DOCTORAL PROGRAMME
IN
BIOMEDICAL SCIENCES

Director prof. Fabrizio Chiti

XLI cycle – academic year 2025/2026

BIOMEDICAL AREA	
ADMINISTRATIVE OFFICE	Department of Experimental and Clinical Biomedical Sciences "Mario Serio"
WEB	www.sbsc.unifi.it/dottorato
CURRICULA	**1.** Human Morphology and Morphogenesis **2.** Functional Biology of Biomolecoles and Biosystems **3.** Physiological and Nutritional Sciences **4.** Experimental Pathology **5.** Endocrinological, Molecular and Regenerative Biotechnologies **6.** Biomedical Sciences of Evolutive Age **7.** Gender Medicine **8.** Single Cell Multi-Omics Technologies in Biomedical Sciences
	POSITIONS AVAILABLE: 11 Positions with scholarship: 10 Positions without Scholarship: 1
SCHOLARSHIPS: 10	**6** - University of Florence **1** - Centro Interdipartimentale di Ricerca sull'Imaging Biomedico - CIRIB **3** - Department of Experimental and Clinical Biomedical Sciences "Mario Serio" – Ministerial Project "Dipartimenti di Eccellenza 2023–2027" - CUP B13C22004460001
STUDY/RESEARCH PERIODS ABROAD	3 months
DOCUMENTS REQUIRED FOR THE ADMISSION (under penalty of exclusion)	• Copy of the Identification Document • Self-certification for qualifications obtained in Italy (laurea triennale, specialistica o magistrale o ciclo unico) with list of exams taken, credits and related grade, title of the thesis and graduation mark (using this **template** or similar forms containing the required information)

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- Qualifications obtained abroad (Bachelor's and Master Degrees or combined cycle Degree) with a list of all exams taken, credits and related grade, rating scale, title of the thesis and graduation mark

The same documentation except for the final mark must be submitted by those who will graduate within the 31/10/2025
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<tr><td>DOCUMENTS REQUIRED FOR THE EVALUATION</td><td>

MANDATORY

- Curriculum vitae
- Research Project

OPTIONAL

- List of publications
- Any other qualification document
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<tr><td>RESEARCH PROJECT</td><td>The research project, written in English on one page and of maximum 700 words, which must include a brief introduction, methodology, expected results and 2-3 references in brief form (Example Rossi et al. 2017 J. Mol Biol. 23, 340-345). The project must refer specifically to one or more of the working themes listed in the section below "Thematics".</td></tr>
<tr><td>INTERVIEW MODE</td><td>In person
(In the application form candidates may ask to conduct the interview remotely)

The interview can be conducted in English language.</td></tr>
<tr><td>EVALUATION MARKS</td><td>
<table>
<tr><th>parameter</th><th>minimum score</th><th>maximum score</th></tr>
<tr><td>Curriculum vitae, publications, and other qualification documents</td><td>–</td><td>45/120</td></tr>
<tr><td>Research Project redaction</td><td>–</td><td>25/120</td></tr>
<tr><td colspan="3">Applicants who obtain a mark of at least 50/120 in the evaluation of the above parameters will be admitted to the interview</td></tr>
<tr><td>Interview: discussion of the research project, publications, and other qualification documents</td><td>–</td><td>50/120</td></tr>
<tr><td colspan="3">Eligibility is achieved with a minimum score of 80/120</td></tr>
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<tr><td>THEMATICS</td><td>

Curriculum in Human Morphology and Morphogenesis:

1) Systematic and topographic anatomy: anatomical variants of organs and apparatuses of anatomical relevance
2) Applied anatomy: anatomic characteristics and topographical relations of organs and apparatuses of interest for diagnostic imaging and clinical semeiotics
3) Morpho-functional histology and cytology: structure-function relationships and mechanisms of regulation in physiological conditions and in pathological models
4) Embryology and organogenesis: mechanisms of cell and tissue differentiation for regenerative medicine
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	5) Histochemistry: localization of specific functional molecules in cells and tissues by advanced microscopy methods 6) Adaptations to muscle activity and to sport of musculoskeletal apparatus, respiratory and circulatory systems. Training methodologies **Curriculum in Functional Biology of Biomolecules and Biosystems:** 1) Biophysics of proteins, lipid bilayers and biomembranes 2) Cell proteostasis and its regulation 3) Cell biology of amyloids and its relevance on associated systemic and neurodegenerative pathologies 4) Phospholipid signalling 5) Yeast and other model systems proteomics 6) Anti-aggregation power and nutraceutical properties of natural compounds **Curriculum in Physiological and Nutritional Sciences:** 1) Molecular mechanism, regulation and mechanochemical coupling of striped muscle contraction 2) Electrophysiology and mechanics of smooth muscle 3) Nervous mechanisms involved in respiratory activity genesis and control 4) Components and strategies involved in motor control of the human voluntary movement 5) Pathophysiology of gastrointestinal apparatus and of nutrition and prevention of chronic-degenerative pathologies. Epidemiological and intervention studies on foods and alimentary profiles **Curriculum in Experimental Pathology:** 1) Molecular and cellular mechanisms of cancer transformation and progression 2) Cancer stem cells; characterization and targets for new therapies 3) Innovative approaches to cancer diagnosis and prognosis 4) Targeting strategies to improve the effectiveness of nanomedicine in oncology 5) Anti-aging Innovative strategies with compounds protective against aging 6) Molecular and cellular mechanisms of aging and longevity **Curriculum in Endocrinological, Molecular and Regenerative Biotechnologies:** 1) Pathophysiology of male reproductive apparatus and its accessory glands 2) Genetic aspects of male infertility 3) Control mechanisms of human spermatogenesis 4) DNA fragmentation in human spermatozoa: biochemical mechanisms and clinical meaning and significance 5) Pathophysiology of thyroid, hypophysis and adrenal gland 6) Pathophysiology of fat tissue

	Curriculum in Biomedical Sciences of Evolutive Age: 1) Clinical biochemistry and modifications of cell and systemic redox status in human physiology and pathology 2) Innovative strategies for neoplastic and cardiovascular therapy by the use of plant polyphenols 3) Specific aspects of diagnostics, therapy and prevention in pediatrics 4) Hygiene public health and health organization 5) Detection of high priority malocclusions in evolutive age in orthodontics 6) Prevention of infective and chronic pathologies, vaccinations, food hygiene and public health laboratory **Curriculum in Gender Medicine:** 1) Endocrinological aspects of the female vs male reproductive apparatus 2) Mechanisms of control of the female vs male sexuality 3) Endocrinological-metabolic control mechanisms of the female vs male reproduction 4) Endocrinological and gynecological aspects of the female oncologic pathology 5) Pathophysiology of the metabolic diseases in the female and the male **Curriculum in Single Cell Multi-Omics Technologies in Biomedical Sciences:** 1) Single cell multi-omics technological platforms (analysis of genomics, transcriptomics, proteomics and metabolomics) and their applications. 2) Single cell multi-omics technologies in the study of cell subpopulations in order to clarify the role in the pathophysiological processes underlying organ damage, inflammatory and regenerative. 3) Single cell multi-omics technologies in the study of the endocrine-metabolic aspects involved in organ pathology. 4) Single cell multi-omics technologies in the study of tumor heterogeneity and tumor microenvironment. 5) Single cell multi-omics technologies in the study of early alterations involved in neurodegeneration processes. 6) Computational analysis, integration and interpretation of data generated by single cell multi-omics technologies. 7) In situ spatial multi-omics analysis approach at cellular and subcellular resolution to visualize and quantify RNA and proteins.

EXAMINATION SCHEDULE			
	DATE	**TIME**	**PLACE**
INTERVIEW	July 14, 2025	9:00 a.m.	Department of Experimental and Clinical Biomedical Sciences “Mario Serio” Viale Giovanni Battista Morgagni, 50 Firenze Aula A
The list of the candidates admitted to the interview and the final ranking will be published at the page **PhD courses**			