



細胞及分子生物學

Cell and Molecular Biology Programme



School of
Life Sciences
THE CHINESE UNIVERSITY OF HONG KONG

香港中文大學
生命科學學院

Programme Overview

2025-2026

Table of Content

Topics	Page
Table of Content	1
Introduction	2
Programme Learning Outcomes	3
Career Prospects	4
Curriculum	5-7
• Major and STARS requirement	5
• Minor requirement	6
• CMB Major Curriculum Diagram	7
Suggested Study Schemes	8-9
• Suggested Study Scheme for CMB Major	8
• Suggested Study Scheme for STARS	9
Course List	10-11
Contact Information	12

Cell and Molecular Biology Programme

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Background and History of the CMB Programme:

Cell and Molecular Biology is an interdisciplinary field that represents the frontiers of biology and medicine. Advances in multi-omics sequencing approaches and imaging techniques have signalled a shift in modern biology to focus on understanding the function of genes at the molecular, cellular and organismic levels.

It is in this background that our Founding Director, Prof. Wei GE, launched the Cell and Molecular Biology Programme (CMB) in 2008. As the first programme to focus on the study of molecular and cellular biology, CMB offers an integrated curriculum that provides students with a solid knowledge base in areas such as stem cell biology, neurobiology, cancer cell biology, organelle dynamics, genomics and more. CMB students receive intensive trainings in laboratory techniques, data analysis, literature search, as well as scientific writing and communication, all with the goal of preparing students for undertaking future research-related work in CMB and beyond.

CMB has attracted not only talented students of high calibre in SLS, but also faculty members of different research backgrounds, making CMB a truly multidisciplinary programme. The success of CMB has earned its reputation in the School, which is reflected by our outstanding CMB graduates who have received numerous awards, scholarships and graduate study offers from top universities around the world.

Our Mission:

- 1) To provide world-class education and training that equip students with a solid foundation of knowledge and skills for developing a career in biological and biomedical sciences;
- 2) To become an internationally recognised education centre in Hong Kong and a regional hub for cutting-edge research in cell and molecular biology;
- 3) To cultivate highly competent and competitive research scientists with strong critical thinking ability, effective communication skills and a proactive attitude to propel them in further studies.

Study Focus:

- Research methods and scientific communication
- Stem Cell Biology, Cancer Cell Biology and Neuronal Cell Biology
- Genomics, Transcriptomics & Metabolomics
- Contemporary topics in Cell Biology and Molecular Biology
- Fundamentals in Biochemistry and Genetics

Curriculum Highlights:

- Student-oriented capstone courses using a one-to-one mentoring approach
- Intensive project-based laboratory training
- An integrated programme covering cutting-edge research topics in cell and molecular biology on top of a solid knowledge base in life sciences
- Communication skills and problem-solving skills essential for further studies, career development and lifelong learning

Programme Learning Outcomes

1. Major Programme:

Upon completion of the programme, CMB students will be able to:

Knowledge outcomes:

- (1) Apply core knowledge in the fields of modern life sciences (including but not limited to cell and molecular biology, biochemistry, developmental biology, neurobiology, and bioinformatics) in a wide range of postgraduate studies and CMB-related career paths;
- (2) Possess in-depth understanding in at least one major area of CMB.

Skill outcomes:

- (1) Obtain fundamental laboratory skills applicable to major fields of modern biological and biomedical sciences, and apply them in experimental designs and problem-solving via the scientific method;
- (2) Critically analyse and interpret scientific data and discuss major issues in CMB through engagement with the scientific literature;
- (3) Communicate proficiently with the scientific community in both oral and written forms;
- (4) Identify key research questions in CMB, generate and integrate novel ideas, and formulate scientific research proposals that comply with the professional standards for grant applications in Hong Kong;
- (5) Work independently and in a team.

Values and attitudes outcomes:

- (1) Develop proactive and positive work attitudes that facilitate self-fulfillment and productivity at the workplace;
- (2) Recognize and comply with the principles of scientific integrity and research conduct, and become responsible members of the scientific community.

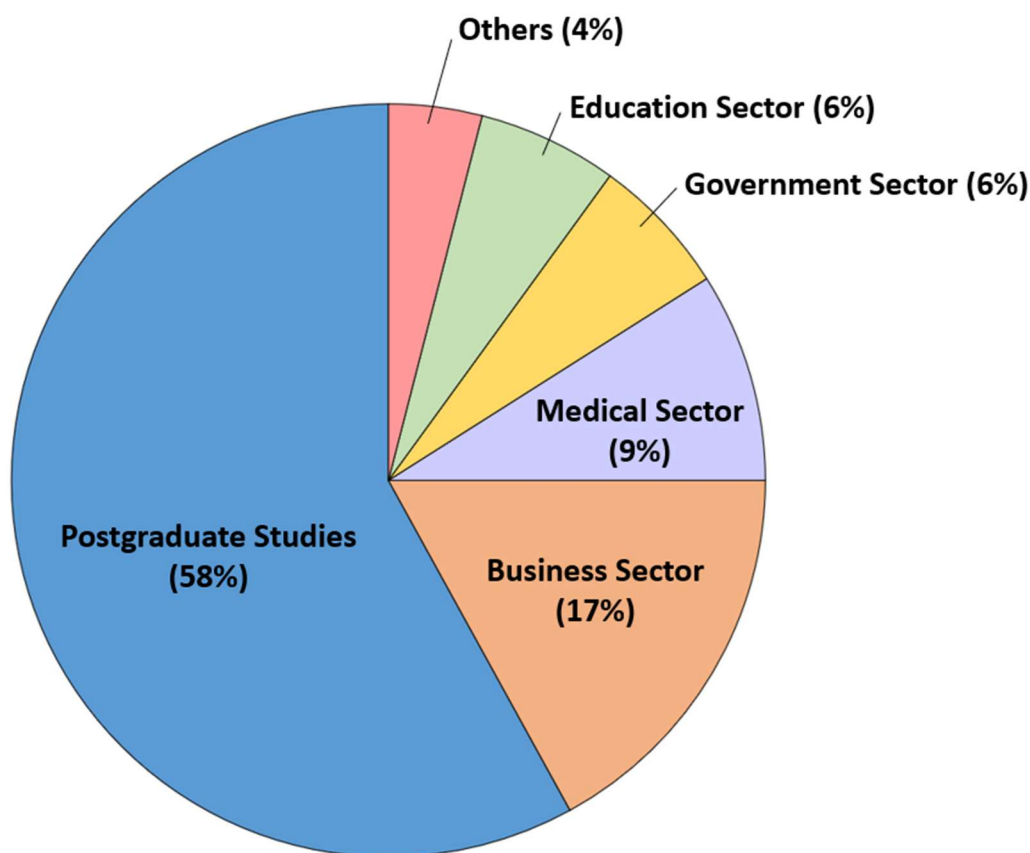
2. Minor Programme:

Upon the completion of the Minor Programme, students will have acquired basic knowledge in modern life sciences including cell and molecular biology, developmental biology, neurobiology, and bioinformatics, which facilitate further studies in modern biological and biomedical sciences or pursuing a related career.

Career Prospects

- As shown in the figure below, ~58% of our graduates pursued postgraduate studies in local or overseas universities (e.g. Master's and/or PhD), which is the highest percentage among all undergraduate programmes in SLS.
- ~17% of our graduates joined the business/commercial sector.
- About one fifth of our graduates join the medical, government and education sector.
- Others include public health, communications, legal services etc.

Career Paths of CMB Graduates (2013-2023)



Examples of study programmes undertaken by CMB Graduates:

- PhD or MPhil (CUHK/HKU/HKUST)
- PhD (Stanford, USA)
- PhD (UC Davis, USA)
- PhD (U Penn, USA)
- PhD (Cornell, USA)
- PhD (UW-Madison, USA)
- PhD (Duke University, USA)
- PhD (Cambridge, UK)
- PhD (Max Planck Institute, Germany)

Cell and Molecular Biology Programme Curriculum

CMB Major Programme Requirement

Students are required to complete a minimum of **58[a]** units of courses as follows:

	Units
1. Faculty Package: Group A: LSCI1002 Group B: CHEM1280 (preferred) or 1070 <u>Plus any 1 course</u> from the following: Group C: MATH1520 (preferred) or 1010 or 1018 Group D: (PHYS1001 or 1002) (preferred) or 1111 Group E: STAT1012 (preferred) or 1011	9
2. Major Required Courses #: BCHE2030, 3050, 3070, BIOL2120, 2313, 2410, CMBI2200, 3010, 3020, 3030, 3040, 3100 (capstone course), 3101, 3200 (capstone course), 4001, 4002, 4003, 4101, 4102, 4103, 4201, 4202, 4203, 4301, 4302, 4303	41
3. Major Elective Courses #: 8 units of courses from the following: BCHE3030, 3040, 4030, 4040, 4060, 4130, BIOL3410, 3530, 3630, 4010, 4120, BMEG2001, 2012, 3102, CMBI2500, 4901 (capstone course), 4902 (capstone course), 4903 (capstone course), LSCI1012, 2003, 3012, 3030, 3333, 4911, 4912, 4913, MBTE3510, 3550, 4320, 4510, 4520, 4530, STAT3210	8
Total: 58[a]	

All **major required courses** and all **major electives** with course code 2000 or above will be included in the calculation of **Major GPA** for honours classification.
(**Note:** LSCI1012 is the only **major elective** course with course code below 2000.)

[a] Study Option: **Berkeley Biosciences Study Abroad Programme**
Students who undergo one term of studies at the University of California, Berkeley, USA will take courses offered by the **Berkeley Biosciences Study Abroad Programme**. Units obtained from the Programme will be recognized as up to 12 units of **Major Programme** requirement. This option will be recorded on transcript.

In addition to fulfilling the above **Major Programme Requirement**, students meeting the criteria as specified by the Faculty of Science can take the following stream offered by the Faculty:

Science, Technology And Research Stream (STARS) 科研星耀專修範圍

Students are required to complete a minimum of 12 units of courses as follows:

	Units
1. Required Courses:	
(i) One Faculty Package Course: Choose from the two remaining groups of the Faculty Package that have NOT been used to fulfill the Faculty Package Requirement in CMB Major	3
(ii) Research Courses: STAR2000, 3000, 4000 [b]	6
(iii) Seminar Courses: STAR2050, 3050, 4050	3
2. Experiential Learning: At least 4 consecutive weeks of outside Hong Kong exposure [c]	---
Total:	12

[b] For **STARS**, students may select research-oriented course(s), as approved by the **Major Programme**, to substitute up to 4 units for fulfillment of Research Courses requirement.

[c] For **STARS**, students must complete any exchange/research/internship programme(s) offered by the University, Colleges, the Faculty of Science or Major Programme, as approved by the **Major Programme**, to fulfill the **Experiential Learning** requirement. Students are responsible for the extra costs incurred in the exchange/research/internship programme(s).

CMB Minor Programme Requirement

Students are required to complete a minimum of **22** units of courses **[e]**, with at least 6 units of 3000 or above level, as follows:

	Units
Required Courses: BCHE3050, BIOL2120, 2410, CMBI3101, 4001, 4002, 4003, 4101, 4102, 4103, 4201, 4202, 4203, 4301, 4302, 4303	22
Total:	22

[e] No more than 11 units of courses taken to fulfill the requirements of the students' Major Programme(s) and other Minor Programme(s) respectively can be used to fulfill the requirement of this Minor Programme.

The 4-Year CMB Curriculum

Year 1

Building Up & Standardizing Fundamental Knowledge in Science
Faculty Package Courses
 Biological Sciences + Chemistry + Mathematics/ Physics/ Statistics

Year 2

Foundation Courses in Life Sciences
 Fundamentals of Biochemistry, Cell Biology, Genetics

CMB Pre-capstone Course

Literature survey in CMB and Scientific Communication

Year 3
Year 4

CMB Core Courses

- Model Organisms in CMB Research,
- Protein Trafficking, Protein Folding, Signal Transduction,
- Cancer Cell Bio, Stem Cell Bio, Neuronal Cell Bio,
- Genomics and Transcriptomics, Proteomics, Metabolomics,
- Current Topics in Cell Bio, Molecular Bio & Biotechniques

Intensive Lab Training
 Project-based experiments

Year-3 Capstone Courses
 -Methodology of **Critical Thinking**
 -**Proposal Formulation** and **Creative Scientific Writing**

Final-Year Capstone Courses (optional)

Experimental Research Project

Suggested Study Scheme for Cell and Molecular Biology Major

	Term	Recommended Course Pattern	Units
1st Year of Attendance	Term 1	Faculty Package: <ul style="list-style-type: none"> LSCI1002 Introduction to Biological Sciences (Group A) CHEM1280 Introduction to Organic Chemistry & Biomolecules (Group B) 	3 3
	Term 2	Faculty Package: <ul style="list-style-type: none"> 1 course from Faculty Package (from Group C, D or E) 	3
2nd Year of Attendance	Term 1	Major Required: <ul style="list-style-type: none"> BCHE2030 Fundamentals of Biochemistry BIOL2120 Cell Biology 	3 3
	Term 2	Major Required: <ul style="list-style-type: none"> BCHE3050 Molecular Biology BCHE3070 Recombinant DNA Techniques BIOL2313 Genetics Laboratory BIOL2410 General Genetics CMBI2200 Literature Survey in CMB and Scientific Communication 	2 1 1 2 2
3rd Year of Attendance	Term 1	Major Required: <ul style="list-style-type: none"> CMBI3010 & 3030 CMB Laboratory I & III CMBI3100 Methodology of Critical Thinking in CMB (STOT) 	4 2
	Term 2	Major Required: <ul style="list-style-type: none"> CMBI3020 & 3040 CMB Laboratory II & IV CMBI3200 Proposal Formulation & Creative Scientific Writing (STOT) CMBI3101 Biology of Model Organisms for CMB Research 	4 2 3
	Summer Term	Major Elective(s): <ul style="list-style-type: none"> CMBI4901 Senior Experimental Project I 	2
4th Year of Attendance	Term 1	Major Required: <ul style="list-style-type: none"> CMBI4001 Protein Trafficking CMBI4002 Protein Folding CMBI4003 Signal Transduction CMBI4201 Genomics & Transcriptomics CMBI4202 Proteomics CMBI4203 Metabolomics Major Elective(s): <ul style="list-style-type: none"> CMBI4902 Senior Experimental Project II 	1 1 1 1 1 1 2
	Term 2	Major Required: <ul style="list-style-type: none"> CMBI4101 Cancer Cell Biology CMBI4102 Stem Cell Biology CMBI4103 Neuronal Cell Biology CMBI4301 Current Topics in Cell Biology CMBI4302 Current Topics in Molecular Biology CMBI4303 Current Topics in Biotechniques Major Elective(s): <ul style="list-style-type: none"> CMBI4903 Senior Experimental Project III 1-2 courses from the Major Electives list (acquire at least 2 units) 	1 1 1 1 1 1 2 ≥2
Total (including Faculty Package): (Required to complete a minimum of 58 units)			≥58

Suggested Study Scheme for CMB – Science, Technology And Research Stream (STARS)

	Term	Recommended Course Pattern	Units
1st Year of Attendance	Term 1	Faculty Package: <ul style="list-style-type: none"> LSCI1002 Introduction to Biological Sciences (Group A) CHEM1280 Introduction to Organic Chemistry & Biomolecules (Group B) 	3 3
	Term 2	Faculty Package: <ul style="list-style-type: none"> 2 courses from Faculty Package (from 2 different groups out of Group C, D or E) Major Elective(s): <ul style="list-style-type: none"> STAR2050 Seminar I 	6 0-1
	Summer Term	Summer session: <ul style="list-style-type: none"> STAR2050 Seminar I (if not taken in T2) 	0-1
2nd Year of Attendance	Term 1	Major Required: <ul style="list-style-type: none"> BCHE2030 Fundamentals of Biochemistry BIOL2120 Cell Biology Major Elective(s): <ul style="list-style-type: none"> STAR2000 Undergraduate Research in Science I OR STAR3050 Seminar II 	3 3 1 or 1
	Term 2	Major Required: <ul style="list-style-type: none"> BCHE3050 Molecular Biology BCHE3070 Recombinant DNA Techniques BIOL2313 Genetics Laboratory BIOL2410 General Genetics CMBI2200 Literature Survey in CMB and Scientific Communication Major Elective(s): <ul style="list-style-type: none"> STAR2000 Undergraduate Research in Science I (if not taken in T1) OR STAR3050 Seminar II (if not taken in T1) 	2 1 1 2 2 1 or 1
3rd Year of Attendance	Term 1	Major Required: <ul style="list-style-type: none"> CMBI3010 & 3030 CMB Laboratory I & III CMBI3100 Methodology of Critical Thinking in CMB (STOT) Major Elective(s): <ul style="list-style-type: none"> STAR3000 Undergraduate Research in Science II OR STAR4050 Seminar III 	4 2 2 or 1
	Term 2	Major Required: <ul style="list-style-type: none"> CMBI3020 & 3040 CMB Laboratory II & IV CMBI3200 Proposal Formulation & Creative Scientific Writing (STOT) CMBI3101 Biology of Model Organisms for CMB Research Major Elective(s): <ul style="list-style-type: none"> STAR3000 Undergraduate Research in Science II (if not taken in T1) OR STAR4050 Seminar III (if not taken in T1) 	4 2 3 2 or 1
	Summer Term	Major Elective(s): <ul style="list-style-type: none"> CMBI4901 Senior Experimental Project I 	2
4th Year of Attendance	Term 1	Major Required: <ul style="list-style-type: none"> CMBI4001 Protein Trafficking CMBI4002 Protein Folding CMBI4003 Signal Transduction CMBI4201 Genomics & Transcriptomics CMBI4202 Proteomics CMBI4203 Metabolomics Major Elective(s): <ul style="list-style-type: none"> CMBI4902[@] Senior Experimental Project II 	1 1 1 1 1 1 2
	Term 2	Major Required: <ul style="list-style-type: none"> CMBI4101 Cancer Cell Biology CMBI4102 Stem Cell Biology CMBI4103 Neuronal Cell Biology CMBI4301 Current Topics in Cell Biology CMBI4302 Current Topics in Molecular Biology CMBI4303 Current Topics in Biotechniques Major Elective(s): <ul style="list-style-type: none"> CMBI4903[@] Senior Experimental Project III 1-2 courses from the Major Electives list (acquire at least 2 units) 	1 1 1 1 1 1 2 ≥2
Total (including Faculty Package):			≥67

[@] Students may take CMBI4902 and 4903 as a substitute for STAR4000 Undergraduate Research in Science III.

Course List

Faculty Package:

Course Code	Course Name	Unit(s)	Term	Course Convenor [†]
LSCI1002	Introduction to Biological Sciences	3	T1 & T2	Prof. KB Wong (T1) Prof. Faye Tsang (T2)
CHEM1280	Introduction to Organic Chemistry & Biomolecules	3	T1 & T2	Prof. J Xia (T1) Prof. YY Yeung (T2)

Major Required (courses offered and shared by other programmes under SLS):

BCHE2030	Fundamentals of Biochemistry	3	T1	Prof. Shannon Au
BCHE3050	Molecular Biology	2	T2	Prof. PC Shaw
BCHE3070	Recombinant DNA Techniques	1	T2	Prof. PC Shaw
BIOL2120	Cell Biology	3	T1	Dr. Lawrence Chiu
BIOL2313	Genetics Laboratory	1	T2	Dr. Henry So
BIOL2410	General Genetics	2	T2	Prof. Diane Guo

Major Required (courses offered by CMB):

CMBI2200	Literature Survey in CMB and Scientific Communication	2	T2	Dr. Alex Koon
CMBI3010	CMB Laboratory I	3	T1	Dr. Alex Koon
CMBI3020	CMB Laboratory II	3	T1	Dr. Alex Koon
CMBI3030	CMB Laboratory III	1	T2	Dr. Alex Koon
CMBI3040	CMB Laboratory IV	1	T2	Dr. Alex Koon
CMBI3100	Methodology of Critical Thinking in CMB (Capstone Course)	2	T1	Dr. Alex Koon
CMBI3101	Biology of Model Organisms for CMB Research	3	T2	Prof. KM Kwan
CMBI3200	Proposal Formulation and Creative Scientific Writing in CMB (Capstone Course)	2	T2	Dr. Alex Koon
CMBI4001	Protein Trafficking	1	T1	Prof. XH Zhuang
CMBI4002	Protein Folding	1	T1	Prof. KB Wong
CMBI4003	Signal Transduction	1	T1	Prof. BH Kang
CMBI4101	Cancer Cell Biology	1	T2	Prof. Jacky Ngo
CMBI4102	Stem Cell Biology	1	T2	Prof. Faye Tsang
CMBI4103	Neuronal Cell Biology	1	T2	Prof. KM Kwan
CMBI4201	Genomics and Transcriptomics	1	T1	Prof. TF Chan
CMBI4202	Proteomics	1	T1	Prof. S Zhong
CMBI4203	Metabolomics	1	T1	Prof. Diane Guo
CMBI4301	Current Topics in Cell Biology	1	T2	Prof. XH Zhuang
CMBI4302	Current Topics in Molecular Biology	1	T2	Prof. KF Lau
CMBI4303	Current Topics in Biotechniques	1	T2	Prof. BH Kang

Major Electives (Capstone Courses):

CMBI4901	Senior Experimental Project I	2	Summer	Prof. TF Chan
CMBI4902	Senior Experimental Project II	2	T1	Prof. TF Chan
CMBI4903	Senior Experimental Project III	2	T2	Prof. TF Chan
LSCI4911	Group Research in Life Sciences I	2	Summer	Prof. TF Chan
LSCI4912	Group Research in Life Sciences II	2	T1	Prof. TF Chan
LSCI4913	Group Research in Life Sciences III	2	T2	Prof. TF Chan

Major Electives:

Term 1:				
LSCI2003	Scientific Conduct and Ethics	2	T1	Prof. Michael Chan
BCHE3040	Proteins and Enzymes	3	T1	Prof. WP Fong
BCHE4040	Aspects of Neuroscience	3	T1	Prof. KF Lau
BCHE4060	Basic and Applied Immunology	3	T1	Dr. Alex Koon
BIOL3410	General Microbiology	3	T1	Prof. HW Luo
BIOL3630	Animal Physiology	3	T1	Ms. May Yam
BIOL4010	Evolutionary Biology	3	T1	Prof. Michael Pittman
BIOL4120	Developmental Biology	3	T1	Prof. KM Kwan
BMEG2001	Introduction to Biomedical Engineering	1	T1	Prof. Jonathan Choi
CMBI2500	Research Internship	2	T1	Dr. Alex Koon
MBTE3510	Medical Biotechnology	1	T1	Dr. Nina Siow
MBTE3550	Biotechnology for Environment and Sustainability	1	T1	Prof. Martin Tsui
MBTE4320	Genetic Engineering	3	T1	Prof. HM Lam
MBTE4510	Plant Biotechnology	3	T1	Prof. S Zhong
Term 2:				
LSCI1012	Introduction to Life Forms in the Biosphere	3	T2	Prof. Jerome Hui
BCHE3030	Methods in Biochemistry	3	T2	Prof. Shannon Au
BCHE4030	Clinical Biochemistry	3	T2	Dr. FH Lo
BCHE4130	Molecular Endocrinology	3	T2	Dr. FH Lo
BIOL3530	Plant Physiology	3	T2	Prof. JX He
BMEG2012	Biomedical Engineering Laboratory	2	T2	Prof. L Duan Prof. HP Ho
BMEG3102	Bioinformatics	3	T2	Prof. DOU Qi
MBTE4520	Animal Biotechnology	3	T2	Prof. Edwin Chan
MBTE4530	Microbial Biotechnology	3	T2	Prof. KB Wong
STAT3210	Statistical Techniques in Life Sciences	3	T2	Dr. Isaac Leung
Summer Term:				
LSCI3012	Practical Bioinformatics for Life Sciences	2	Summer	Prof. TF Chan
LSCI3030	Structural Biology	2	Summer	Prof. KB Wong
LSCI3333	Introductory Live-Cell Imaging: Applications and Analyses	2	Summer	Dr. Alex Koon

STARS Courses:

STAR2000	Undergraduate Research in Science I	1	T1/T2	
STAR2050	Seminar I	1	T2/ summer	
STAR3000	Undergraduate Research in Science II	2	T1/T2	
STAR3050	Seminar II	1	T1/T2	
STAR4000	Undergraduate Research in Science III	3	T1/T2	
STAR4050	Seminar III	1	T1/T2	

† **Course Convenors** are subjected to changes. Please visit CUSIS for the most up-to-date information.

CMB Contact Information

Website: <https://www.sls.cuhk.edu.hk/index.php/cmbi>

Introductory Video: http://www.sls.cuhk.edu.hk/sls_media/cmbi/videos/CMBI_FinalVersion-pc.mp4

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