

Outline of the Research Activity of the Department of Pharmaceutical and Pharmacological Sciences 2016-2017

The Department of Pharmaceutical and Pharmacological Sciences stems from the merging of the previous Departments of Pharmaceutical Sciences and of Pharmacology and Anesthesiology, which have always represented the reference structures for research and teaching, focusing on the worlds of medical drugs.

The main disciplines include pharmaceutical chemistry and technology, pharmacology and toxicology, integrated by solid experience in chemistry, biochemistry and cell biology, in addition to pharmaceutical and medical bio/nanotechnology.

The staff includes 51 professors (4 fixed term Researchers, 16 Research Fellows, 23 Associate Professors, 8 Full Professors), 19 technicians, 17 administratives, 4 general services and about 60 young researchers under training, including 43 PhD students and 16 post-doctoral fellows.

Governance

- Director and Vice-Director
- Departmental Council
- Resource and development Committee
- Scientific Committee
- Internationalization Committee
- Educational Committee
- Service and Logistics Committee

Premises

Building A (Via Marzolo n.5)

- 6 Teaching classrooms
- 5 Teaching laboratories
- Lecturer offices
- Research laboratories
- Student study rooms
- Library

Building B (Via Loredan n.16)

- 1 big Teaching classroom
- Lecturer offices
- Research laboratories
- Small meeting rooms
- IT room

Building C – Pharmacology (Largo Meneghetti n.2)

- 3 Teaching classrooms
- Lecturer offices
- Research laboratories
- IT room
- Library

Research Areas

Pharmacology, Toxicology and Pharmacognosy (BIO/14, 15 Researchers)

- Neuropharmacology (Giusti, Zusso) <http://www.dsfarm.unipd.it/neuropharmacology>
- Gastrointestinal Pharmacology (Colucci, De Martin, Giron) <http://www.dsfarm.unipd.it/gastrointestinal-pharmacology>
- Cardiovascular Pharmacology (Bolego, Ferri) <http://www.dsfarm.unipd.it/cardiovascular-pharmacology>
- Cancer Pharmacology (Montopoli, Quintieri, Ragazzi, Trevisi) <http://www.dsfarm.unipd.it/cancer-pharmacology>
- Pharmacognosy and Environmental Toxicology (Bova, Carrara, Debetto, Frolidi) <http://www.dsfarm.unipd.it/pharmacognosy-and-environmental-toxicology>

Medicinal Chemistry (CHIM/08, CHIM/10, 18 Researchers)

- Drug Design and Synthesis (Chilin, Dolmella, Ferlin, Marzaro, Mattarei, Moro, Sturlese, Zagotto) <http://www.dsfarm.unipd.it/drug-design-and-synthesis>
- Molecular Mechanisms of Drug Action (Dalla Via, Gandin, Gatto, Mattarei, Marzano, Miolo, Sissi) <http://www.dsfarm.unipd.it/molecular-mechanisms-drug-action>
- Nutraceuticals (Bertazzo, Dall'Acqua, Zancato) <http://www.dsfarm.unipd.it/nutraceuticals>

Pharmaceutical Technology and Drug Delivery (CHIM/09, 10 Researchers)

- Advanced Drug Delivery and Biopharmaceutics (Caliceti, Mastrotto, Morpurgo, Pasut, Salmaso, Schiavon) <http://www.dsfarm.unipd.it/drug-delivery-and-biopharmaceutics>
- Galenic and Cosmetic Formulation and Pharmaceutical Processes (Dal Zotto, Franceschinis, Realdon, Semenzato) <http://www.dsfarm.unipd.it/galenic-and-cosmetic-formulation-and-pharmaceutical-processes>

Biochemistry, Pharmaceutical Biology, Regenerative Medicine (BIO/10, BIO/15, BIO/16 – 9 Researchers)

- Biochemistry (De Filippis, Polverino de Laureto, Spolaore) <https://www.dsfarm.unipd.it/biochemistry-0>
- Pharmaceutical Biology (Caniato, Filippini, Piovan) <https://www.dsfarm.unipd.it/pharmaceutical-biology-0>
- Regenerative Medicine (Conconi, Di Liddo, Grandi) <http://www.dsfarm.unipd.it/regenerative-medicine-0>

Scientific equipments for departmental services

Biochemistry and cell biology

Biacore

Circular dichorism

Ultracentrifuge

Imaging - Versadoc

Confocal Microscopy

Plate reader

Flow cytometer

Molecules, Macromolecules and Colloids

Flash chromatography

Spectrofluorometer

Zeta potential and nanosizer

Microcalorimeter

Isothermal Calorimetry

Mass Analysis Xevo G2-XS QTof

Mass Analysis ESI-TOF Mariner

Chemical Analyses

FT-IR spectroscopy

Flash chromatography

300 MHz NMR spectrometer

400 MHz NMR spectrometer Avance

HPLC

Atomic absorption

Gas chromatography

Elemental Analysis

Physicochemical Analyses

Contact angle

Size analysis

Differential Scanning Calorimeter

Pharmaceutical technology

Spray dryer

Granulator

Tabletting

Dissolution

Other equipments

Microwave reactor

Teaching

- Bachelor (3 years) in:
 - Herbal Sciences & Technologies
- Master (5 years) in:
 - Pharmacy,
 - Pharmaceutical Chemistry and Technology
- Master (2 years, post 3 year-Bachelor in Biotechnologies) in:
 - Pharmaceutical Biotechnologies (held in English)
- Specialization School in Hospital Pharmacy (4 years including residency)
- PhD Schools
 - Pharmacological Sciences
 - Molecular Medicine: *Regenerative Medicines* (in collaboration with the Department of Molecular Medicine)
 - Molecular Sciences: *Pharmaceutical Sciences*(in collaboration with the Department of Chemical Sciences)

- Post graduate courses (1 year)
 - Business and Management: Perfume and Fragrances Industries and Cosmetics Sector
 - Clinical Phytoterapy
 - Pharmaceutical Logistics
 - Radiopharmacy

69% of Associate and Full Professors is involved in didactic activity to a maximum of 120 hours per Academic year;

21% of Associate and Full Professor is involved in didactic activity from a minimum of 121hours to a maximum of 132 hours

3 Assistant Professors are involved in didactic activity for more than 120 hours

11 Assistant Professors are involved in didactic activity from a minimum of 60 hours to a maximum of 120 hours

32% of Professors has taken part to Teaching for Learning courses for the implementation of interactive didactic

Extracurricular didactic activities are very few

Research Products

In 2016	In 2017
<ul style="list-style-type: none"> - 184 research articles; 82 from the Medicinal Chemistry Group (CHIM/08), 30 from the Drug Delivery Group (CHIM/09), 44 from the Pharmacology Group (BIO/14), 30 from the Biochemistry, Pharmaceutical Biology and Regenerative Medicine Group (BIO/10, BIO/15, BIO/16); - The most relevant research article of 2016 was published by the research group of Prof. De Filippis (Biochemistry), entitled <i>A MICUI Splice Variant Confers High Sensitivity to the Mitochondrial Ca²⁺ Uptake Machinery of Skeletal Muscle</i>, IF 14,714 and SJR 13.295; - Research article IF: Medicinal Chemistry Group (CHIM/08) mean IF 3,27, Drug Delivery Group (CHIM/09) mean IF 4,03, Pharmacology Group (BIO/14) mean IF 3,54, Biochemistry, Pharmaceutical Biology, 	<ul style="list-style-type: none"> - 161 research articles; 79 from the Medicinal Chemistry Group (CHIM/08), 19 from the Drug Delivery Group (CHIM/09), 55 from the Pharmacology Group (BIO/14), 8 from the Biochemistry, Pharmaceutical Biology and Regenerative Medicine Group (BIO/10, BIO/15, BIO/16); - The most relevant research article of 2017 was published by the research group of Dr. Andrea Mattarei (Drug Design and Synthesis), entitled <i>Direct Pharmacological Targeting of a Mitochondrial Ion Channel Selectively Kills Tumor Cells In Vivo</i>, IF 27.407 and SJR 13.922; - Research article IF Medicinal Chemistry Group (CHIM/08) have mean IF 4.26, Drug Delivery Group (CHIM/09) mean IF 4,36, Pharmacology Group (BIO/14) mean IF 3,71, mixed SSD mean IF 5.83; Biochemistry, Pharmaceutical Biology,

<p>Regenerative Medicine Group (BIO/10, BIO/15, BIO/16) mean IF 3,73;</p> <ul style="list-style-type: none"> - 75% of researchers published less than 5 research articles, 5 professors didn't publish any research article in 2016. This fact will cause a penalty in the next Evaluation of Research by the Italian Ministry of Education (VQR). - Mean IF 3,66; mean SJR 1.43 - 81 research articles with first/last/corresponding <i>author</i> belonging to the Department; - 40% of the research articles are written in collaboration with foreign researchers 	<p>Regenerative Medicine Group (BIO/10, BIO/15, BIO/16) mean IF 5.83;</p> <ul style="list-style-type: none"> - 68% of researchers published less than 5 research articles, 5 professors didn't publish any research article in 2017. This fact will cause a penalty in the next Evaluation of Research by the Italian Ministry of Education (VQR). - Mean IF 4.16; mean SJR 1.68 - 76 research articles with first/last/corresponding <i>author</i> belonging to the Department; - 38% of the research articles are written in collaboration with foreign researchers
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Internationalisation

<p>In 2016</p> <ul style="list-style-type: none"> - International Workshops (4): <ol style="list-style-type: none"> 1. 8th June 2016: Fostering Innovation towards start-up – Committee: Salmaso, Montopoli, Morpurgo 2. 20-25 June 2016: Summer School ESP Photobiology School: Prof.ssa Miolo 3. 29-30 September 2016 <i>Nanotechnology in pharmascience</i> – Gatto, Caliceti 4. 19th December 2016: S.I.Fit. Young Researchers Project – Montopoli - 41 Erasmus agreements; - 3 Memorandum of Understanding (MoU) extra-EU; - in-coming: <ul style="list-style-type: none"> 1 Visiting Professor (Prof. Marjo Yliperttula), 18 distinguished scientists for international seminars 	<p>In 2017</p> <ul style="list-style-type: none"> - International Workshops (4): <ol style="list-style-type: none"> 1. 10th October 2017: Workshop Recent advances in cancer therapy –Montopoli 2. 20th April 2017: Start up grind – Morpurgo 3. 30th March 2017: Delegation from China Pharmaceutical University - Gatto 4. 7th March 2017: Targeting the metabolic deregulation of cancer: a novel pharmacological approach –Montopoli - 47 Erasmus agreements; - 2 Memorandum of Understanding (MoU) extra-EU; - in-coming: <ul style="list-style-type: none"> 1 Visiting Professor (Prof. Marjo Yliperttula), 1 Visiting Scientist (Prof. Vadim Vasilyev), 28 distinguished scientists for international seminars - out-going: 3 DSF researchers (Ferri, Polverino, Zusso) selected by the Call for Inter-University Cooperation
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Fund raising

In 2016	In 2017
<ul style="list-style-type: none"> - Total Research budget € 1.022.295,13 - € 359.812.49 from Departmental Integrated Research Budget – BIRD (assigned yearly by the University of Padova to each Department for the realization of Research Projects); - € 208.000 assigned through selections (Departmental Research Projects - PRID, Departmental Research Grants ARD-A); - 2 EU Projects funded (ITN Caliceti, ITN Pasut) total budget: € 471.602,64; - 7 European Social Fund Projects funded: € 193.880,00 - 28% of professors benefits from a competitive grant (Departmental Research Project - PRID, European Social Fund - FSE, National Foundations) - 20 research fellowships awarded: 7 from European Social Funds - FSE, 7 from external funding (Grants derived from Research Projects), 6 from UNIPD budget; - 16 research contracts with external companies: € 304.000,00 - 14 donations from Foundations and external companies: € 105.031,00 	<ul style="list-style-type: none"> - Total Research budget € 1.187.847,80 - € 367.439,96 from Departmental Integrated Research Budget – BIRD (assigned yearly by the University of Padova to each Department for the realization of Research Projects); - € 220.000 assigned through selections (Departmental Research Projects - PRID PRID, PRID-Junior, Departmental Research Grants ARD-B); - 1 EU Project funded (€ 164.203,80 - Marie Curie Individual Fellowship – Sosic) - 1 AIRC Consolidator Grant (€ 510.000,00) Pasut - 1 Italian National Program for Antarctic Research – (€ 31.200) Polverino - 1 Ministry of Education Project (€ 64.533,00) Moro - 35% of professors benefits from a competitive grant (Departmental Research Project - PRID, European Social Fund - FSE, National Foundations) - 10 research fellowships awarded: 2 from European Social Fund - FSE, 3 from Marie Curie Projects, 3 from UNIPD budget, 1 from Research Foundations, 1 from international funding (Bova); - 21 research contracts with external companies: € 614.220,00 - 12 donations from Foundations and external companies: € 88.000,00

Third Mission – Public Engagement

In 2016 and 2017:

- Scientific parks (Galileo park <http://www.galileovisionarydistrict.it/>)
- Spin-Off
 - **Ananas** (a unique kind of poly-avidin nanoparticles obtained through a process of natural self-assembly which guarantees high composition and performance reproducibility. The nanoparticles ANANAS can be used alone or in combination with other reactive ANANAS as tools in the diagnostic laboratory and research use. They can be functionalized with multiple biotinylated elements with different properties (antibodies, receptors, fluorophores, drugs, peptides...), that can be placed on their surface at stoichiometrically controlled molar ratios. Depending on the elements inserted, one can obtain nanoparticles with different functional properties. ANANAS nanoparticles are useful in vitro diagnostic such as molecular amplifier of the signal compared to commercially available)
http://www.ananasnanotech.it/home/index.php?option=com_content&view=article&id=49:about-us&catid=42:articoli-about-us&Itemid=55
 - **UniR&D** (Unired offers skills in the following fields: Rheology applied to product formulation and development, Physical characterization of complex fluids, Stability risk assessment, Associating and combining new raw materials)
<http://www.unired.it/en/>
- dissemination events (Night of Researchers, Galileo Festival, Kids University)
- collaborations with Public Institutions (Italian Medicines Agency - AIFA), Pharmacist Associations (ECM, professional and continuing education courses for pharmacists, traineeships for graduated students).
- Book-crossing