Cancer 3

- iClicker 32A
- Mutations
  - Benzo(a)pyrene
  - Ras
  - p53
- Inherited cancer risk
- iClicker 32B

- Due in Lab this week
  - Lab report #10
  - Pre-lab #11

- Register your iClicker!
- Grades are locked Dec. 15th

Office hours today
2-3

Exam 3 Results
average = 60
A 72 - 100
B 62 - 71
C 53 - 61
D 44 - 52
F 0 - 43

Final Exam - Comprehensive

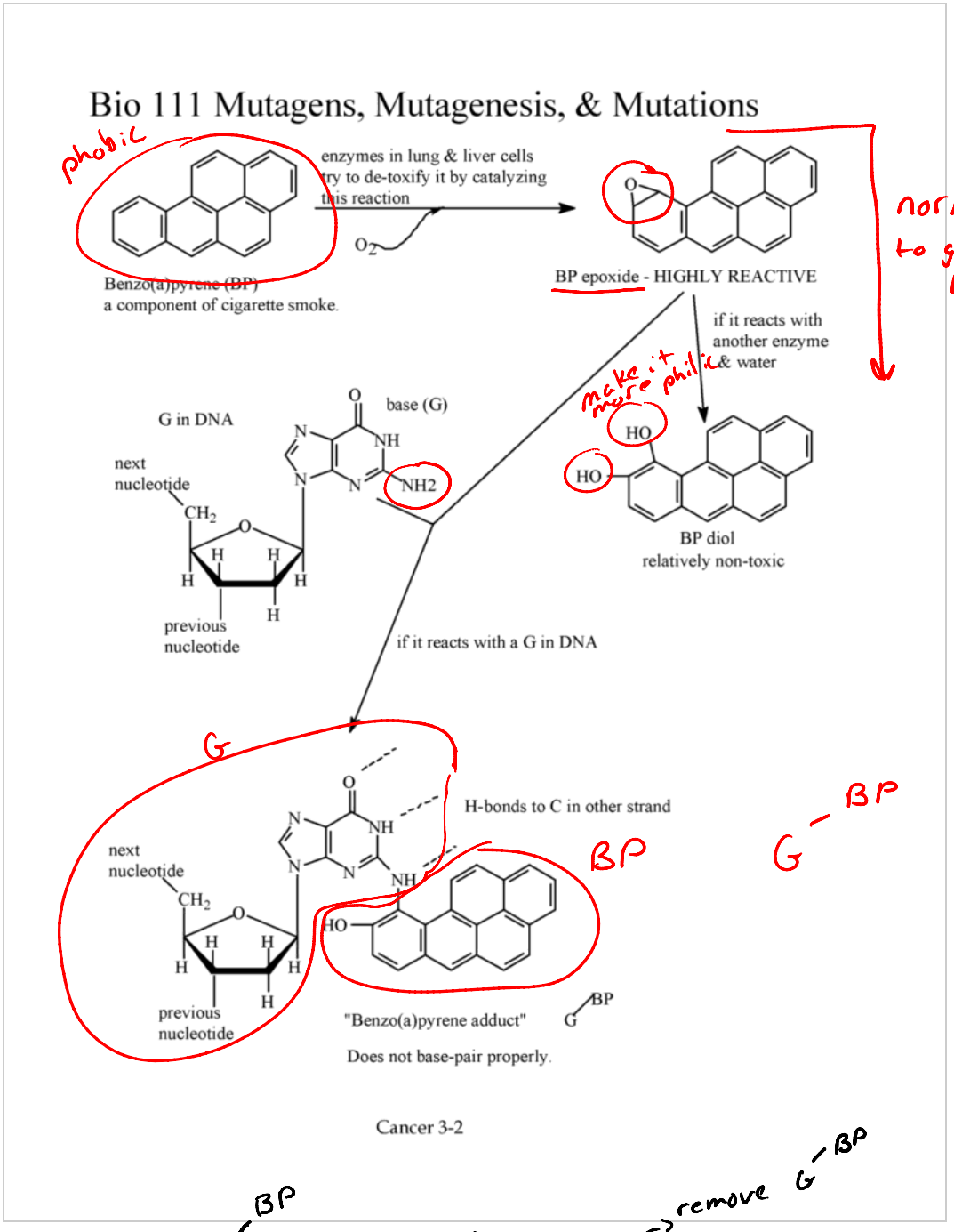
- Dec 16th (Wed)
- 11:30-2:30
- Last name A-E in McCormick Cafe
- Last name F-Z here in Lipke
- Study your exams!

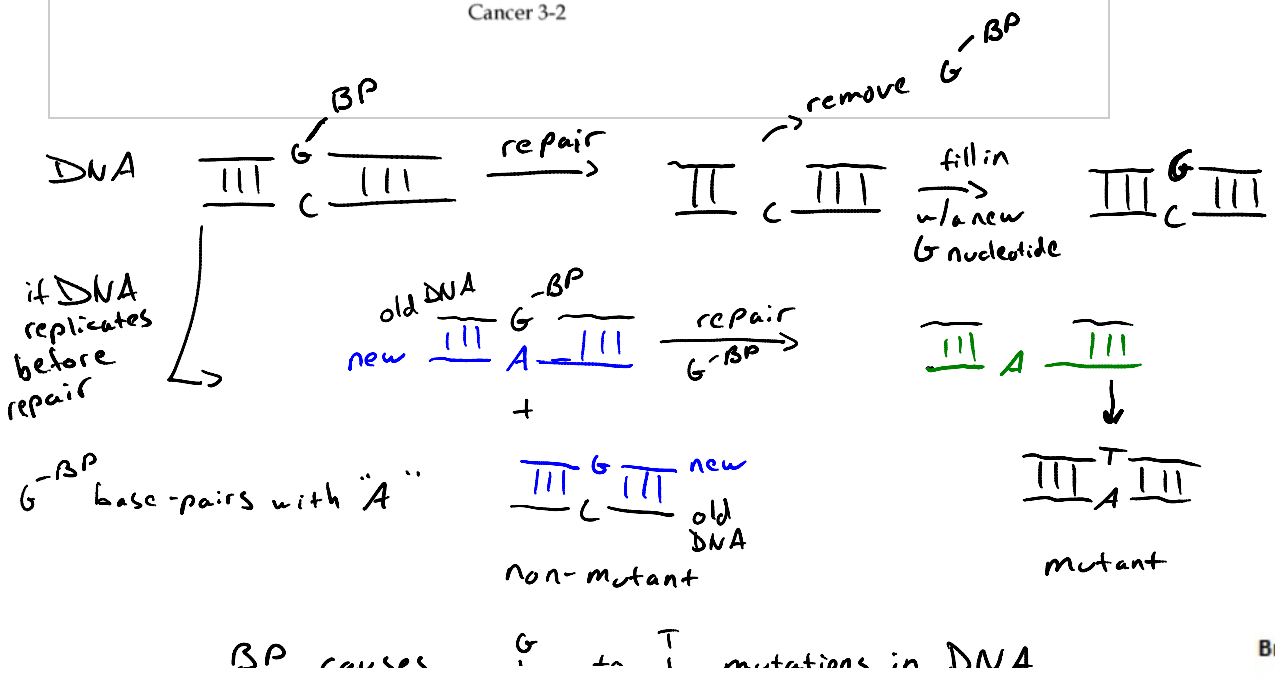
Mutations

- changes in DNA sequence (random)
  - background → grow older, heal wounds etc. DNA polymerase mistakes
  - due to mutagens = chemicals / radiation that

increase your mutation rate

ex. benzo(a)pyrene (BP)
- found in cigarette smoke





BP causes G/C to T/A mutations in DNA

BP mutations

① most of the time no consequences
- 90% of human genome is "space" between genes
  → mutation has no effect

- if a mutation has an effect in an essential gene to make the protein inactive, there is a backup copy from the other allele

- many genes are not needed in every cell

② if we mutate one copy of the Ras gene at a specific location

codon 12 G → T

— GGC — (glycine) — GTC — (valine) causes Ras to always be active (Ras*)

- prevents p53 from being made
- p53 is degraded
- cells divide without growth factor → Cancer

Why doesn't the normal Ras gene prevent cancer?

- why is cancer phenotype of Ras* dominant?

a cell has 50% normal Ras and 50% Ras*

normal Ras: does nothing without GF

Ras*: promotes cell division without GF

Cancer phenotype is dom.

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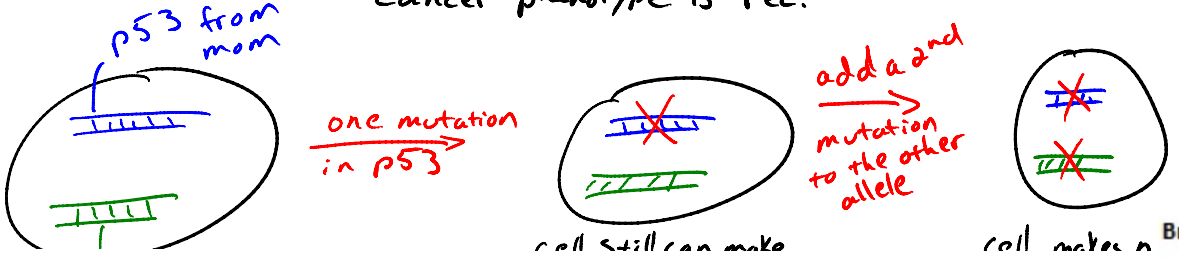
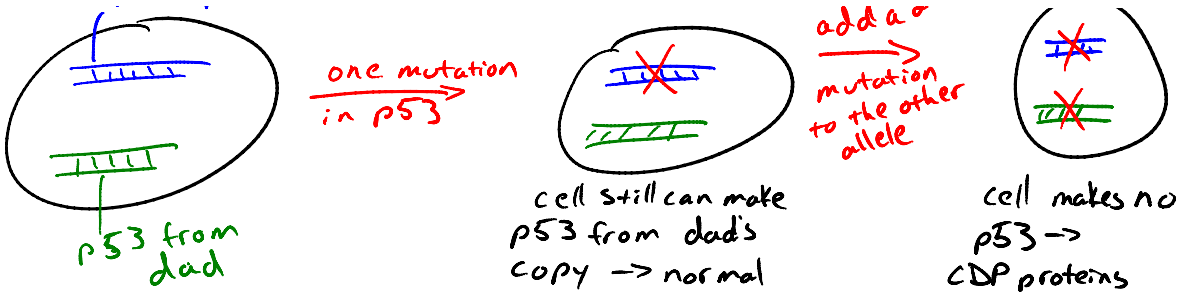
mutations in p53

- mutations that prevent p53 production cause cancer
- you need to mutate <u>both</u> copies of p53

Cancer phenotype is rec.





- only one mutation in Ras, but it has to be very specific location

- p53 needs 2 mutations, but can be almost any mutation