

计划生育生殖生物学国家重点实验室

简况和论文选集

State Key Laboratory of Reproductive Biology

Brief Introduction and Selected Papers

1991-1992

中国科学院动物研究所

Institute of Zoology, Chinese Academy of Sciences

北京 中国
Beijing China

实验室简介:

实验室主任: 庄临之
副主任: 陈大元 刘以训

学术委员会主任: 曹咏清
副主任: 程治平 李伟雄

顾问: 薛杜普 研究员 中国医学科学院基础医学研究所
学部委员
郑丕留 研究员 中国农业科学院畜牧研究所

学术委员会委员(按姓氏笔画)

王永潮	教授	北京师范大学
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沈孝宙	研究员	计划生育生殖生物学国家重点实验室
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顾芝萍	研究员	中国科学院上海药物研究所
曹咏清	研究员	计划生育生殖生物学国家重点实验室
程治平	教授	哈尔滨医科大学
谢衷明	研究员	上海计划生育科学研究所

研究方向:

本实验室是从细胞和分子水平探讨生殖调控的基本规律,着重研究胚胎着床的机理,进行着床信息活性物质蛋白质和多肽的分离、鉴定及功能分析,同时从妊娠识别概念着手,研究胚胎和子宫内膜的相互识别粘附和局部免疫保护等机制,为全面了解人妊娠早期生理功能协调机制,将系统研究早期胎盘绒毛的内在激素、细胞因子、神经肽及神经递质分泌调控的分子机理以及其在着床和妊娠早期的功能;精子、卵子发生、成熟和排放机理是生殖生物学研究重要内容,要深入探索性腺重要活性物质基因表达的激素调节及与生殖细胞分化成熟的关系,研究受精和排卵机制;同时深入探索与抗生育直接有关的激素和有关分子基因工程方面的工作,为寻找控制生育特异活性物质开辟新途径。

主要研究内容:

1. 胚胎着床机理研究: (1)与着床有关的活性肽类的纯化、结构和生物特性与功能; (2)着床过程中的妊娠识别、粘附和免疫保护; (3)滋养层与子宫内膜或蜕膜间的相互关系。
2. 妊娠早期人胎盘的细胞和分子生物学研究: (1)探讨滋养层细胞分泌、分化和增殖调节的分子机理; (2)人胎盘生殖激素和细胞因子及其受体基因表达的调节。
3. 生殖腺的细胞和分子生物学研究: (1)生殖细胞间的相互作用及其生物功能的内分泌、自分泌和旁分泌调节机制; (2)性腺细胞活性物质基因表达与生殖细胞分化、成熟和排放的关系; (3)滤泡生长、闭锁和黄体功能的调节机理。
4. 受精机理的研究: (1)精子顶体反映机制和精卵发生的ZP₃、onco基因表达。(2)受精中的离子转运和调控机制及细胞骨架作用。(3)受精的分子免疫机制与精卵识别。
5. 生殖神经内分泌的研究: (1)下丘脑中LHRH神经元中肽类物质和神经递质的相互关系; (2)人胎盘内神经递质和神经肽的分离纯化及其功能的研究。
6. 基因表达调控与基因重组: 利用重组DNA技术,探讨生殖激素及其受体的基因调节和有重要价值的活性蛋白或肽类的基因克隆、结构分析及表达。
7. 避孕药(具)的药效、毒副作用和作用机理的研究。

研究组的构成及研究方向:

本实验室共设八个研究组,成龙配套,在学科和技术方面各有特长,从不同角度和不同水平探讨生殖规律.

1. 肽类生化实验室: 胚胎和子宫中特异肽和糖蛋白的纯化及其与着床关系的研究.
负责人: 曹咏清
2. 神经内分泌实验室: 人胎盘及下丘脑中活性肽和神经肽的纯化及功能研究.
负责人: 张崇理
3. 受精生物学实验室: 受精与抗受精机理及胚胎工程研究.
负责人: 陈大元
4. 激素生化实验室: 类固醇激素受体生化及避孕药物作用机理的研究.
负责人: 邹继超
5. 分子生物学实验室: 性腺重要活性物质基因表达的激素调控、排卵机制及着床机理的研究.
负责人: 刘以训
6. 基因重组实验室: 人与哺乳动物基因表达调控及基因工程的研究.
负责人: 沈孝宙
7. 生殖生理实验室: 排卵和溶黄体及避孕药物作用机理的研究.
负责人: 祝 诚
8. 细胞和分子生物学实验室: 人胎盘滋养层细胞的增殖、分化与功能调控及避孕药物离体筛选和作用机理研究.
负责人: 庄临之

课题申请指南:

1. 生殖内分泌学包括神经内分泌学研究
2. 生殖腺的细胞和分子生物学研究
3. 生殖细胞发育、成熟和排放机理的研究
4. 受精机理和抗受精的研究
5. 胚胎着床机理的研究
6. 妊娠早期人胎盘的细胞和分子生物学研究
7. 与生殖有关的肽类基因表达调控与基因工程的研究
8. 与生殖有关的生物活性物质及其作用机理的研究
9. 避孕药物作用原理的研究

State Key Laboratory of Reproductive Biology

Director: Professor Zhuang, Lin-zhi

Vice Director: Professors Chen, Da-yuang and Liu, yi-xun

Scientific Advisory Committee

Chairperson: Professor Cao, Yong-qing,

Vice Chairperson: Professors Cheng, Zhi-ping and Li, Wei-xiong

Advisors: Professor Xue, She-pu, member of Chinese Academy of Science (CAS). Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences.

Professor Zheng, Pei-liu, Chinese Academy of Agriculture Sciences.

Members:

Cao, Yong-qing, Professor, State Key Laboratory of Reproductive Biology, CAS.

Cheng, Da-yuang, Professor, State Key Laboratory of Reproductive Biology, CAS.

Cheng, Zhi-ping, Professor, Harbin Medical University.

Gu, Zhi-ping, Professor, Shanghai Institute of Materia Medica, CAS.

Li, Zai-ping, Professor, Shanghai Institute of Biochemistry, CAS.

Li, Wei-xiong, Professor, Beijing Medical University.

Liu, Yi-xun, Professor, State Key Laboratory of Reproductive Biology, CAS.

Shen, Xiao-zhou, Professor, State Key Laboratory of Reproductive Biology, CAS.

Shi, qi-xian, Professor, Zhe-jiang Academy of Medicine.

Wang, Yong-chao, Professor, Beijing Normal University.

Xiao, Bi-lian, Professor, National Research Institute for Family Planning.

Xie, Zhong-ming, Professor Shanghai Institute of Planned Parenthood Research.

Yang, Chuan-ren, Professor, Beijing University of Agriculture.

Zhang, You-dua, Professor, Shanghai Institute of Biochemistry, CAS.

Zhang, Chong-li, Professor, State Key Laboratory of Reproductive Biology, CAS.

Zhao, Bai-ge, Professor, Shanghai Institute of Planned Parenthood Research.

Zhu, Yao-hua, Associate Professor, State Family Planning Commission.

Zhuang, Lin-zhi, Professor, State Key Laboratory of Reproductive Biology, CAS.

A Brief Introduction

The State Key Laboratory of Reproductive Biology (SKLRB) supported directly by the government functioned formally in March of 1991, on the basis of Department of Endocrinology and the Laboratory of Reproductive Biology (LRB) which was found in 1985. SKLRB is an independent research unit for basic study of reproduction relevant to birth control. Professor Zhang Zhi-yi (1914-1990), the former director of LRB, deputy director of Division of Biological Sciences, CAS, was the founder of SKLRB which was affiliated to the Institute of Zoology, CAS, with provision of maintenance. The research direction is supervised by the State Family Planning Commission (SFPC). The laboratory is intended to be an international center for reproductive research and opens to all capable scientists engaged in this field, including those from abroad. The SKLRB received a financial support of US\$1,000,000 from the government mainly for the equipment, and also receives fund of ¥400,000 from CAS and ¥200,000 from SFPC each year for the running cost.

By the year of 1992, 9 senior staff members (8 Professors and 1 associate professor), 3 junior staff members, 12 technicians, 32 visiting scholars were working in the lab. which consists of 8 groups.

- Peptide Biochemistry
group leader: Professor Cao Yong-qing
- Biology of Fertilization
group leader: Professor Chen Da-yuang
- Molecular Biology
group leader: Professor Liu Yi-xun
- Recombinant DNA
group leader: Professor Shen Xiao-xhou
- Neuroendocrinology
group leader: Professor Zhang Chong-li
- Reproductive Physiology
group leader: Professor Zhu Cheng
- Cellular and Molecular Biology
group leader: Professor Zhuang Lin-zhi
- Hormone Biochemistry
group leader: Professor Zou Ji-chao

Objects of the laboratory

The objects of the laboratory are as follows

1. To further knowledge on the study of searching specific peptides or other compounds relevant to birth control from blastocyst, uterus and other sources.
 - Studies on the purification and characterization as well as their physiological functions of specific peptides in rabbit and primate blastocysts, and to examine the possible role in the process of implantation.
 - Isolation and characterization of the first trimester human placental interferon and other active peptides, their possible role in implantation.
 - Interaction and recognition between trophoblast and endometrial cells in vitro.
 - The role of plasminogen activator and plasminogen activator inhibitor in the process of implantation.
 - Anti-implantation effect of Neuropeptides and neurotransmitters
2. To study autocrine and paracrine regulation of cell proliferation, differentiation and secretion in cellhuman trophoblast at early gestation stages.
 - Regulation of synthesis and secretion of hormones, neuropeptides and neurotransmitters in the cultured human trophoblast cells.
 - Distribution and regulation of plasminogen activators and plasminogen activator inhibitors in trophoblast tissue and cells.
 - Regulation of protooncogene expression in the cytotrophoblast cell line (Normal human placenta origin) by hormones, inhibin, activin, growth factors as well as neurotransmitters and neuropeptides.
 - comparison of inhibin, activin and cGnRH gene expression in cultured cytotrophoblast cells at different gestation stages.

- Isolation, purification and characterization of trophoblast neuropeptides.
3. To study the mechanism of autocrine paracrine and endocrine regulation of gonad function.
- Hormone regulation of tPA, PAI-1 gene expression in primate ovary and testis.
 - Gene expression of FSH and LH receptors, and inhibin α , β A and β B subunits during follicular development and maturation.
 - Effect of PA-PAI-1 system, growth factors, prostaglandins and interferon as well as other factors on oocyte maturation, ovulation and luteolysis.
 - Cell specific and time-coordinated tPA and PAI-1 gene expression during gonadotropin-induced ovulation and luteolysis.
 - Interaction and regulation of Sertoli and Leydig cells in primate testis, mechanism of spermatogenesis and sperm maturation.
 - Interaction and regulation of hormones and their receptors in ovary, testis and uterus.
4. To study the mechanism of fertilization
- In vitro capacitation, fertilization and oocyte maturation.
 - Sperm acrosome reaction site and its inducing factors.
 - Role of sperm membrane in sperm-oocyte recognition.
 - Role of cytoskeleton in oocyte and fertilized egg.
 - ZP₃ and Oncogene expression during spermatogenesis and oogenesis.
 - Ionic transport mechanisms and regulatory roles during fertilization.
 - Molecular immunological mechanism of fertilization.
 - Changes of oocyte specific RNA during maturation.
 - Role of PA-PAI-1 in spermatogenesis and fertilization.

5. To study hypothalamic neuropeptides: regulation and physiological role in reproduction.
 - Control of hypothalamic GnRH neurons by central nerve system.
 - Identification of co-existence of GnRH and other peptides or neurotransmitters in the same hypothalamic neuron.
 - Regulation of GnRH secretion in cultured hypothalamic neuron by cholinergic and adrenergic agents.
6. To study gene cloning and expression
 - cDNA cloning of a specific peptide from rabbit embryo.
 - Cloning and sequencing of the bovine metallothionein (MT) gene.
 - Expression of the recombinant human growth hormone (GH) gene and hepatitis B surface antigen gene in mammalian cells.
 - Cloning of the fish GH gene and MT gene.
 - Transcriptional regulation of SV40 early promoter in fish cells.
 - Characterization and isolation of the trans-acting factor(s) of hCG- β gene from human trophoblast tissue.

1991-1992年学术委员会批准课题

1991年资助课题一览表:

序号	申请人	职 称	工作单位	课题名称	资助额(万)
1	曹咏清	研究员	动物所	着床前胚胎小分子肽的研究	2.0
2	陈大元	研究员	动物所	精子吸附外源基因的受精机理研究	1.5
3	庄临之	研究员	动物所	EGF和IGFS在人胎盘滋养层细胞生长、分化与激素分泌的调控机制	2.0
4	刘以训	副研究员	动物所	恒河猴卵巢tAP和PAI-1基因表达的激素调节	2.0
5	沈孝宙	研究员	动物所	hCG- β 亚单位转录调节因子的分离与鉴定	2.5
6	祝 诚	副研究员	动物所	卵巢黄体功能调节研究	1.5
7	张崇理	研究员	动物所	早期胎盘中具有抑制绒毛孕酮释放功能的活性肽的研究	2.0
8	邹继超	研究员	动物所	雌激素拮抗剂抗生育作用研究	1.5
9	张丽珠	教 授	北医三院	人卵母细胞及颗粒细胞中纤蛋白溶酶原激活及抑制因子;避孕甾体(RLX)对子宫内皮PA、PAI的调节	1.0
10	朱正美 (李宾)	教 授	大连医学院	着床期兔子宫内膜特异糖蛋白的纯化	1.5
11	周苏文 (邹爱民)	教 授	宣武医院	妊娠过程中人胎盘绒毛和母体血清中LHRH,NE含量的变化	0.8
12	冯怀亮	讲 师	东北农学院	籍受精机理的细胞学研究	1.2
13	董 伟 (周虚)	教 授	北京农业大学	外源GnRH对母猪初情期调节及作用机理的研究	1.0
14	魏振年	主任医师	福建计划生育研究所	恒河猴睾丸内激素调控的离体研究	1.0
15	唐美仪	讲 师	曲阜师范大学	妊娠早期人胎盘绒毛CRF的含量、功能及其与着床关系的研究	1.0
16	程丽仁	副研究员	动物所	神经肽和神经递质对绒毛释放hCG的动态效应	1.0
17	刘 斌 (王清德)	教 授	北京医科大学	早孕因子对胚胎着床的影响	1.0
18	郑 行	讲 师	北京农业大学	动物妊娠早期血小板减少机理探讨	0.9
19	夏国良 (张才乔)	讲 师	北京农业大学	催乳素对前列腺细胞的作用及其作用机制	1.2
20	张天荫	教 授	山东大学	硬骨鱼类的受精机理	0.8
21	仇怀林	副教授	河南师范大学	太行山猕猴胚胎着床前后生物活性肽的研究	1.0

1992年资助课题一览表:

序号	申请人	职 称	工作单位	课题名称	资助额(万)
1	曹咏清	研 究 员	动 物 所	着床前胚胎小分子肽的研究	2.2
2	陈大为	研 究 员	动 物 所	带下注射的受精机理研究	2.2
3	庄临之	研 究 员	动 物 所	EGF和IGFS在人胎盘滋养层细胞生长、分化与激素分泌的调控机制	2.3
4	刘以训	研 究 员	动 物 所	睾丸支持细胞PA和PAI-1基因表达与精子发生和成熟的关系	2.3
5	沈孝宙	研 究 员	动 物 所	hCG- β 亚单位转录调节因子的分离与鉴定	2.0
6	祝 诚	副研究员	动 物 所	卵巢黄体功能调节研究	1.5
7	张崇理	研 究 员	动 物 所	早期胎盘中具有抑制绒毛孕酮释放功能的活性肽的研究	2.0
8	邹继超	研 究 员	动 物 所	雌激素拮抗剂抗生育作用研究	1.5
9	陈宜峰	研 究 员	南京师大	哺乳动物黄体功能的激素调节	1.0
10	陈亚雄				
10	朱正美 (李宾)	教 授	大连医学院	着床期免子宫内脱膜特异糖蛋白的纯化	1.2
11	周苏文 (邹爱民)	教 授	宣武医院	妊娠过程中入胎盘绒毛和母体血清中LHRH,NE含量的变化	0.8
12	石其贤	研 究 员	浙江医科院	精子内脱膜蛋白抗受精作用研究	1.2
13	董 伟 (周虚)	教 授	北京农业大学	外源GnRH对母猪初情期调节及作用机理的研究	1.0
14	季维智 (苟思缘)	助 研	昆明动物所	胎盘合体滋养层形成机理及天花粉蛋白特异损伤合体滋养层机理的研究	1.2
15	唐美仪	讲 师	曲阜师范大学	妊娠早期入胎盘绒毛CRF的含量、功能及其与着床关系的研究	1.0
16	程丽仁	副研究员	动 物 所	神经肽和神经递质对绒毛释放hCG的动态效应	0.8
17	周美华	教 授	上海医科大学	作用于卵巢的避孕药和其它药物对卵巢PA和PAI-1系统的影响	1.0
18	程治平 (刘佳慧)	教 授	哈 尔 滨 医科大学	酪、丝、苏氨酸促排卵机制的研究	1.0
19	刘 斌 (王清德)	教 授	北京医科大学	早孕因子对胚胎着床的影响	1.0
20	霍建章	教 授	河北医学院	附睾精子成熟期间质膜表面结构与受体变化	0.8

1991-1992年在国内外核心刊物上发表的论文目录

PUBLICATIONS

性腺(Gonads)

- (1) 刘以训 冯强, Cajander Stephen (1991): hCG 和 GnRH 诱发去垂体大鼠排卵及卵巢PA活性变化的比较研究 中国科学B辑 1:54-61
Liu Yi-xun, Feng Qiang, Cajander Stephen(1991): A Comparative Study on Involvement of tPA Activity in Ovulation Induced By hCG and GnRH Agonist in Hypophysectomized Rats. Science in China (Series B) 34 (10):1215-1224 ----- 1
- (2) Liu yi-xun, Hu Zhao-yuan, Feng Qiang, Zou Ru-jin (1991): Paradoxical Effect of A GnRH Agonist on Steroidogenesis in Cultured Monkey Granulosa Cells. Science in China (Series B) 34 (12):1452-1460 ----- 19
- (3) Liu yi-xun, Peng Xiao-Rong, Ny Tor (1991): Tissue-Specific and Time- Coordinated Hormone Regulation of Plasminogen-Activator-Inhibitor Type-1 and Tissue-Type Plasminogen Activator in the Rat Ovary During Gonadotropin-induced Ovulation. Eur.J. Biochem. 195, 549-555 ----- 28
- (4) Ohlsson Monica, Peng Xiao-rong, Liu Yi-xun, Jia Xiao-chi, Hsueh, AJW, Ny Tor (1991): Hormone Regulation of Tissue-Type Plasminogen Activator Gene Expression and Plasminogen Activator-Mediated Proteolysis. Seminars in Thrombosis and Hemostasis 17(3): 286-290 ----- 35
- (5) Ny Tor. Liu yi-xun, Ohlsson Monica, Peng Xiao-Rong, Jia Xiao-chi, Hsueh AJW (1991): Hormone Regulation of Tissue-Type Plasminogen

Activator and Plasminogen Activator Inhibitor Type-1 Gene Expression in the Ovary. In Major Advances in Human Female Reproduction. ed. by Adashi EY and Mancuso.S.M 77-84

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- (6) 刘以训 冯强 邹如金 (1991):促性腺激素诱导猕猴排卵周期中卵巢纤溶酶原激活因子与抑制因子的变化 生理学报 43(5):472-479

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