

Antibody Drug Conjugate and Vaccine Manufacturing

ADCs

Lectures
- Intro to ADCs
- Intro to ADC Manufacturing
- Bioreactor Operation, Design and Control
- Reduction and Conjugation of ADC
- Filtration of ADCs
- Formulation of ADCs
- Fill Finish and Barrier Systems for ADCs
- QC Analytics for ADC Manufacturing

Practicals
- Buffer Prep
- Bioreactor Operation for mAb Handling and Preparation
- Solution Preparation for ADCs (Reduction, Conjugation, Quenching)
- Small Scale UF/DF
- Formulation of ADC
- Bulk Drug Substance Filling
- Fill Finish Overview
- Filling Line Set-Up
- Aseptic Process Simulations
- Barrier Systems (Isolator)
- Container Inspection (Vial and Syringe)
- Lyophilisation Equipment Overview
- Lyophilisation Workshop
- QC Analytics for ADC Manufacturing

QC

Lectures
- Introduction to QC Analytics for Antibody Drug Conjugates
- Linker–Payload Analysis
- Drug-Antibody Ratio (DAR) Determination Methods
- Chromatography in the Analysis of ADCs
- ELISA for ADCs
- Introduction to Capilliary Electrophoresis for ADCs
- Overview of Bioassays for ADCs

Practicals
- UV/Vis Spectroscopy for ADCs
- Aggregate Detection
- Peptide Mapping for ADCs
- HIC for DAR Determination Workshop
- Capillary Electrophoresis for ADCs
- ELISA for ADC Potency

Advanced Therapies Manufacturing Curriculum

General ATMP Overview

Lectures
- Intro to ATMP Overview
- Introduction to Cell Therapy
- Introduction to Gene Therapy
- Intro to ATMP and Gene Therapy Overview
- Introduction to Regulations for ATMPs

Practicals
- Tour of the ATMP Labs
- Disposable Technologies for ATMPs
- GMO Risk Assessment Tour

Cell Therapies

Lectures
- What are Cell Therapies
- CAR-T Therapy
- Stem Cell Therapy

Practicals
- Cell Thaw and Culture
- Cell Culture Scale-Up
- Thaw and Cell Separation
- Cell Processing for Cell Therapy
- Bioreactor Set-up and Perfusion
- Freeze-Thaw of Cell Therapies

Gene Therapy

Lectures
- What are Gene Therapies
- Viral vectors and Nucleases
- Plasmids and Fermentation

Practicals
- Fermentation - Cell Thaw and Scale Up using Isolator
- Fermenter Innoculation and Sampling
- Fermenter P&ID with Harvest
- Cell Thaw and Culture
- Upstream Manufacturing for Gene Therapy
- Downstream Manufacturing for Gene Therapy
- Gene Therapy Bioreactors
- Depth Filtration
- QC Testing
- Exosome Purification

QC

Lectures
- Introduction to QC Analytics for Cell Therapy
- Introduction to QC Analytics for Gene Therapy
- Manufacturing Techniques and QC for Gene Therapy
- Introduction to Flow Cytometry
- ELISA
- PCR
- Endotoxin
- Mycoplasma
- Sterility Testing

Practicals
- Aseptic Handling and Sampling
- Cell Therapies: Sampling Through the Process
- Indirect HCP ELISA
- Intro to qPCR
- Flow Cytometry
- Endotoxin
- Mycoplasma
- Sterility Testing

mRNA Manufacturing Curriculum

General

Lectures
- Introduction to mRNA
- Introduction to mRNA Manufacturing
- Introduction to Regulations
- Regulatory Considerations and Challenges for mRNA Manufacturing
- Facility Design for mRNA Manufacturing
- Biopharma Utilities

Practicals
- mRNA Manufacturing Technologies Tour
- Utilities Walkdown

Drug Substance

Lectures
- Introduction to Upstream Processing for Plasmids
- Plasmids and Fermentation
- Linearization, Transcription and Capping of mRNA
- Upstream Processing for mRNA
- Introduction to Filtration
- Introduction to Downstream Processing for mRNA
- Introduction to Chromatography for mRNA

Practicals
- Fermentation - Cell Thaw and Scale Up using Isolator
- Fermenter Innoculation and Sampling
- Fermenter P&ID with Harvest
- Solution Preparation and Handling for mRNA Production
- Small Scale UF/DF for mRNA manufacturing
- Large Scale UF/DF for mRNA
- Large Scale Chromatography
- Bulk Drug Substance Filling

Drug Product

Lectures
- LNP Encapsulation and Final Formulation
- Filling Process Overview
- Introduction to Lyophilisation

Practicals
- FIT (including PUPSIT)
- LNP Encapsulation and Final Formulation
- Filling Process Overview
- Filling Line Set-up
- Aseptic Process Simulation
- Lyophilisation Equipment Overview
- Lyophilisation Workshop

Other Modalities – Peptides (Focus on GLP-1 Therapeutics) and Vaccines

Peptide Manufacturing Focus on GLP-1 Therapeutics

Lectures

- GLP-1 Biology & The Approved Receptor Agonists
- GLP-1 Agonists - Emerging Clinical Data and Indications
- Overview Peptide Synthesis and General Manufacture Approaches
- GLP-1 RA Regulations, Quality, and Supply Chain Management
- GLP-1 Receptor Agonists Current & Future Trends

Vaccine Manufacture

Lectures

- Vaccines and Immunity
- Vaccine Manufacturing Strategies
- Bioreactor Operation for Vaccine Manufacture
- Downstream Purification for Vaccine Manufacture
- Aseptic Fill for Vaccine Manufacture
- QC for Vaccine Manufacture

Practicals

- Cell Culture for Vaccine Manufacture
- Startup, Scale up and Production for Suspension Cells
- Startup, Scale up and Production for Adherent Cells
- Filtration for Vaccine Manufacture
- Chromatography for Vaccine Manufacture
- Fill Finish of Vaccines
- Lyophilisation of Vaccines

APPENDIX 2
NIBRT TRAINING EQUIPMENT LIST

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Air Sampler	bioMérieux	Air IDEAL 3P Traceability	Active air monitoring for manufacturing facilities	1	Fill Finish
Air Sampler	EMTEK LLC	P100 Microbial Air Sampler	Active air monitoring for manufacturing facilities	1	Fill Finish
Air Sampler	Millipore	MAS-100 VF	Active air monitoring for manufacturing facilities	2	Fill Finish
Air Sampler	Millipore	Millipore Active Air Sampler	Active air monitoring for manufacturing facilities	1	Fill Finish
ATF System	Repligen	Repligen Cell ATF	Disposable ATF system used for perfusion processes	1	Upstream
Autoclave	Getinge	Getinge Autoclave Assembly	Sterilises equipment, reagents, and other material	1	Equipment Preparation
Automated Sensor Maintenance System	Knick	cCare system	Automated sensor maintenance system	1	Upstream
Bioanalyser	bioMérieux	VITEK 2C	Performs DNA, RNA, or protein sample analysis	1	QC Micro
Bioreactor	Applikon	Bio Console ADI 1025	Benchtop 7 L glass bioreactor system for cell culture applications	2	Media Preparation
Bioreactor	Corning	Ascent FBR	A fixed bed bioreactor system designed to combine the benefits of adherent bioproduction platforms with the scale and automation of suspension manufacturing systems	1	ATMP Manufacturing Technologies Suite
Bioreactor	Morimatsu	Mocellular 3 L Glass Bioreactor	Benchtop glass bioreactor system for cell culture applications	1	Upstream
Bioreactor	PALL	mPath	Bioreactor control system	1	ATMP Manufacturing Technologies Suite
Bioreactor	Pierre Guerin	150 L Stainless Steel Bioreactor	Stainless steel bioreactor used for cell culture applications	2	Upstream
Bioreactor	Pierre Guerin	30 L Stainless Steel Bioreactor	Stainless steel bioreactor used for cell culture applications	1	Upstream
Bioreactor	Univercells	Scale-X Carbo System	Fixed Bed Bioreactor and In-Line TFF Concentration	1	ATMP Manufacturing Technologies Suite
Block Heater	Eppendorf	Thermomixer Comfort	For the heating and mixing of samples	1	QC Analytics
Block Heater	Thermo Fisher Scientific	Digital Dry Bath	For precise temperature stability and uniformity when heating samples	2	QC Micro
BSC	AZBIL Telstar Technologies	Bio II Advance Plus 4	Biosafety cabinet class II for aseptic cell culture processes	3	Cell Culture Lab
BSC	AZBIL Telstar Technologies	Bio II Advance Plus 4	Biosafety cabinet class II for aseptic cell culture processes	12	ATMP Aseptic Manufacturing Training Lab
BSC	Biosciences	SAFEMATE 1.2	Biosafety cabinet class II for aseptic cell culture processes	1	Inoculum
BSC	Euro Clone	Aura Vertic SD4	Biosafety cabinet class II for aseptic cell culture processes	3	Cell Culture Lab

Equipment	Manufacturer	Name	Equipment Description	Total	Location
BSC	Euro Clone	SAFEMATE 1.2	Biosafety cabinet class II for aseptic cell culture processes	4	Cell Culture Lab
Bulk Fill	Parker	Parker SciLog® FD	Automated bulk fill system for filling of drug substance	1	Downstream
Capillary Electrophoresis	Beckman Coulter	PA 800plus	Electrokinetic sample separation and analysis	1	QC Analytics
Capillary Electrophoresis	Thermo Fisher Scientific	SEQ Studio	Sequencer that uses electrokinetic technology for analysis	1	QC Micro
Capillary Electrophoresis	BioTechne	MauriceFlex	Capillary electrophoresis system used for identity and purity testing	1	QC Analytics
Cell Bank	Statebourne	Biorack 750	Cell bank used for the long term storage of cells for biopharmaceutical production	1	Cell Culture Lab
Cell Counter	Beckman Coulter	ViCell Blu	Automated cell counter for cell viability	1	Cell Culture Lab
Cell Counter	Beckman Coulter	Vi-Cell XR	Automated cell counter for cell viability	1	Inoculum
Cell Counter	ChemoMetec	NucleoCounter NC-202	Automated cell counter for cell viability	2	Cell Culture Lab
Cell Counter	Roche	Cedex HiRes	Automated cell counter for cell viability	1	Cell Culture Lab
Cell Processing	Cytiva	Sefia S-2000	A functionally closed benchtop automated processing system for upstream or downstream	1	ATMP Manufacturing Technologies Suite
Cell Processing	Gibco by Thermofisher Scientific	DynaCellect	An automated, closed instrument for cell isolation, activation, and bead removal	1	ATMP Manufacturing Technologies Suite
Cell Processing	Terumo	Quantum Flex	An automated, functionally closed cell culture bioreactor system	1	ATMP Manufacturing Technologies Suite
Cell Processing	Cytiva	Sepax C-Pro	A functionally closed benchtop automated cell processing system	1	ATMP Manufacturing Technologies Suite
Cell Processing	Gibco by Thermo Fisher Scientific	CTS DynaMag	Aseptic magnetic separation system that isolates target cells or depletes unwanted cells	2	ATMP Manufacturing Technologies Suite
Centrifuge	Eppendorf	Centrifuge 5424	Benchtop centrifuge	1	QC Analytics
Centrifuge	GEA Westfalia Separator Group GmbH	Pilot Plant Centrifuge	Industrial scale stainless steel centrifuge used for cell harvest	1	Upstream
Centrifuge	GEA Westfalia Separator Group GmbH	Whisperfuge	Benchtop scale centrifuge used for cell harvest	1	Upstream
Centrifuge	Gibco by Thermofisher Scientific	CTS Rotea	Counterflow centrifuge for cell processing	2	ATMP Manufacturing Technologies Suite
Centrifuge	Hettich	Hettich Zentrifugen	Benchtop centrifuge	1	Cell Culture Lab
Centrifuge	Orto Alresa	Bioprocen 22 R	Benchtop centrifuge	1	QC Analytics
Centrifuge	Orto Alresa	Consul 22	Benchtop centrifuge	2	ATMP Manufacturing Technologies Suite
Centrifuge	Thermo Fisher Scientific	SPD121P Speed Vac Concentrator	Remove solvents from a sample - works with the vapour trap	1	QC Analytics
Chromatography	Cytiva	AKTA process CFG	Manufacturing chromatography platform for running purification processes	2	Downstream

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Chromatography	Cytiva	AKTA Process	Industrial scale mobile chromatography skid used for running purification processes	2	Downstream
Chromatography	Cytiva	AxiChrom Column Controller	Industrial scale chromatography skid and column used for running purification processes	1	Downstream
Chromatography	Cytiva	BPG 100/500 Column	Pilot scale column used for product purification	4	Downstream
Chromatography	Merck	ISOPAK Column	Industrial scale column used for product purification	1	Downstream
Chromatography	Merck	ISOPAK Slurry Transfer Skid	Industrial scale chromatography skid used for running purification processes	1	Downstream
Chromatography	Merck	Quikscale® Column GAP 100 x 550	Pilot scale column used for product purification	2	Downstream
Clean/Steam out of Place	BCD Engineering	Clean out of Place	Clean out of place station for cleaning of vessels and hoses	1	COP/SOP
Clean/Steam out of Place	BCD Engineering	Steam out of Place	Steam out of place station for sterilisation of vessels and hoses	1	COP/SOP
Cleaning Systems	Ecolab	3 Bucket Systems	Cleaning systems for plant contamination control	5	Downstream
Controlled Thaw/ Freeze	Benchmark Scientific	Multi-Therm	Temperature controlled vortex	2	ATMP Manufacturing Technologies Suite
Controlled Thaw/ Freeze	Cytiva	VIA Freeze	Controlled rate freezer	1	ATMP Manufacturing Technologies Suite
Controlled Thaw/ Freeze	Cytiva	VIA Thaw™	Provides automated, controlled, and consistent thawing of cellular products in cryobags	1	ATMP Manufacturing Technologies Suite
Controlled Thaw/ Freeze	Huber	Unistat 815	Temperature control for a thermostat bath	1	ATMP Manufacturing Technologies Suite
Controlled Thaw/ Freeze	Single-Use Support	RoSS.pFTU	Controlled rate freezer for bags	1	ATMP Manufacturing Technologies Suite
Controlled Thaw/ Freeze	Thermo Fisher Scientific	CryoMed	Temperature controlled LN2 freezer	1	ATMP Manufacturing Technologies Suite
Depth Filtration	Merck	Millistack Pod Holder	Depth filtration for harvest	1	Upstream
Depth Filtration	3M	Zeta Plus Encapsulated System Holder	Depth filtration system for harvest	1	Upstream
Depth Filtration	Filtrox AG	Discstar Bio SD 1/2"	Depth filtration system for harvest	1	Cytiva Suite
Depth Filtration	Merck	Millistak Pilot Scale Pod Holder	Depth filtration system for harvest	1	Upstream
Depth Filtration	PALL	Stainless Steel Depth Filter	Depth filtration system for harvest	1	Upstream
Depth Filtration	PALL	STAX Process Scale Chassis 5	Depth filtration system for harvest	1	Upstream
Downflow Booth	Bio Air	Blue Air	Containment device for operator and product protection	1	Media Preparation

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Endotoxin Test Reader	Bio-Tek Instruments	Synergy HTX	Multi-mode microplate reader	1	QC Micro
Endotoxin Tester	Charles River	Enosafe nexgen-PTS	An in vitro assay used to detect bacterial endotoxins	1	QC Micro
Filling Line	i-DOSITECNO & ESCO	Filling Line & Isolator	Aseptic liquid filling for GMP regulated facilities	1	Fill Finish
Filling Line	Watson-Marlow	Flexicon Filling Line & RABS	Aseptic liquid filling for GMP regulated facilities	1	Fill Finish
Filling Device	Terumo	Finia		1	Fill Finish
Filling System	Ecolab	M4 Qube	Mini Qube Filling System	1	ATMP Manufacturing Technologies Lab
Filling System	Sanisure	Mixed4Sure	Single use small volume mixing system for multiple biopharmaceutical mixing steps.	1	Single-Use Suite
Filling System	Sanisure	One2Fill 10X	Bioprocessing bottle filling system enabling simultaneous filling of ten bottles	1	Single-Use Suite
FIT	Merck	Integritest 5	Filter integrity testing system	2	Downstream
FIT	Cytiva	Flowstar V	Filter integrity testing system	2	Downstream
FIT	Millipore	Integritest 4 with Exact Air II	FIT system with integrated WIT system	2	Downstream
FIT	PALL	AquaTest	FIT system with integrated WIT system	1	Downstream
FIT	PALL	Flowstar IV	FIT system	1	Downstream
FIT	Sartorius	Sartocheck 5	FIT system	1	Downstream
FIT	Meissner	AccuFlux	FIT system	1	Downstream
Flow Cytometer	Miltenyi	MACSQuant Analyser 10 Flow Cytometer	Flow cytometer for cell analysis	1	ATMP Manufacturing Technologies Suite
Gas Analyser	Servomex	5200 Multi Purpose	Analyser used to measure levels of O2, CO and CO2	3	Media Preparation
Homogeniser	GEA	Homogeniser	Homogeniser	1	Upstream
Incubator	Thermo Fisher Scientific	CO2 Incubator	Controlled incubation of cells	1	Cell Culture Lab
Incubator	Thermo Fisher Scientific	Incubator	To grow and maintain microbiological cultures or cell cultures	1	Inoculum
Isolator	Bioquell	QUBE Extension Module	Aseptic configurable isolator	3	Media Preparation
Light Box	Bosch	Bosch Light Box	LED light box for visual inspection of samples	1	Fill Finish
Light Box	Shield Medicare	KlerReveal UV 52W Cabinet	Viewing area illuminated by UV	2	QC Micro
Lyophilisation	Leybold	Lyo Microscope Pump	Freeze drying microscope for the analysis of freeze-dried samples	1	Fill Finish
Lyophilisation	Telstar	LYOBETA 3P8 Lyophiliser	Lyophiliser for the freeze-drying of final fill drug product	1	Fill Finish
Microbial Detection System	Beckman Coulter	HIAC 9703+	A liquid particle counter system to test parenteral products for sub-visible particle content	1	QC Micro
Microscope	Various	Microscope	Used for the microscopic identification of contamination and other microorganisms	22	Various
Osmometer	Gonotec	Osmomat 030	Measures osmolality for quality control purposes	2	QC Analytics

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Oven	Memmert	Memmert UNE 400	Heating ovens used for heating, drying, tempering, testing, ageing, sterilisation	1	QC Micro
Particle Counter	Astech (Ireland) Ltd	Lighthouse Solair 3100+	Particle counter used for airflow determinations	1	Fill Finish
Particle Counter	Beckman Coulter	MET ONE 3400+	Particle counter used for airflow determinations	2	QC Micro
Particle Counter	Climet	CI 153 1 CFM Particle Counter	Particle counter used for airflow determinations	1	QC Micro
Particle Counter	TSI	AeroTrak APC	Particle counter used for airflow determinations	1	QC Micro
Parts Washer	Suncombe	Parts Washer Pilot Plant	Used to clean equipment, tools, and parts used in manufacturing environments	1	Equipment Preparation
PCR	Applied Biosystems	QuantStudio 5 Real-Time PCR	Quantify nucleic acid in samples	1	QC Analytics
PCR	BIOFIRE Diagnostics a bioMérieux Centre of Excellence	FilmArray 2.0 Industry	PCR for the detection of mycoplasma contamination	1	QC Micro
Perfusion	PALL	Perfusion Skid	Stainless steel perfusion skid for bioreactor perfusion processes	1	Upstream
Plate Reader	Bio-Tek Instruments	Synergy H1	Single-channel absorbance, fluorescence, and luminescence microplate reader	1	QC Analytics
Pump	Levitronix	BPS-i30 & BPS-i100	Magnetic induction pump for ultrapure processing applications	4	Various
Pump	Masterflex	Ismatec® & L/S® Series	Industrial peristaltic pumps	12	Various
Pump	Watson-Marlow	100, 520S, 620S	Industrial peristaltic pumps	15	Various
PUPSIT Skid	Cytiva	PUPSIT Skid	Manual drug product filtration system	1	Downstream
Rocker	Bibby Sterilin LTD	Stuart See-saw Rocker	Laboratory scale mixing of liquids in vessels	1	QC Analytics
Scales	Sartorius	Sartorius Floor Scales	Industrial scale stainless steel floor scales	2	Various
Shaker Incubator	Eppendorf	New Brunswick S41i	CO2 Incubator Shaker	2	ATMP Manufacturing Technologies Suite
Shaker Incubator	New Brunswick Scientific	Excella E24	Controlled incubation of cells	1	Cell Culture Lab
Single-Use Bioprocessing System	Avantor	In-Line Dilution Skid	Single use point of use buffer preparation, from concentrates	1	Downstream
Single-Use Bioprocessing System	Cytiva	GT MVP (Small Scale MVP)	Automated solution processing for a variety of processing steps	1	Downstream
Single-Use Bioreactor	Cytiva	Xuri	Single use wave bioreactor used for cell culture and scale up	1	ATMP Manufacturing Technologies Suite
Single-Use Bioreactor	Cytiva	ReadyToProcess Wave 25	Single use wave bioreactor used for cell culture and scale up	2	Single-Use Suite
Single-Use Bioreactor	Cytiva	XDR-200	Single use stirred tank bioreactor - 200 L	2	Single-Use Suite
Single-Use Bioreactor	Cytiva	XDR-50	Single use stirred tank bioreactor - 50 L	1	Single-Use Suite

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Single-Use Bioreactor	Morimatsu	Mocellular WAV (Wavebag)	Single use wave bioreactor used for cell culture and scale up	1	Upstream
Single-Use Bioreactor	PALL	XRS 25 Bioreactor	Single use wave bioreactor used for cell culture and scale up	1	ATMP Manufacturing Technologies Suite
Single-Use Bioreactor	Sartorius	BIOSTAT CultiBag STR plus 200L	Single use stirred tank bioreactor used for cell culture and scale up	1	Upstream
Single-Use Centrifuge	Alfa Laval	CultureOne Primo	Single use centrifuge for cell harvesting	1	ATMP Manufacturing Technologies Suite
Single-Use Chromatography	Cytiva	AKTAready Gradient & ISO	Single use chromatography system	3	Single-Use Suite
Single-Use Mixer	Cytiva	XDM-100T	Single use mixer for point of use buffer preparation	1	Single-Use Suite
Single-Use UFDF	Cytiva	AKTAreadyflux	Single use ultrafiltration & diafiltration system	1	Single-Use Suite
SmartReg by SalamanderU	Execution System (MES)		Voice-activated low-code	1	Cell Culture Lab
Smoke Machine	Astech (Ireland) Ltd	AFM 35 Cleanroon Fogger	Cleanroom smoke machine for air flow demonstrations	1	Fill Finish
Smoke Machine	CAT Clean Air Technology	Volvano VP 12	Cleanroom smoke machine for air flow demonstrations	1	Cell Culture Lab
Sonicator	Elma	Elmasonic S 30 H	Device that uses ultrasonic energy to agitate particles in liquids	2	Equipment Preparation
Spectrophotometer	Agilent Technologies	Cary 60	Measures absorbance for quality control and routine analysis purposes	1	QC Analytics
Spectrophotometer	C-Technologies	SoloVPE	Measures absorbance for quality control and routine analysis purposes	1	QC Analytics
Spectrophotometer	Hitachi	U-2900	Measures absorbance for quality control and routine analysis purposes	1	QC Analytics
Spectrophotometer	Jenway	Jenway 6305	Measures absorbance for quality control and routine analysis purposes	1	QC Analytics
Spectrophotometer	Implen	NanoPhotometer	Microvolume absorbance measurement for quality control and routine analysis	1	QC Analytics
Sterility Tester	Charles River	Celsis Accel	Rapid sterility tester that confirms microbial contamination using an amplified ATP-based bioluminescence reaction	1	ATMP Aseptic Manufacturing Training Lab
Sterility Tester	Charles River	Celsis Adapt	Rapid detection of microbial contamination of short shelf-life products, ATMPs, CGT production	1	ATMP Aseptic Manufacturing Training Lab
Sterility Testing	bioMérieux	BACT/ALERT 3D	Rapid and automated sterility test	1	QC Micro
SUM 50L	Thermo	imPULSE Single Use Mixer	Single Use Mixer	1	Single Use Suite
SUM 100L	Thermo	imPULSE Single Use Mixer	Single Use Mixer	1	Single Use Suite
Thermal Validation System	Lives International	XpertVal64 system	Thermal Validation Equipment	1	Equipment Preparation
Thermal Validator	Amphenol Thermometrics Inc.	Kaye Validator X2015E	Thermal mapping system for validation of thermal processes	1	Upstream

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Titrator	Mettler Toledo	Karl-Fisher Compact Titrator	Precision determination of moisture to ensure product quality, stability, and efficacy	1	QC Analytics
Transfection System	Gibco by Thermofisher Scientific	CTS Xenon Electroporation Instrument	Benchtop electroporation device	1	ATMP Manufacturing Technologies Suite
Transfection System	Invitrogen	NeonTransfection System	Benchtop electroporation device	2	ATMP Manufacturing Technologies Suite
Tube Sealer	Cytiva	Hot Lips Tube Sealer	Aseptic tube sealing device	1	Equipment Preparation
Tube Sealer	Sartorius	BioSealer	Aseptic tube sealing device	1	Buffer Preparation
Tube Sealer	Sartorius	BioSealer	Aseptic tube sealing device	3	Equipment Preparation
Tube Sealer	Sartorius	BioSealer TC	Aseptic tube sealing device	2	Single-Use Suite
Tube Welder	Cytiva	Sterile Tube Fuser - Dry	Aseptic tube welding device	1	Equipment Preparation
Tube Welder	Sartorius	BioWelder	Aseptic tube welding device	3	Equipment Preparation
Tube Welder	Sartorius	BioWelder TC	Aseptic tube welding device	2	Single-Use Suite
Tube Welder	Terumo	Terumo Sterile Tubing Welder	Aseptic tube welding device	2	ATMP Manufacturing Technologies Suite
Ultrafiltration/ Diafiltration (UF/DF)	PALL	Minimate TFF system	Benchtop ultrafiltration & diafiltration system	6	ATMP Aseptic Manufacturing Training Lab
Ultrafiltration/ Diafiltration (UF/DF)	PALL	Benchtop Stainless Steel UFDF	Benchtop ultrafiltration & diafiltration system	1	Downstream
Ultrafiltration/ Diafiltration (UF/DF)	PALL	Ultrafiltration System Skid	Industrial scale stainless steel UF/DF skid for concentration and diafiltration	2	Downstream
Ultrafiltration/ Diafiltration (UF/DF)	Spectrum Labs	KrosFlo Research TFF System	Benchtop ultrafiltration & diafiltration system	1	ATMP Manufacturing Technologies Suite
UPLC	Acquity	UPLC System	Sample separation and analysis	2	QC Analytics
UV Lamp	Magnaflux LTD	Magnaflux ZB-100F	Portable, hand-held UV lamp for fluorescent non-destructive testing applications	1	COP/SOP
Vapor Trap	Thermo Fisher Scientific	Savant RVT400 Refrigerated Vapor Trap	Remove solvents from a sample - works with the speed vac concentrator	1	QC Analytics
Vessel	Kells Stainless Ltd	200 L Media Prep Vessel	Stainless steel vessel for media preparation	1	Media Preparation
Vessel	Kells Stainless Ltd	50 L Buffer Vessel	Stainless steel vessel for buffer preparation	2	Buffer Preparation
Vessel	Kells Stainless Ltd	25 L Capture Pooling Vessel	Stainless steel vessel for viral clearance/filtration	1	Downstream
Vessel	Kells Stainless Ltd.	25 L Viral pH Vessel	Stainless steel vessel for viral clearance/filtration	1	Downstream
Vessel	Kells Stainless Ltd	Harvest Vessel	Stainless steel vessel for collection of cell process outputs	1	Upstream
Viral Filtration	Asahi Kasei	Viral Filter	Viral filtration and gold particle testing	2	Downstream

Equipment	Manufacturer	Name	Equipment Description	Total	Location
Water and Bioburden Testing	Millipore	Milliflex Oasis Filtration System	System for microbiological examination of aqueous fluids	1	QC Micro
Water and Bioburden Testing	Millipore	Milliflex PLUS Pump	Vacuum pump system for microbiological examination of aqueous fluids	1	QC Micro
Water Bath	Medical Supply LTD	Water Bath	Incubates or thaws samples	1	Inoculum



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