



# **MCB 110**

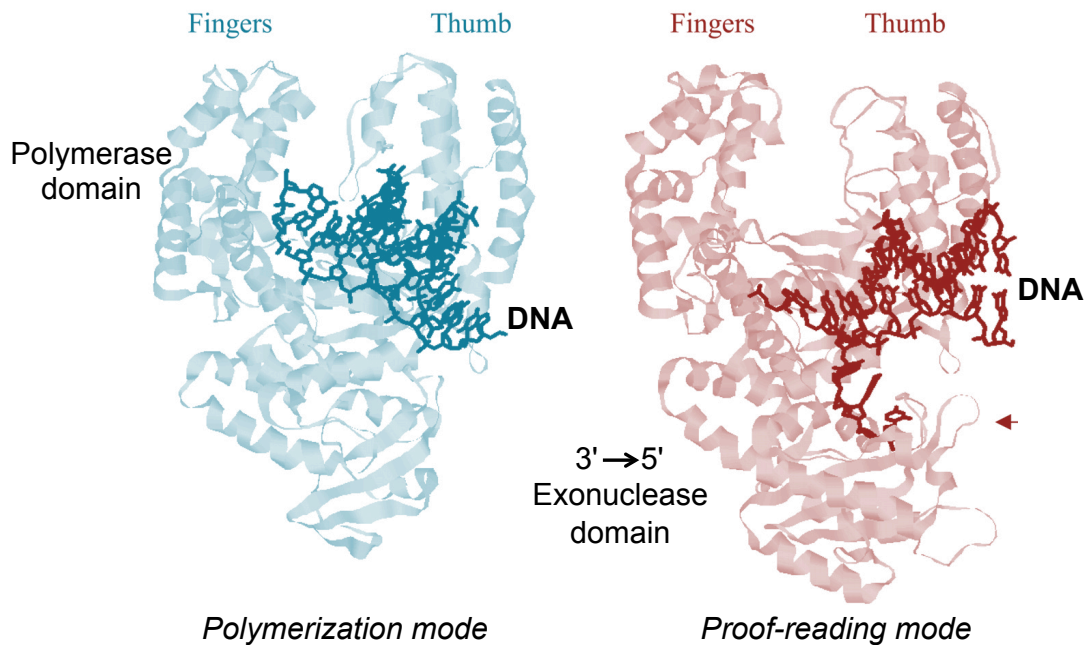
**"Molecular Biology: Macromolecular  
Synthesis and Cellular Function"**

**Spring, 2018**

**Faculty Instructors: Prof. Jeremy Thorner  
Prof. Qiang Zhou  
Prof. Eva Nogales**

**GSI: Ms. Samantha Fernandez  
Mr. Christopher Duncan-Lewis**

## *Escherichia coli* DNA polymerase I [Klenow fragment]



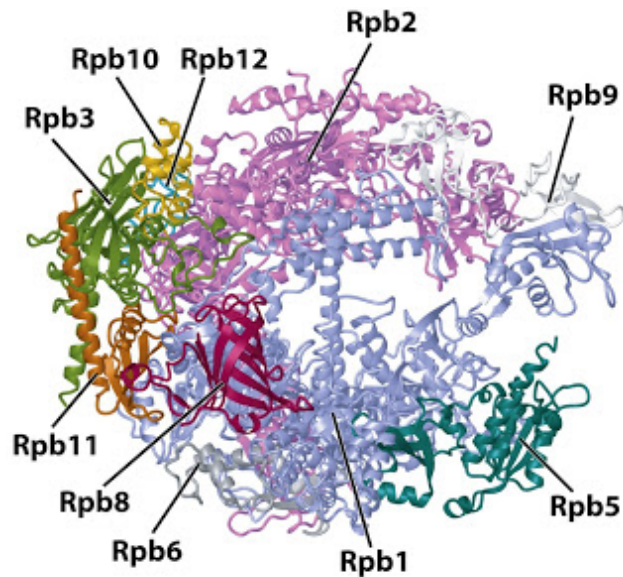
# MCB 110 - Part I - Spring, 2018

## Instructor: Prof. Jeremy Thorner

Week	Day	Date	Topic	Reading*
1	M	01/15	No class (Martin Luther King Jr. Holiday) - PREPARE	Ch1, Ch2 & Ch3
	W	01/17	Nucleic acid chemistry & protein-DNA recognition	Ch2
	F	01/19	Chromosomes: Packing and topological constraints	Ch4
2	M	01/22	DNA replication: DNA polymerases	Ch6
	W	01/24	The replication fork: Leading and lagging strands	Ch6
	F	01/26	Replication factors: Unwinding, protection, & priming	Ch6
3	M	01/29	Replications factors: Processivity, progression, & ligation	Ch6
	W	01/31	Origins and the initiation of DNA replication	Ch6
	F	02/02	Cell cycle control and the regulation of origin firing	Ch5 & Ch6
4	M	02/05	Telomeres and telomerase	Ch6
	W	02/07	DNA damage and its repair	Ch15
	F	02/09	DNA end-joining & homologous recombination	Ch16
5	G	02/12	Mobile genetic elements & their transposition	Ch17
	W	02/14	Mechanistic basis of adaptive immunity	Ch17
	F	02/16	Genome engineering and DNA editing	Ch19
6	M	02/19	No class (Presidents Day Holiday)	
	Tu	02/20	<b>EXAM #1 (7 - 9:30 PM) - Rooms TBA</b>	

\*All assigned reading is in Craig NL *et al.* (2014)  
*Molecular Biology: Principles of Gene Function*, 2<sup>nd</sup> Edition

## ***Saccharomyces cerevisiae* RNA polymerase II**



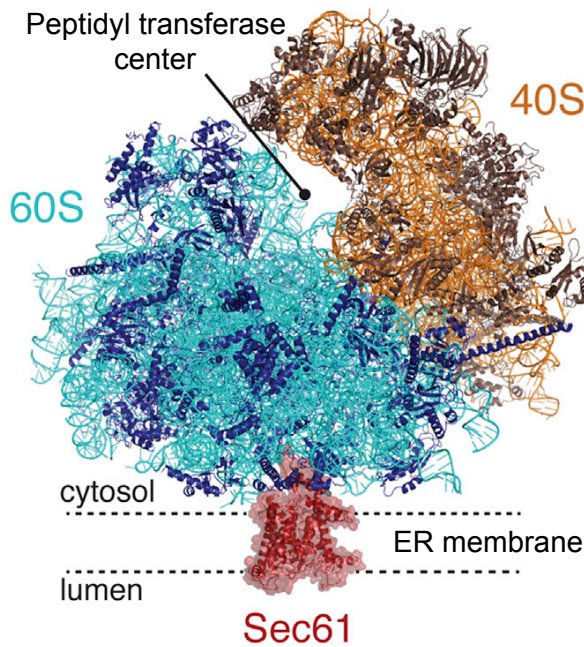
## **MCB 110 - Part II – Spring, 2018**

**Instructor: Prof. Qiang Zhou**

Week	Day	Date	Topic	Reading*
6	W	02/21	Prokaryotic transcription: promoters & RNA polymerase	Ch 8: p296-327
	F	02/23	Regulation of transcription in prokaryotes	Ch 9: p340-5; 352-5
7	M	02/26	Eukaryotic transcription apparatus & methods for analyzing individual and global gene transcription, Part I	Ch 8: p296-327
	W	02/28	Eukaryotic transcription apparatus & methods for analyzing individual and global gene transcription, Part II	Ch 8: p296-327
	F	03/02	Regulation of transcription in eukaryotes: chromatin & its impact on transcription, Part I	Ch 9: p330-40
8	M	03/05	Regulation of transcription in eukaryotes: chromatin & its impact on transcription, Part II	Ch 9: p330-40
	W	03/07	Regulation of transcription in eukaryotes: polymerase pausing & elongation	Ch 8: p319-23
	F	03/09	Regulation of transcription in eukaryotes: interpreting & integrating upstream signals	Ch 9: p360-5
9	M	03/12	mRNA processing: capping & polyadenylation	Ch10: p385-8
	W	03/14	mRNA processing: mechanism & control of splicing, Part I	Ch10: p388-405
	F	03/16	mRNA processing: mechanism & control of splicing, Part II	Ch10: p388-405
10	M	03/19	RNA interference & RNA degradation, Part I	Ch10: p410-5
	W	03/21	RNA interference & RNA degradation, Part II	Ch10: p410-5
	Th	11/02	<b>EXAM #2 (7 - 9:30 PM) - Rooms TBA</b>	—

\*Reading is in Craig NL et al. (2014) *Molecular Biology: Principles of Gene Function*, 2nd Ed.

## Mammalian Ribosome-Translocon Complex



# MCB 110 - Part III – Spring, 2018

## Instructor: Prof. Eva Nogales

Week	Day	Date	Topic	Reading*
10	F	03/23	Introduction to protein synthesis & the ribosome	Ch11 (but not 11.13)
11	M	03/26	No class (Spring Break Week)	—
	W	03/28	No class (Spring Break Week)	—
	F	03/30	No class (Spring Break Week)	—
12	M	04/02	tRNAs, AA-tRNA synthetases & translation factors	Ch11
	W	04/04	Initiation of translation in prokaryotes and eukaryotes	Ch11 & Ch12
	F	04/06	Translation elongation, termination & ribosome recycling	Ch11
13	M	04/09	Regulation of translation	Ch11 & Ch12
	W	04/11	Co- & post-translational protein folding	Ch14
	F	04/13	Post-translational protein cleavage & modification	Ch14
14	M	04/16	Protein degradation: ubiquitylation & the proteasome	Ch14
	W	04/18	Protein targeting to organelles and the nucleus	R-Lod. Ch13
	F	04/20	Synthesis of secretory & membrane proteins	R-Lod. Ch13
15	M	04/23	Methods for studying membrane biology	R-Lod. Ch14
	W	04/25	Vesicle budding, targeting & fusion in exocytosis	R-Alb. Ch12 & Ch13
	F	04/26	Endocytosis & lysosomes	R-Lod. & R-Alb.
RRR	M	04/30	—	
	W	05/02	—	
	F	05/04	GSI-led Review Session	
Finals	Tu	05/08	<b>EXAM #3 (3 - 6 PM)</b>	Good luck!

\*Reading is in Craig NL *et al.* (2014) *Molecular Biology: Principles of Gene Function*, 2nd Ed. and/or the Reader (material from Lodish *et al.* and/or Alberts *et al.*), as indicated.

# SUMMARY OF EXAM DATES, PLACES & TIMES

## EXAM #1 (Thorner):

TUESDAY, 20 February 2018, 7 – 9:30 PM  
2040 VLSB & 159 Mulford,

Students assigned to rooms alphabetically by last name.

## EXAM #2 (Zhou):

THURSDAY, 22 March 2018, 7 – 9:30 PM  
Rooms???

Students assigned to rooms alphabetically by last name.

## EXAM #3 (Nogales):

TUESDAY, 8 May 2018, 3 – 6 PM  
Room(s) to be announced prior to Finals Week.

*Any DSP student will be notified individually  
about her / his accommodation.*



## Basis of Assessing Student Performance in MCB 110

Three Exams (100 points each) =	300 pts.
Five (out of Six) Quizzes (6 points each) =	30 pts.
Disc. Session Attendance & Participation =	3 pts.
<u>TOTAL =</u>	<u>333 pts.</u>