

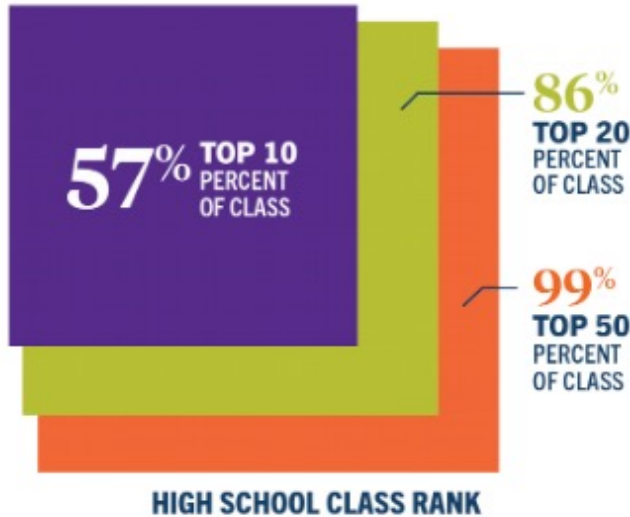
# Incorporating Study Strategies in Your Class for Improved Student Success

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Michael Sehorn

# Clemson Students

## 2023 FIRST-YEAR PROFILE



**60,122**  
APPLIED



**22,879**  
ACCEPTED



**4,494**  
ENROLLED

**SAT: 1240-1400**

MIDDLE 50% OF SAT SCORES

**ACT: 28-32**

MIDDLE 50% OF ACT SCORES

# First year students

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Most Clemson students did not have to study hard in high school to get good grades.

*There are exceptions eg. Governor's School*

# The high school study strategy

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- They used study guides provided by teachers.
- They don't know how to take notes.
- They start the study process too late.

Yet, they still get good grades.

# The high school study strategy at Clemson

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- Many students are surprised by their first test score.
- Like any good Clemson student, they adapt.
- Still get a good grade.

# The high school study strategy at Clemson

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Transfer students and especially first-generation students struggle.

# Biochemistry students

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- Type A ++
- They are hyper-focused on their GPA.
- They have numerous extracurricular activities.
- They struggle when they are not perfect.
- They can be toxic.

# Biochemistry students

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- 15-20% want to attend graduate school.
- ~90% of the students will attend graduate school.



# Biochemistry students

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- 50-60% want to go to medical school.
- ~85 of the students will go to medical school.

# BCHM 4360: Genes to Proteins

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- Designed to prepare students for medical school and graduate school.
- The bonus is they learn biochemistry and molecular biology which helps for the MCAT.

# Preconceived notions

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# Preconceived notions

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- Dr. Sehorn is scary.
- Dr. Sehorn is mean.
- Dr. Sehorn is never available to meet.
- Dr. Sehorn's class is hard.
- Dr. Sehorn's class is a lot of work.

# Experience

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## Teaching & Research in . . .

- Biochemistry
- Analytical Instrumentation
- Biotechnology
- Biophysics
- Molecular Biology



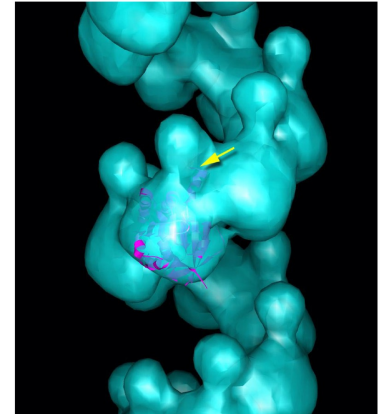
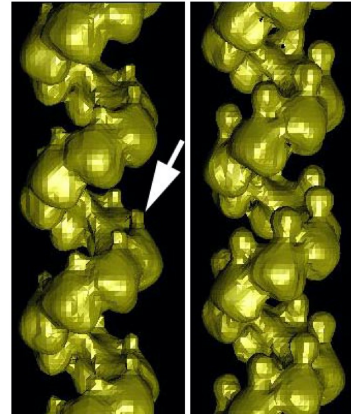
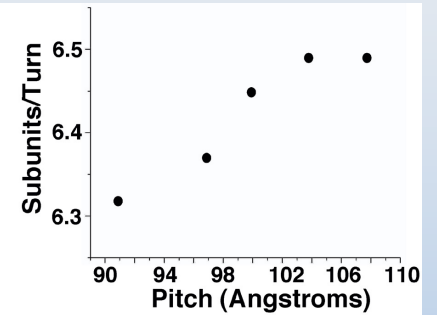
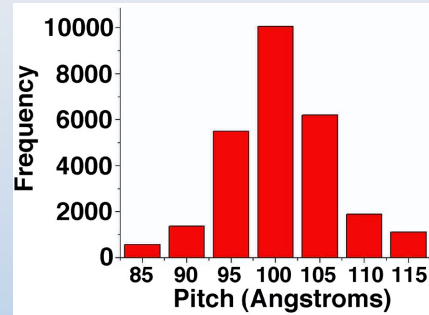
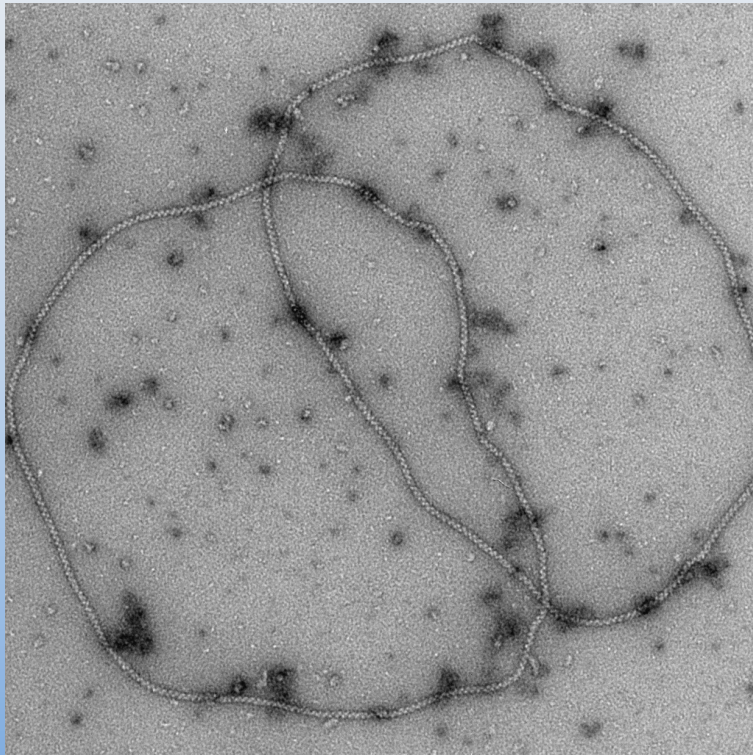
# Homologous Recombination and DNA Double Strand Break Repair

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- Unrepaired DSBs are catastrophic
  - Aneuploidies
  - Cancer
  - Cell death
- Cells have DNA DSB repair pathways
  - Non-homologous End Joining
  - Homologous recombination
- Homologous recombination is error-free pathway



# Human Dmc1 nucleoprotein filament



# Students are informed on what is to come

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## Exam Format

- ~20 True-False questions
- ~15 Multiple Choice, Multiple-Multiple Choice questions
- Boat load of Free Response (short answer and essay)
  - The student will be responsible for understanding and being able to discuss and answer questions based on multiple research articles.
  - The student should make sure they devote substantial time studying the research articles to do well on exams.
  - Moderate to difficult
  - Based on multiple levels of understanding.

**Hint:** 3 - 5 days before an exam is not adequate to read, understand and hardwire the information in the research articles.

**I can assure you this course will challenge you.**

**How do you improve your chances of doing well?**

# Come to Class

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- Higher attendance means higher grades.
- PowerPoints have most, but not all material.
- Some “have-to-know” hints given.
- Attendance will be randomly taken.

# Make “Good” Notes

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- “Good note-takers” score 45% points better than “bad note-takers”.
- “Taking Notes”  $\neq$  “Making Notes”.
- Powerpoints can give false sense of security.
  - Is note-taking really necessary?
  - Organization may not be appropriate for your style of studying & learning.
  - Do not promote “higher level” synthesis & learning.
- Take notes w/o powerpoints, then integrate?

# Start Studying Early

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- Before class?
- Right after class – often the best.
- Information is still “fresh”.
- Can (& should) fill in additional comments not in PowerPoint's.



# Study Adequately & Regularly

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*"I studied for 36 hours straight but still did poorly on the exam".*

- 3 Hours (minimum) for each hour of class time.
- Return to earlier materials often.
- Synthesize, integrate & relate.

# Comprehension Quizzes

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- Please do the daily quiz all by yourself as it is a low stakes assignment designed to provide you feedback on how you are doing with your studying.
- The goal is to let Dr. Sehorn not only know what material was understood, but more importantly, the material that was confusing.
- This will guide Dr. Sehorn to help clarify any confusion. Ultimately, the goal is to improve the performance on the exams.

# New for this semester!

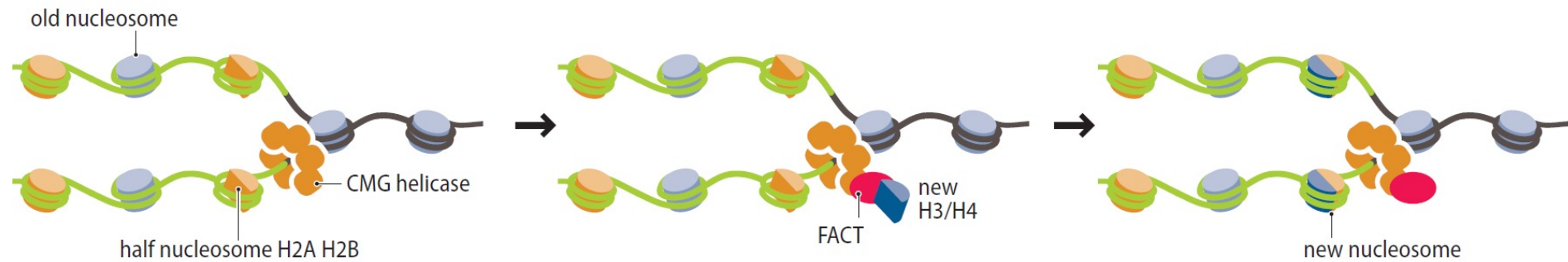
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Try not to be too excited.....

# New for this semester!

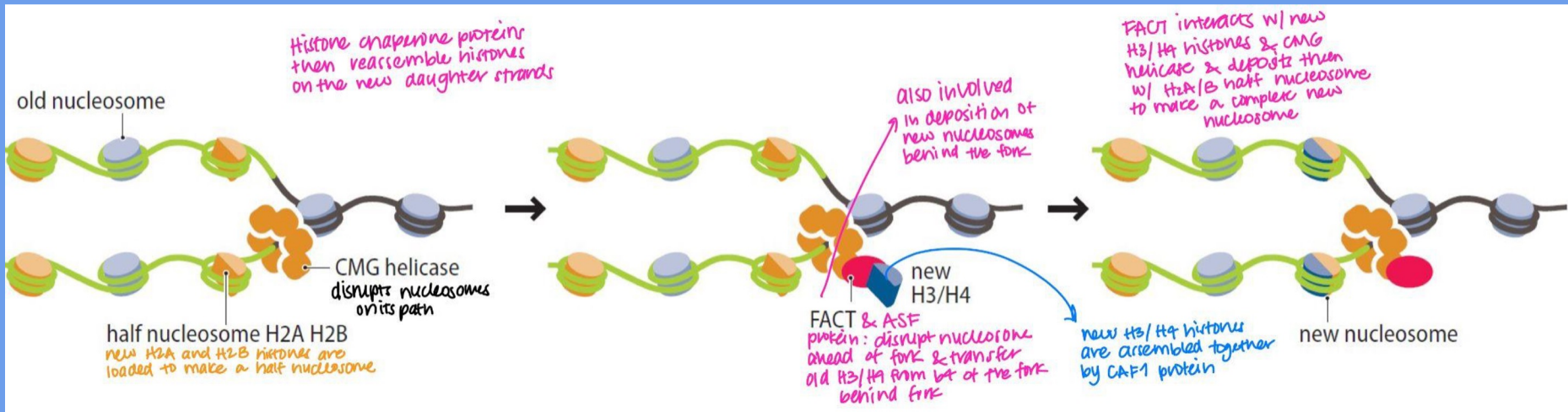
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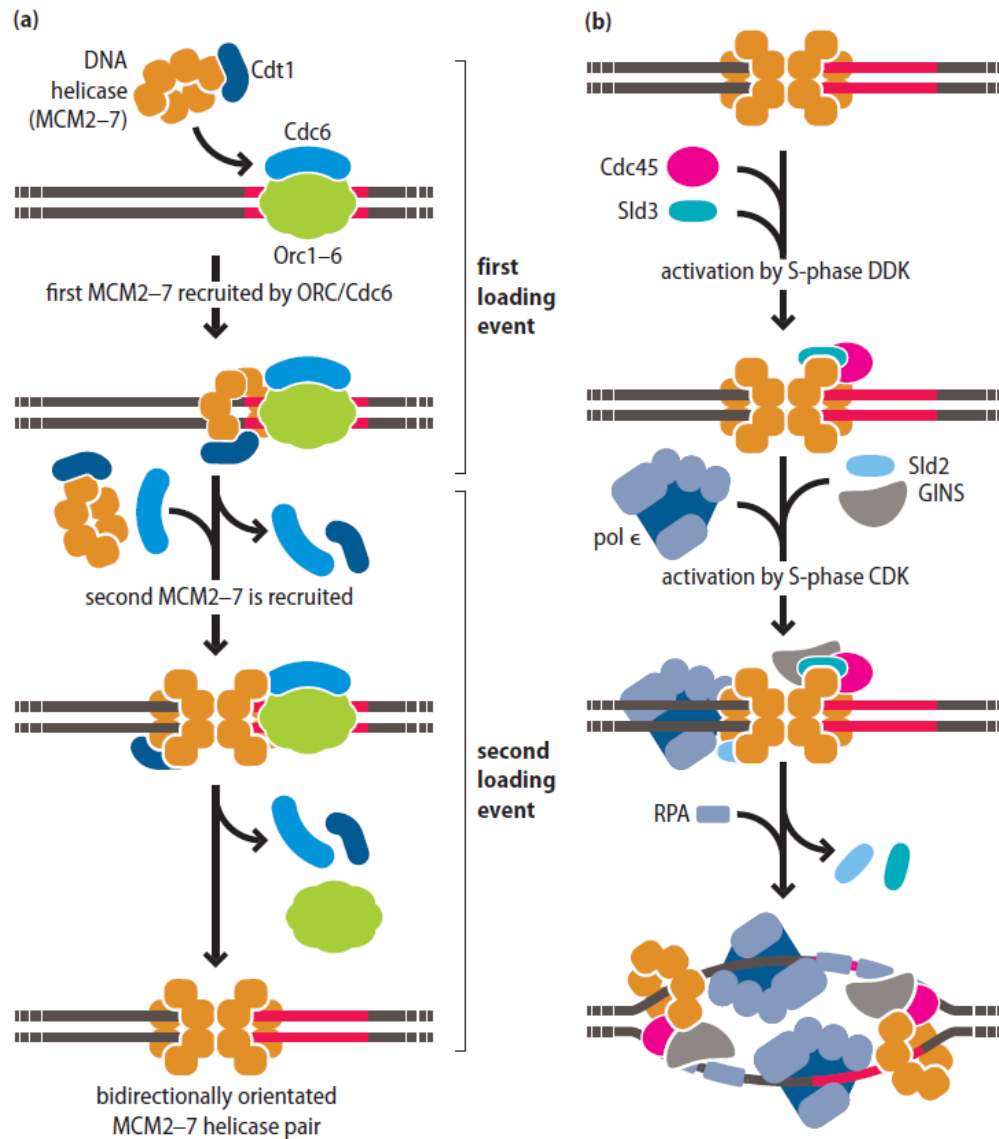
Each person will remake Chapter 4 and Chapter 6 powerpoint slide shows to make them functional. Creativity is encouraged, such as drawing using an iPad etc.



- CMG helicase at the replication fork disrupts nucleosomes in its path
- Histone chaperone proteins then re-assemble histones on the new daughter strands
- The histone chaperone FACT, along with ASF protein, helps to disrupt the nucleosome ahead of the fork and transfer the old H3/H4 from before of the fork to behind the fork
- FACT is also involved in deposition of new nucleosomes behind the fork
- New H2A and H2B histones are loaded to make a half nucleosome, and new H3/H4 histones are assembled together by CAF1 protein (see next figure)
- FACT then interacts with the new H3/H4 histones and CMG helicase and deposits them with the H2A/H2B half nucleosome to make a complete new nucleosome

# Replicating through Chromatin



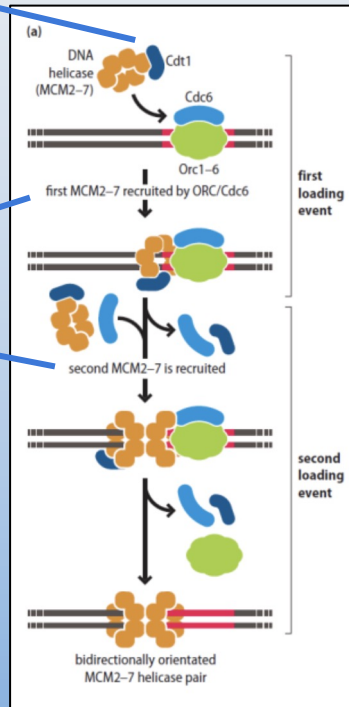


- Origin unwinding in eukaryotes is very different to bacteria
- The ORC recruits Cdc6 and Cdt1 proteins
- These sequentially load two ring-shaped MCM2-7 hexamers in a head-to-head orientation
- The ORC dissociates once the MCM2-7 pair is loaded
- The MCM2-7 pair is then activated by accessory proteins such as Cdc45
- Other proteins are loaded, including polymerase, and then the full helicase complex (called CMG) can be activated by phosphorylation to unwind DNA and start replication

# Initiation in Eukaryotes

ORC recruits Cdc6 and Cdt1

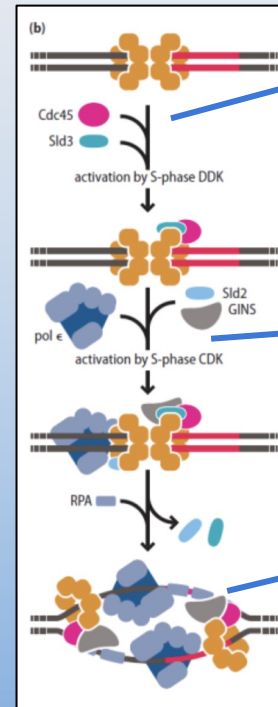
These proteins load, head-to-head, two ring-shaped MCM2-7 hexamers, causing ORC to dissociate



Accessory proteins (like Cdc45) then activate the MCM2-7 pair

Polymerase and other proteins are loaded, forming the complete helicase complex known as CMG

This can then be activated by phosphorylation, unwinding the DNA and initiating replication





# Powerpoint Slides 2.0

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- Each student uploads their own individual Chapter revised/modified powerpoints to Canvas the night before class.
- During class students will form groups of 3-4 people.
- The group will review each group member's modified/revised powerpoint show and create a single group powerpoint slide show that incorporates the best parts of each individual group member's powerpoint slideshow covering all the material in the Chapter.
- The group will select one person to upload the collaborative powerpoint to Canvas with each group members name attached to it.

# What do I get for this extra effort?

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Besides a better understanding of the material that will undoubtedly result in a high score on your exam?

# Bonus points!

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- Each person that uploads an individual powerpoint that they revised/modified/created to Canvas, will get 3 bonus points added to their Exam 1 score.
- Each member of the group that uploads the collaborative powerpoint slide show to Canvas will get 2 points added to their Exam 1 score.

# Reflection for Exam 1

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- What they thought about the extra work.
- Do they think it helped them?
- Would they do it for exam two?
- What would they do differently?

After they were done with the reflection, I revealed that their scores on Exam 1 were 17 points higher than every previous class without the 5 points of bonus added.

I told them I was impressed and they should be proud of the effort they put in.

# Skip ahead to the final exam

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- The average on the final exam was 15 points higher than any previous year.
- The average number of points students earned on the 60 free response question that covered all the information through the semester was 57.

# Skip ahead to the final exam

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- The number of students earning an A increased from 35% to 50%.

*I let my Chair know that there was a possibility my class would have more As than usual.*

- Students that took the MCAT after the class reported significant increases in their score for the biochemistry section.

# Next time

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- I won't restrict it to just a revised powerpoint.