

Anti-Cancer & Anti-HIV
effects of ALKA V-6

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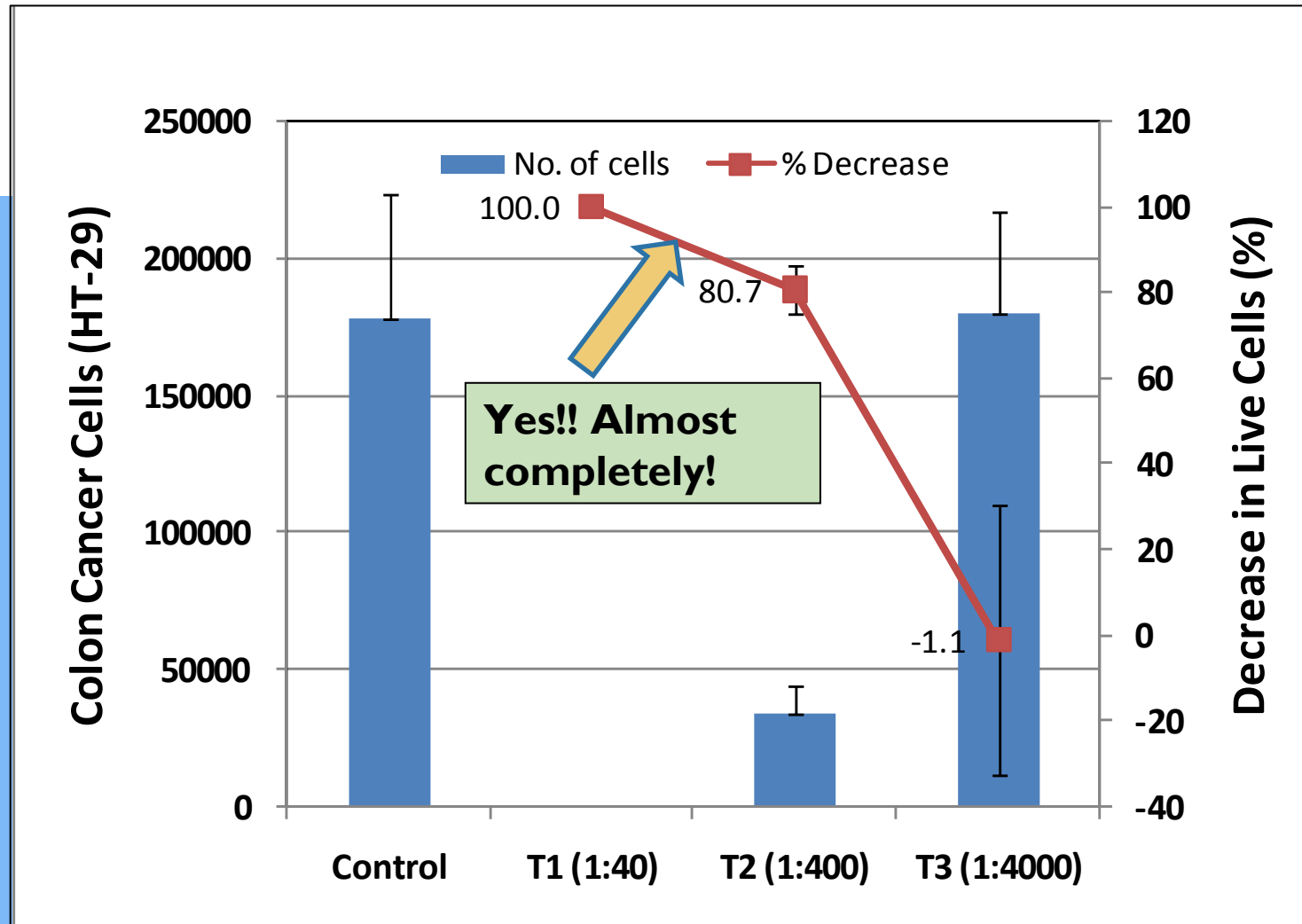
OBJECTIVES

- The overall objective of this research was to determine
 - Cancer chemotherapeutic
 - Anti-retroviral effects
- of ALKA-HYDROXY in cell cultures and other in vitro systems.

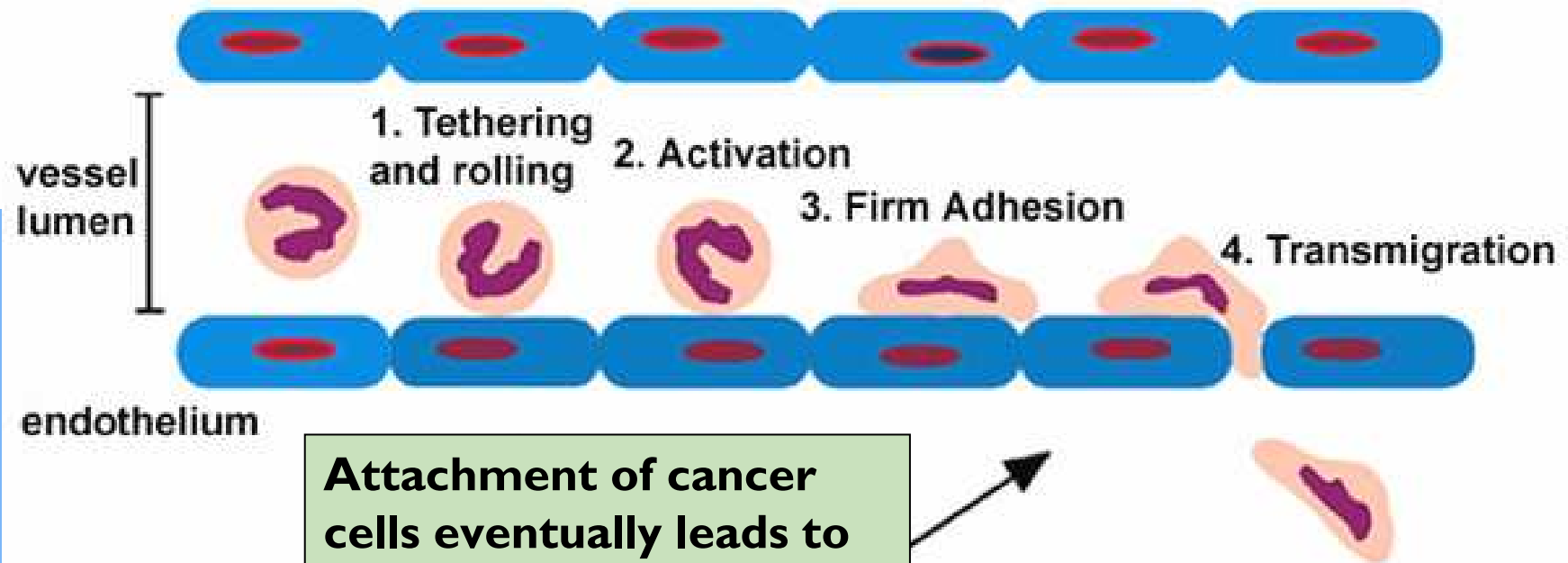
Anti-Cancer Effect

- What is the ability of ALKA V-6 to prevent mutations in the DNA?
- What is the ability of ALKA V-6 to prevent oxidative stress?
- Induce programmed cell death
- Activate antioxidant enzymes
- Increase Nitric oxide

Can ALKA V-6 kill Cancer cells??



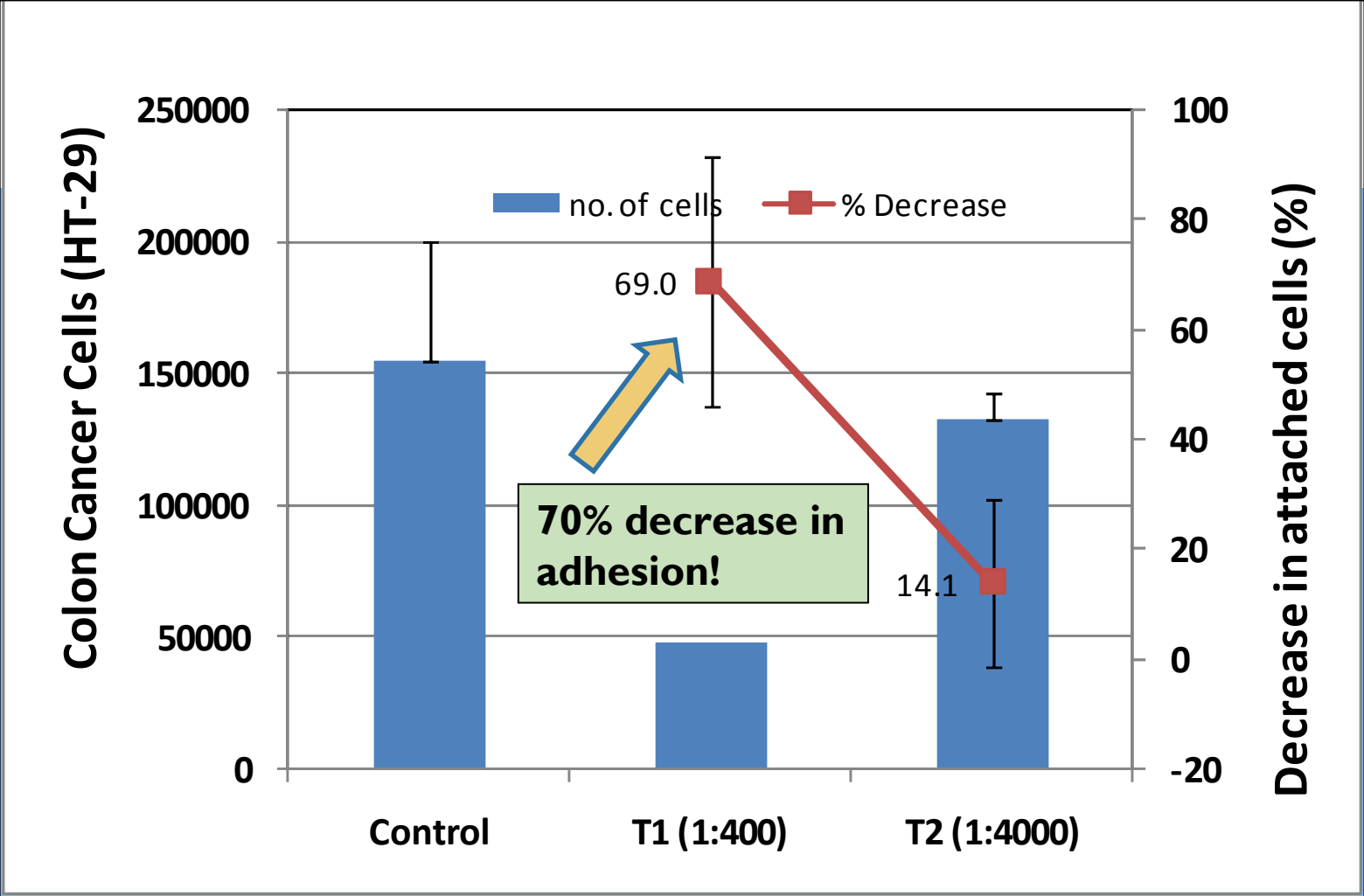
Adhesion of Cancer Cells



Attachment of cancer cells eventually leads to metastasis of cancer.

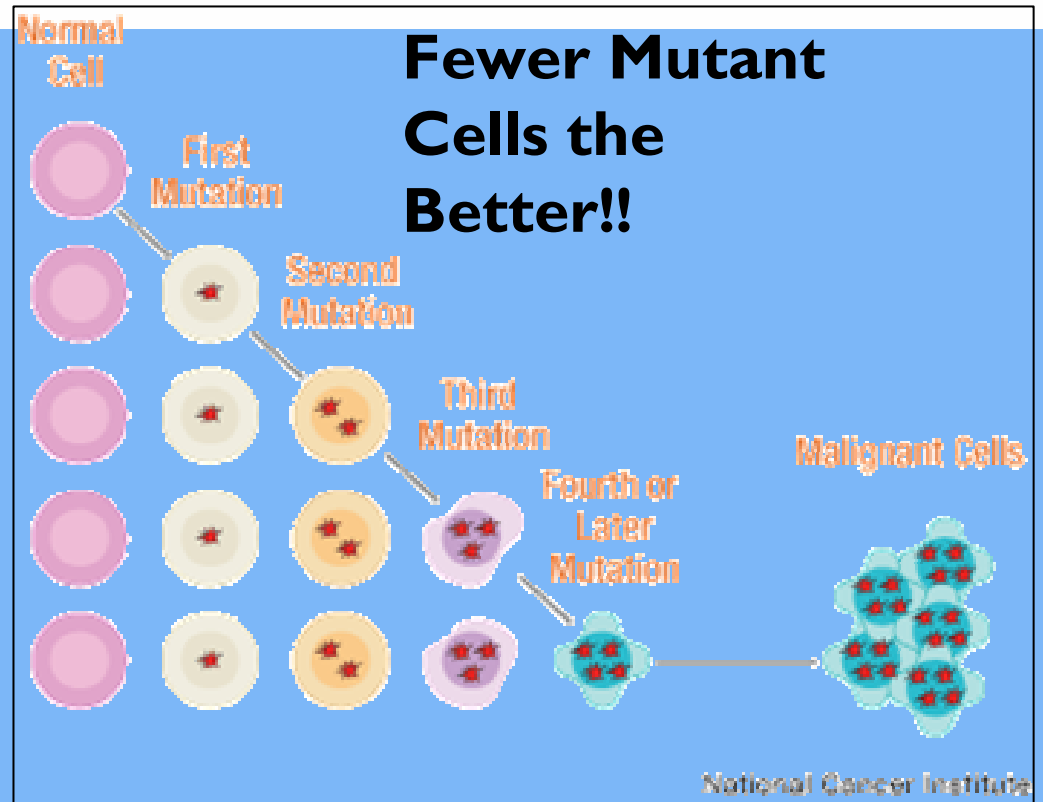
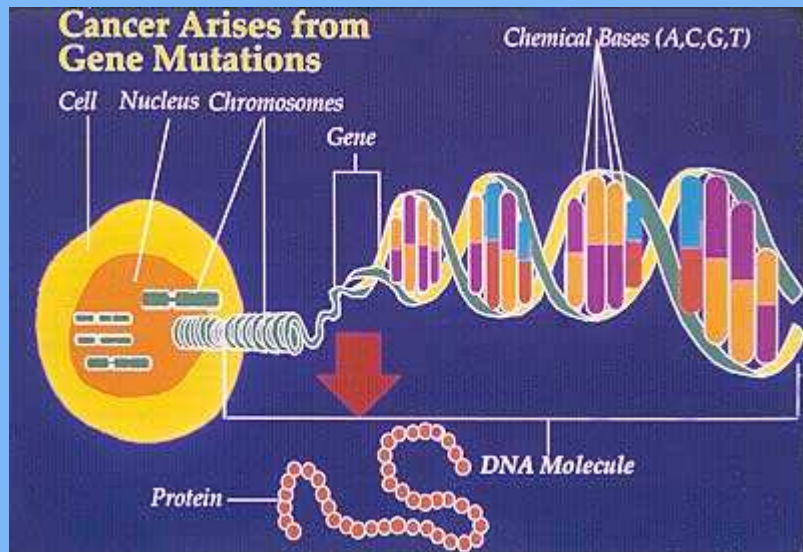
LESS ADHESION THE BETTER!!

Colon Cancer Cells Adhesion & ALKA V-6

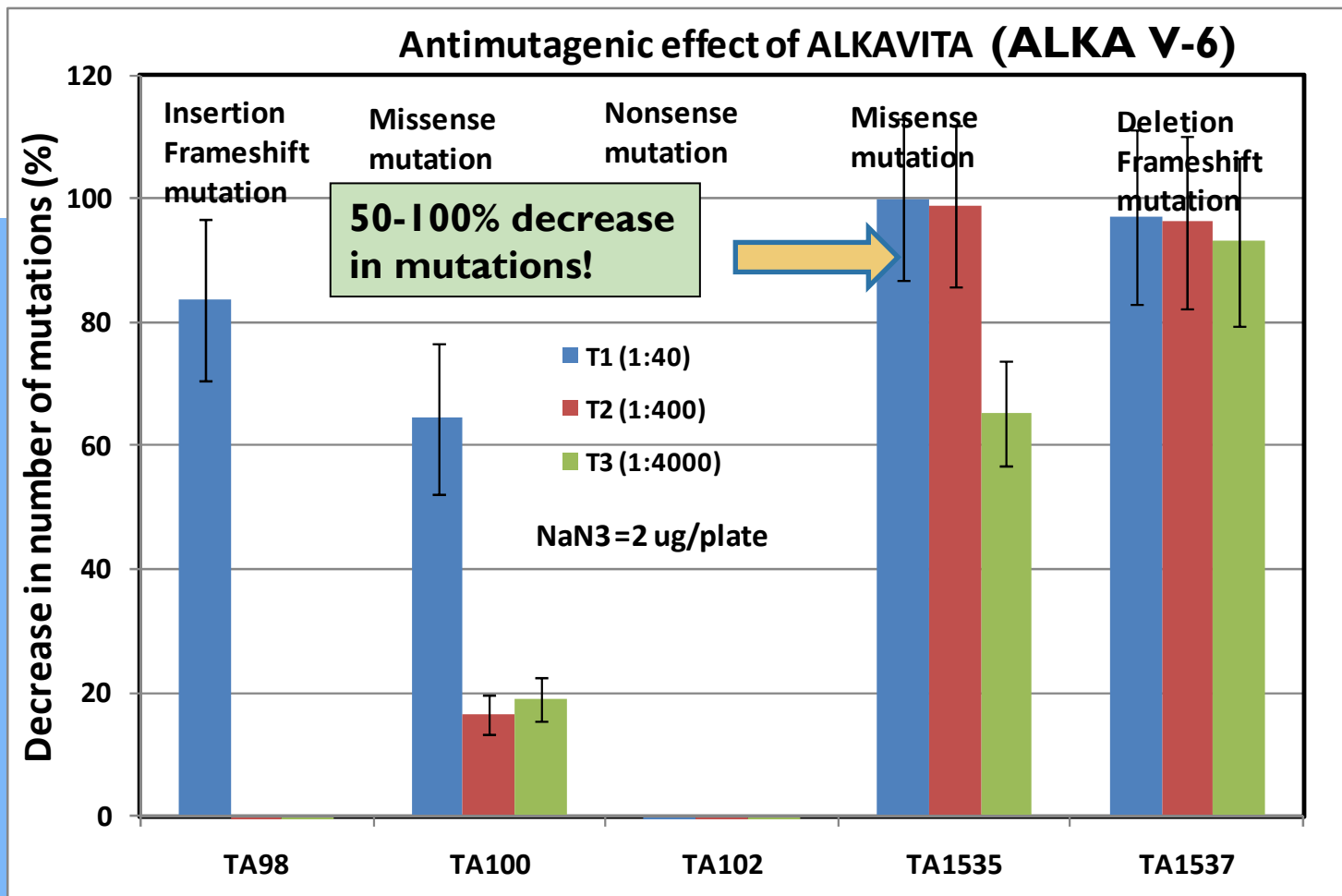


Mutations and Cancer

- ▣ Mutations Sometimes Lead to Cancer
- ▣ Caused by pollutants, toxins

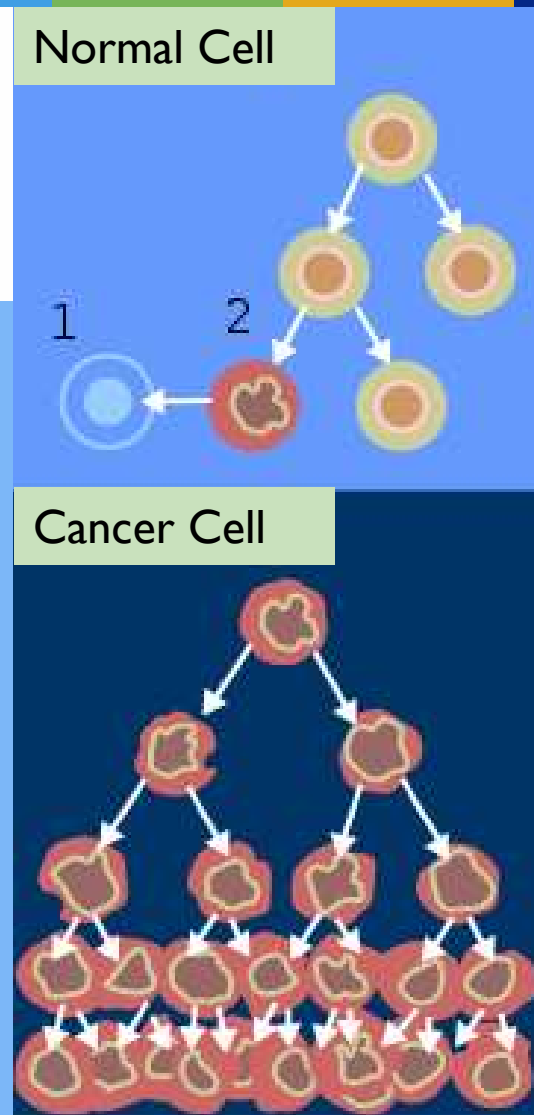


Mutagens & ALKA V-6



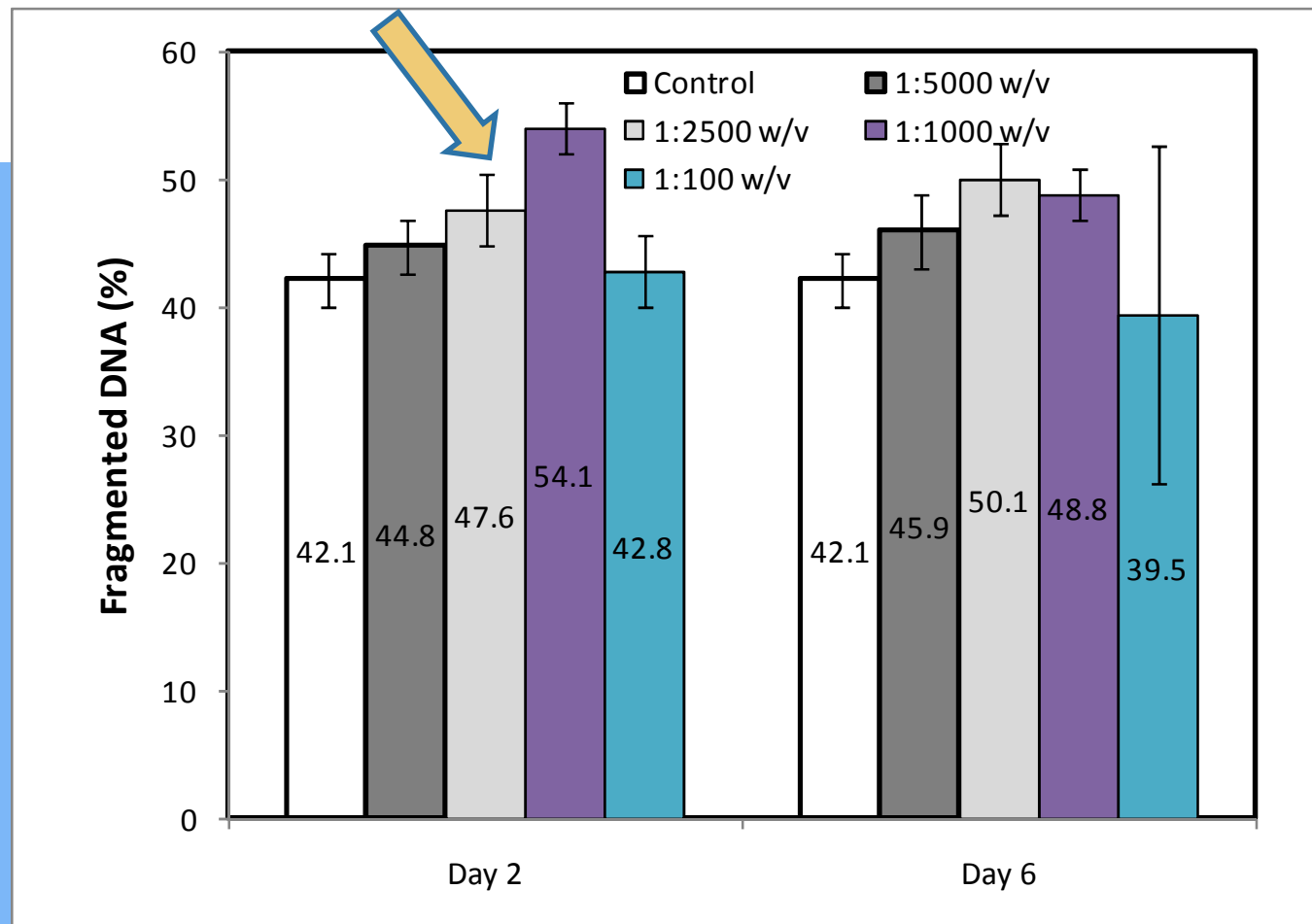
Apoptosis

- ▣ Programmed cell death
 - ▣ Cells normally age and die after a few divisions
- ▣ Defective
 - ▣ development and progression of cancer.
 - ▣ resistance to chemotherapy
- ▣ Selectively induce apoptosis in cancer cells
 - ▣ Measured by fragmented DNA



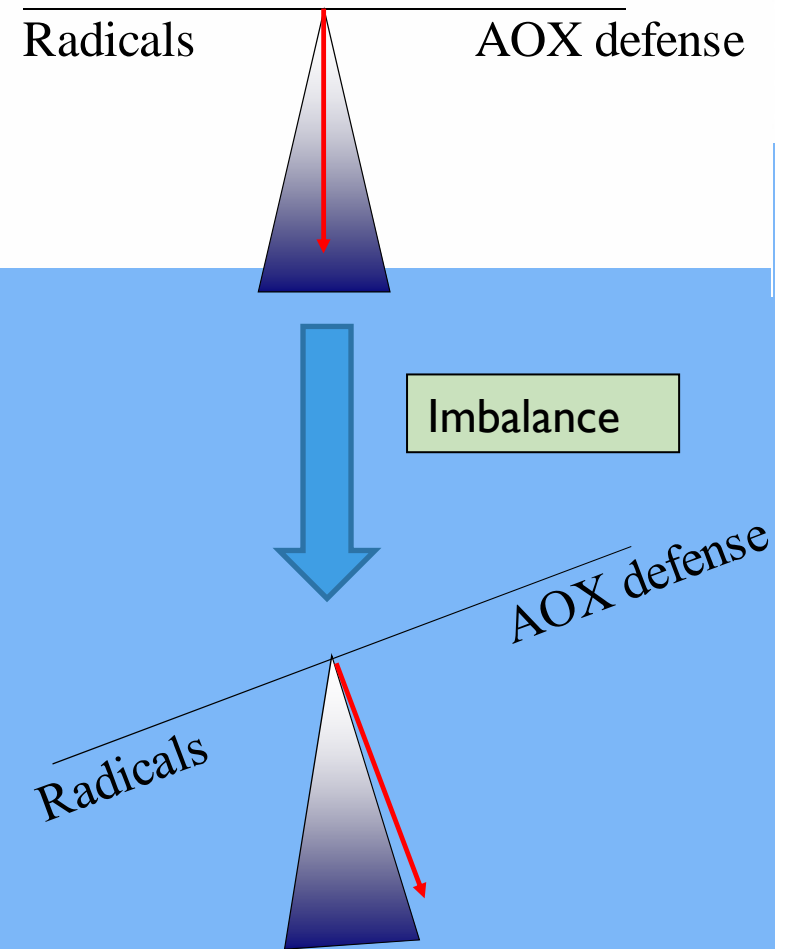
ALKA V-6 and Apoptosis

Apoptosis increased

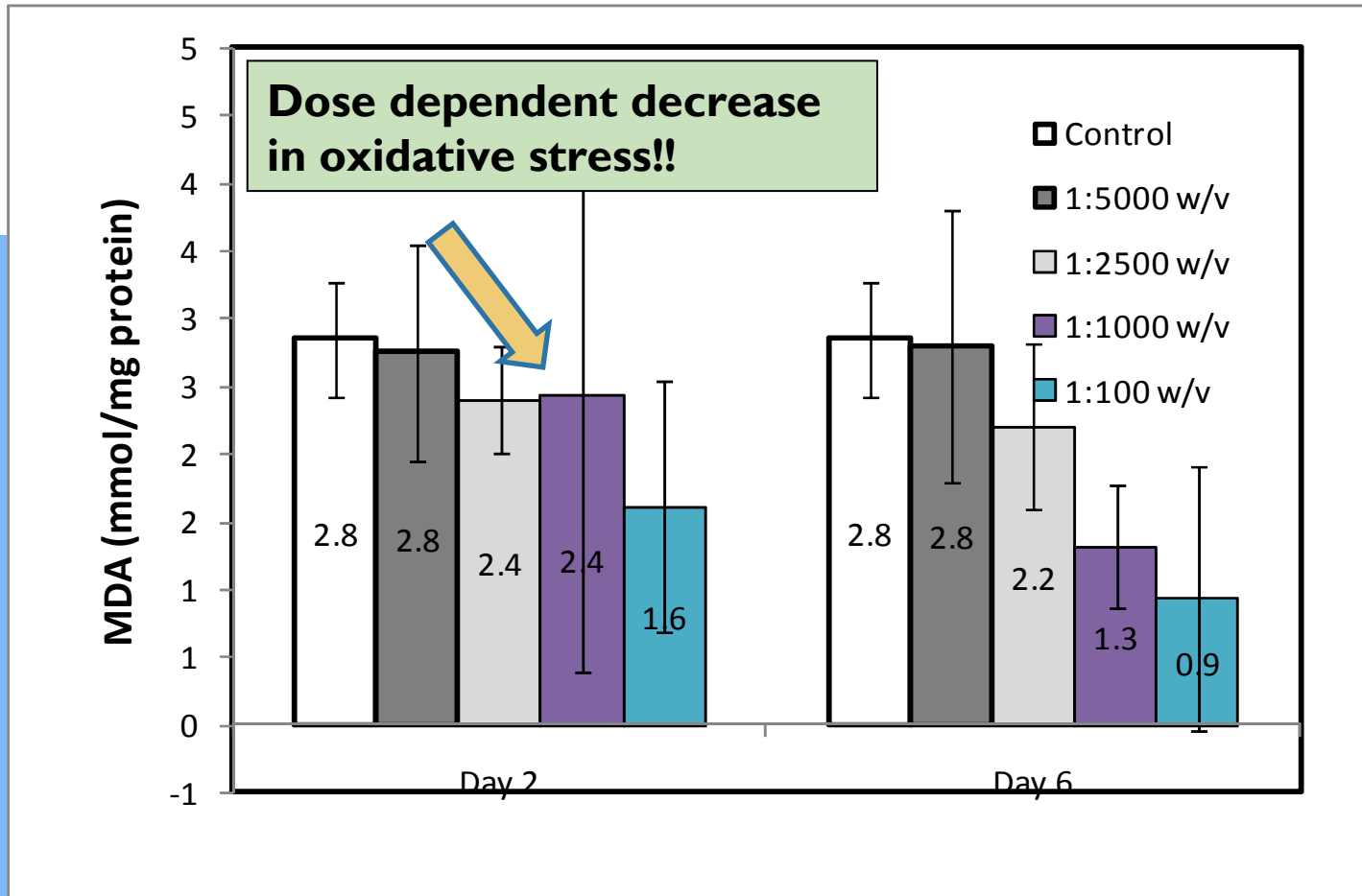


Oxidative stress

- Altered homeostatic balance resulting from oxidant insult
- Free radicals in the body overwhelm antioxidant defense systems
- Responsible for many diseases
- Cancer
- Decrease free radicals
 - Measured by MDA
- Increase antioxidant defenses
 - Enzymes
 - Chemicals



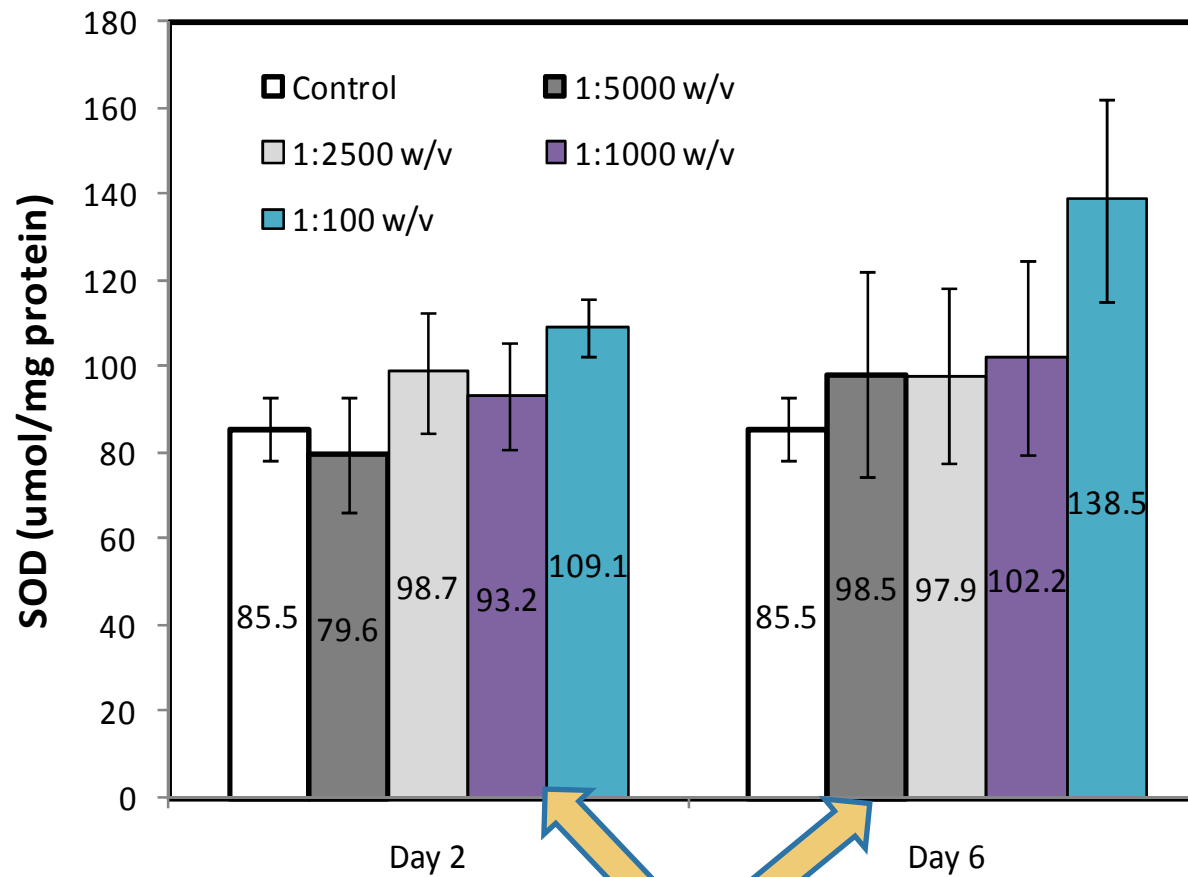
ALKA V-6 and Oxidative stress



SOD and CAT

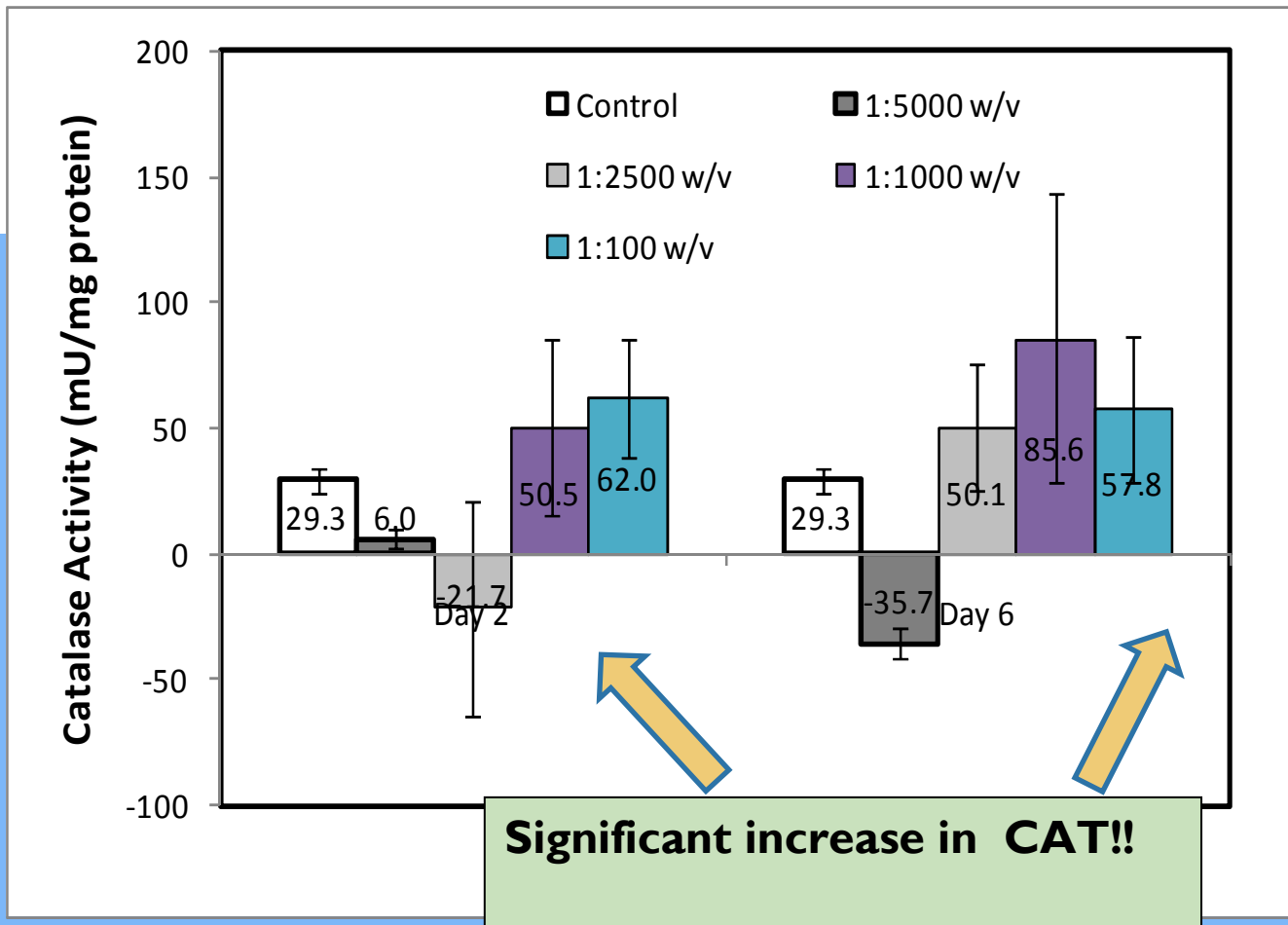
- Superoxide (O_2^-) and hydrogen peroxide (H_2O_2) are
 - Toxic compounds
 - If not removed can cause cancer
 - Superoxide is mopped up by superoxide dismutases (SODs)
 - Hydrogen peroxide is removed by catalase (CAT) and glutathione peroxidase.
 - Cancer cells have high levels of metabolism that
 - Superoxide (O_2^-) and hydrogen peroxide (H_2O_2)
 - Low levels of SOD and CAT
- **Higher the levels of SOD and CAT the better it is!**

ALKA V-6 and SOD

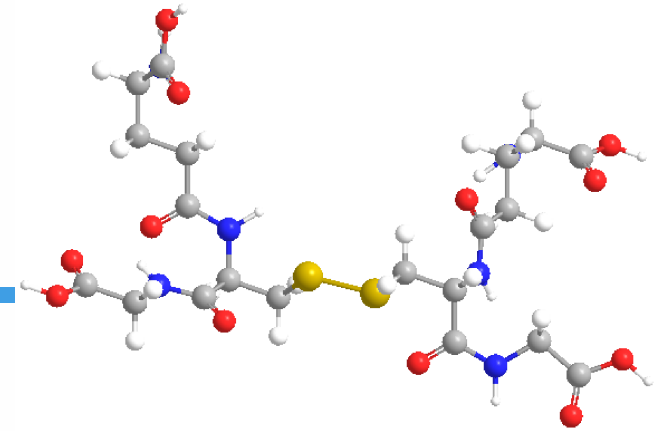


Dose dependent increase in SOD!!

ALKA V-6 and CAT



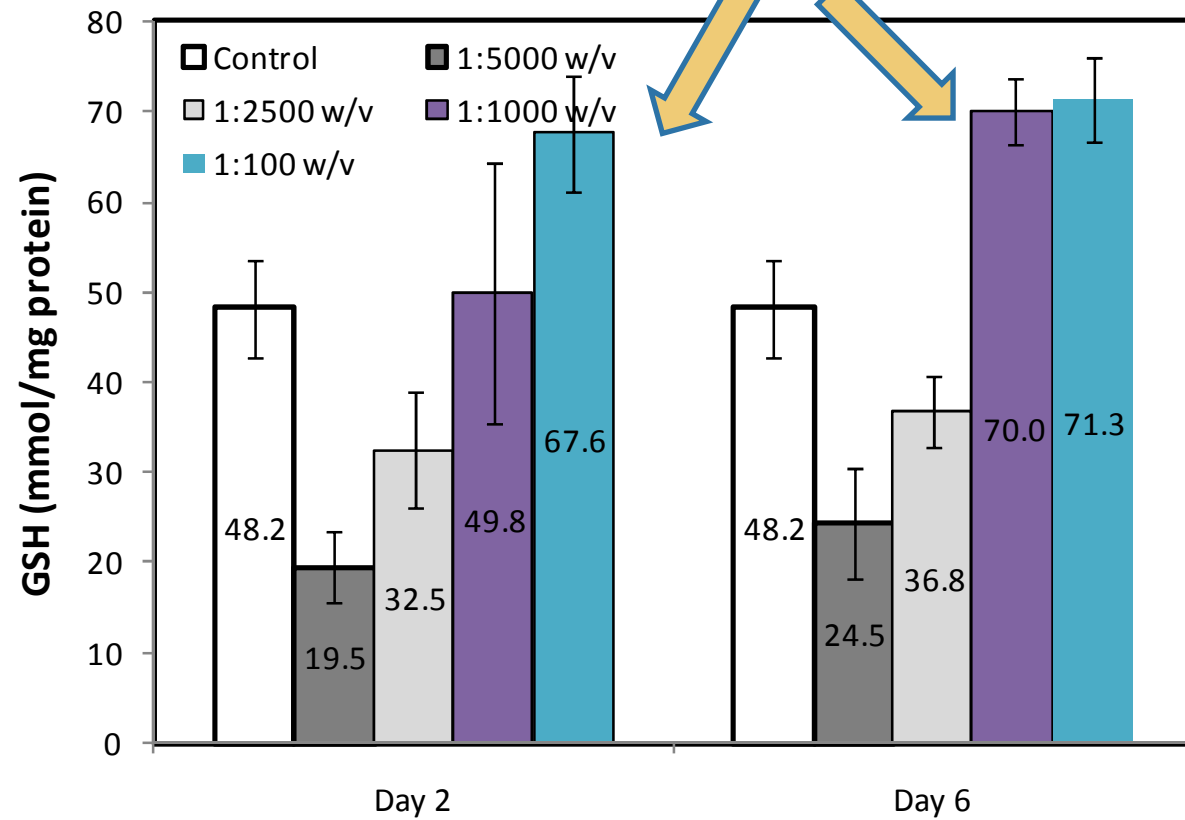
Glutathione



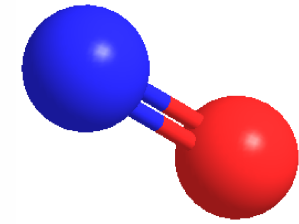
- ▣ Most important antioxidant
- ▣ Prevents conditions that can lead to diseases
 - ▣ Cancer
 - ▣ Cataracts
 - ▣ human immunodeficiency virus (HIV).
- ▣ Detoxify various harmful chemicals
 - ▣ Heavy metals and pollutants
- ▣ **MORE THE BETTER!**

ALKA V-6 & Glutathione

Dose dependent increase in GSH!!



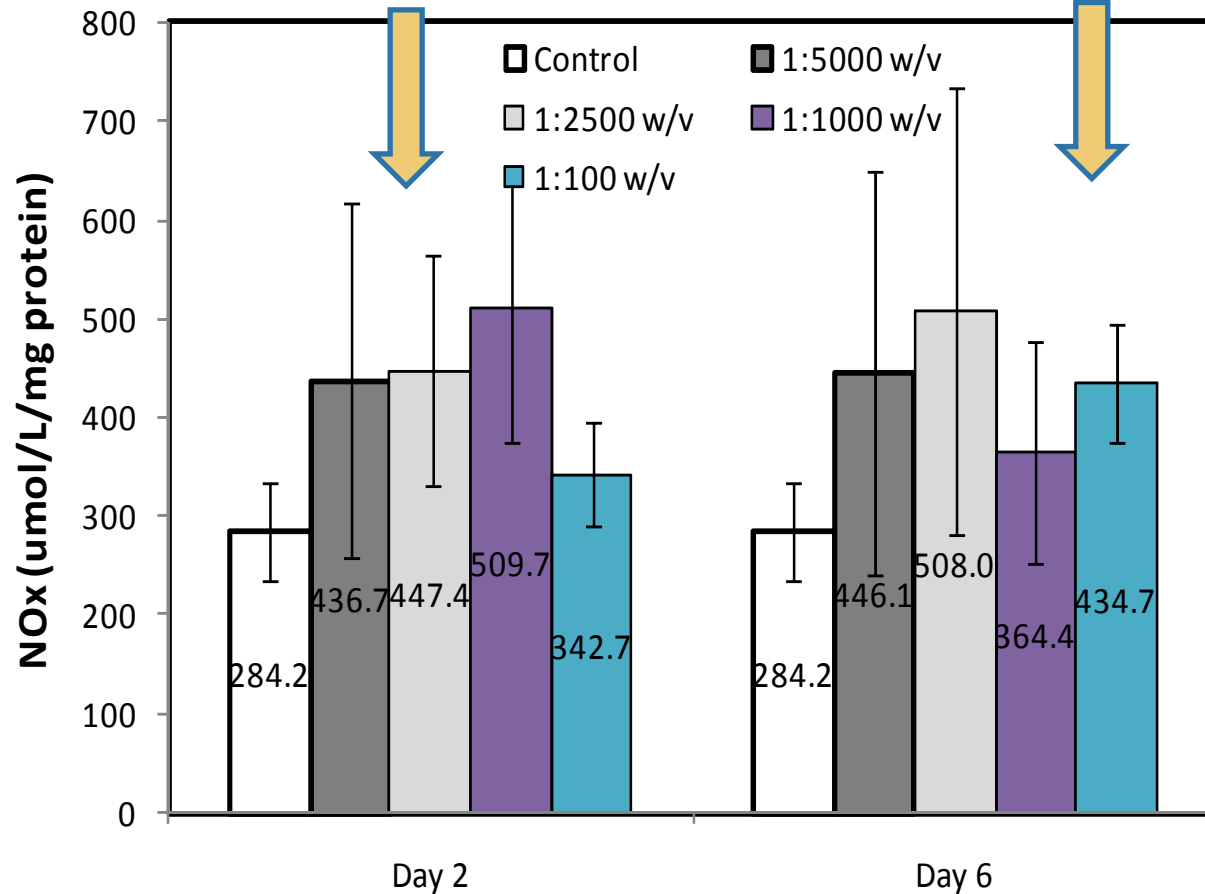
Nitric Oxide



- ▣ The immune system uses nitric oxide
 - ▣ fighting viral, bacterial and parasitic infections,
- ▣ Decreases proliferation of tumours
- ▣ Associated with learning, memory, sleeping, feeling pain, and, probably, depression.
- ▣ Inflammation and rheumatism.
- ▣ Reduce Blood Pressure
- ▣ Viagra
- ▣ **MORE THE BETTER!**

ALKA V-6 & Nitric Oxide

Significant increase in NOx!!

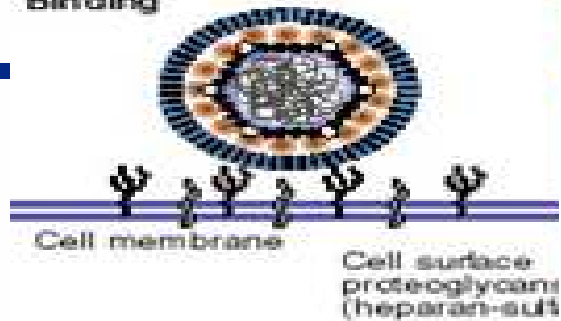


Anti-Retroviral effects



Anti Viral Drugs

Binding



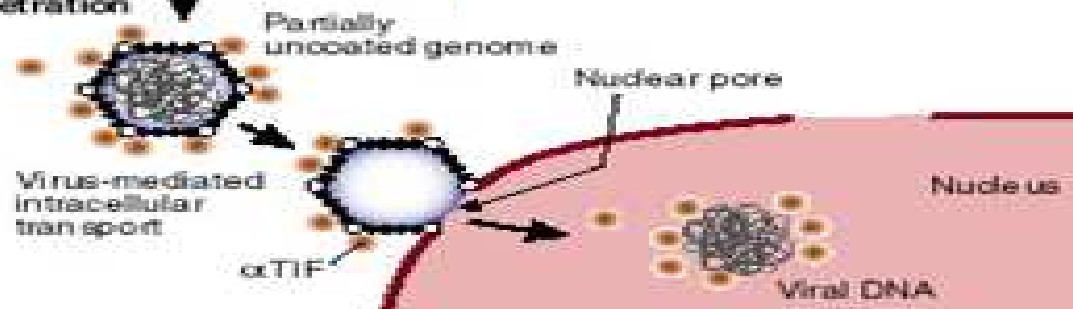
Binding



Membrane fusion

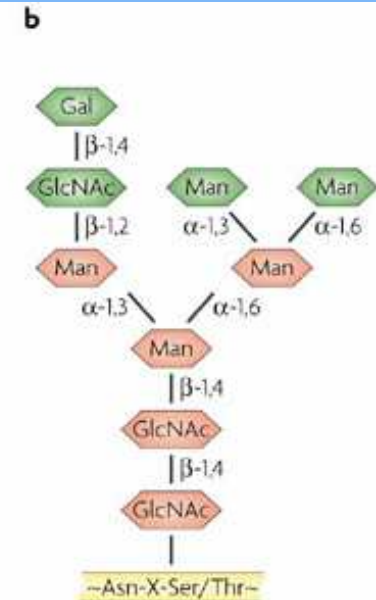
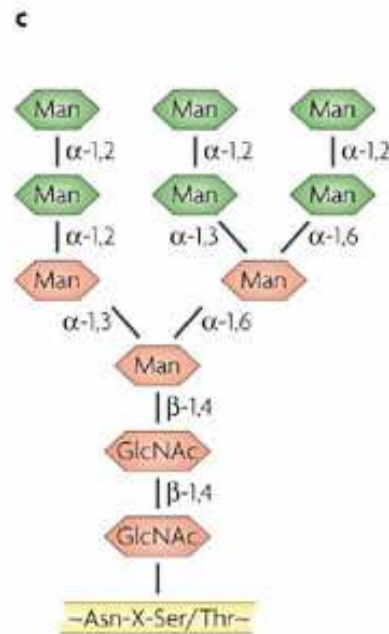
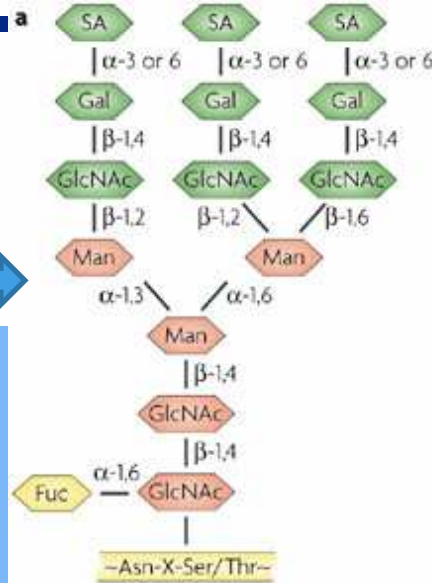
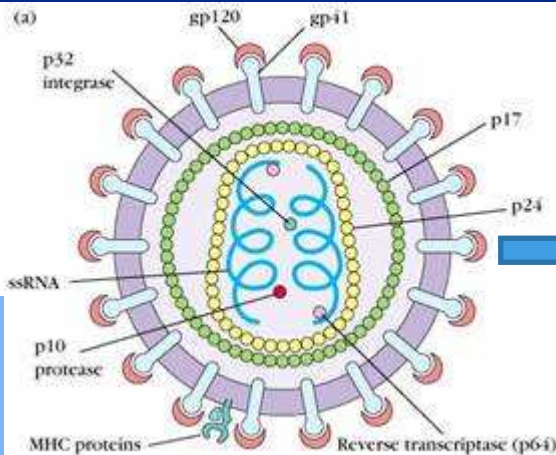


Penetration



- Virus evades immune system
- Attaches to our cells using surface sugars
- If this process can be inhibited infection can be prevented

Viral Envelope



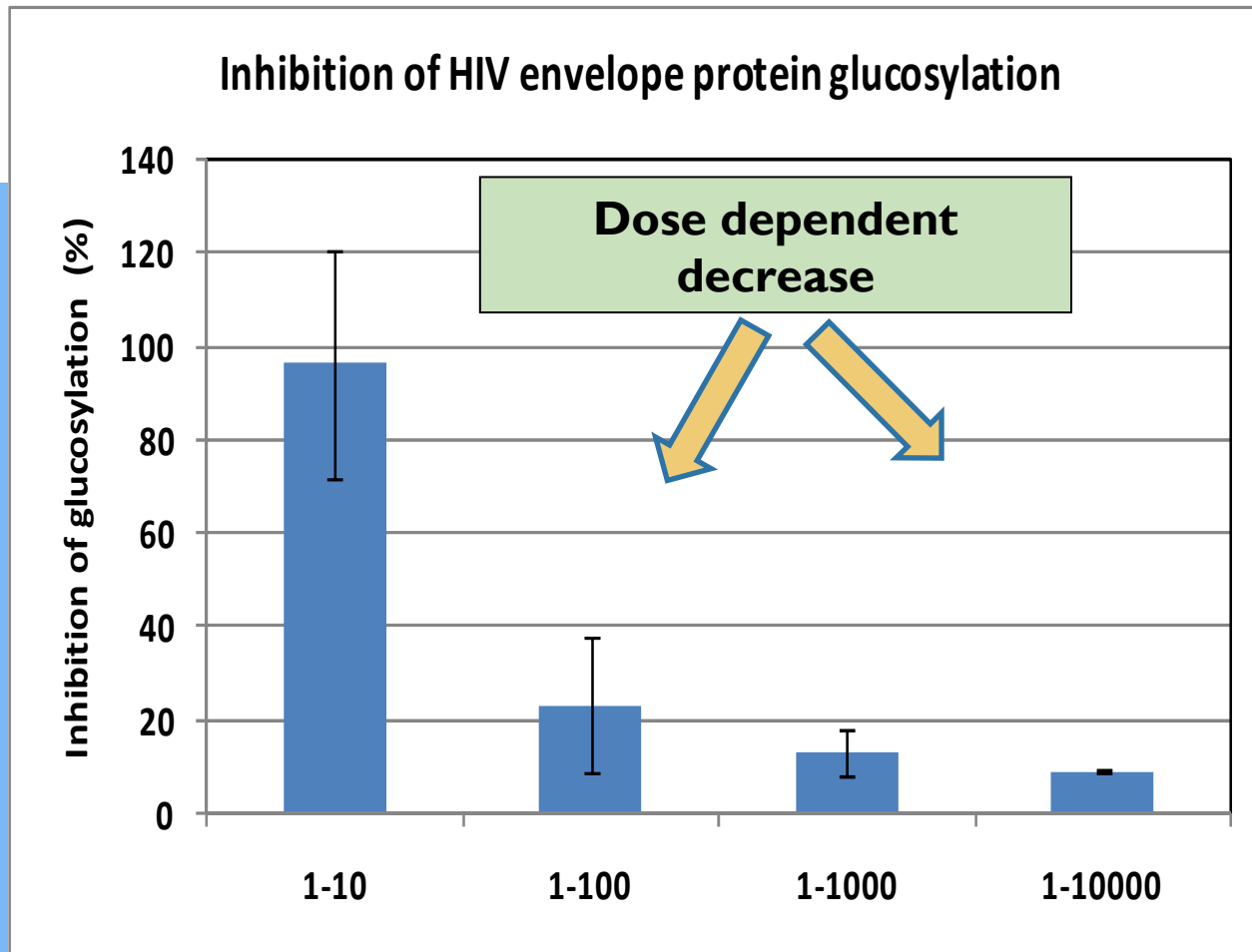
- Different sugars
- Determine the shape
- Shape can be changed by changing sugar composition

- If shape changes they can no longer bind to the cell receptor
- They cannot hide from immune system anymore

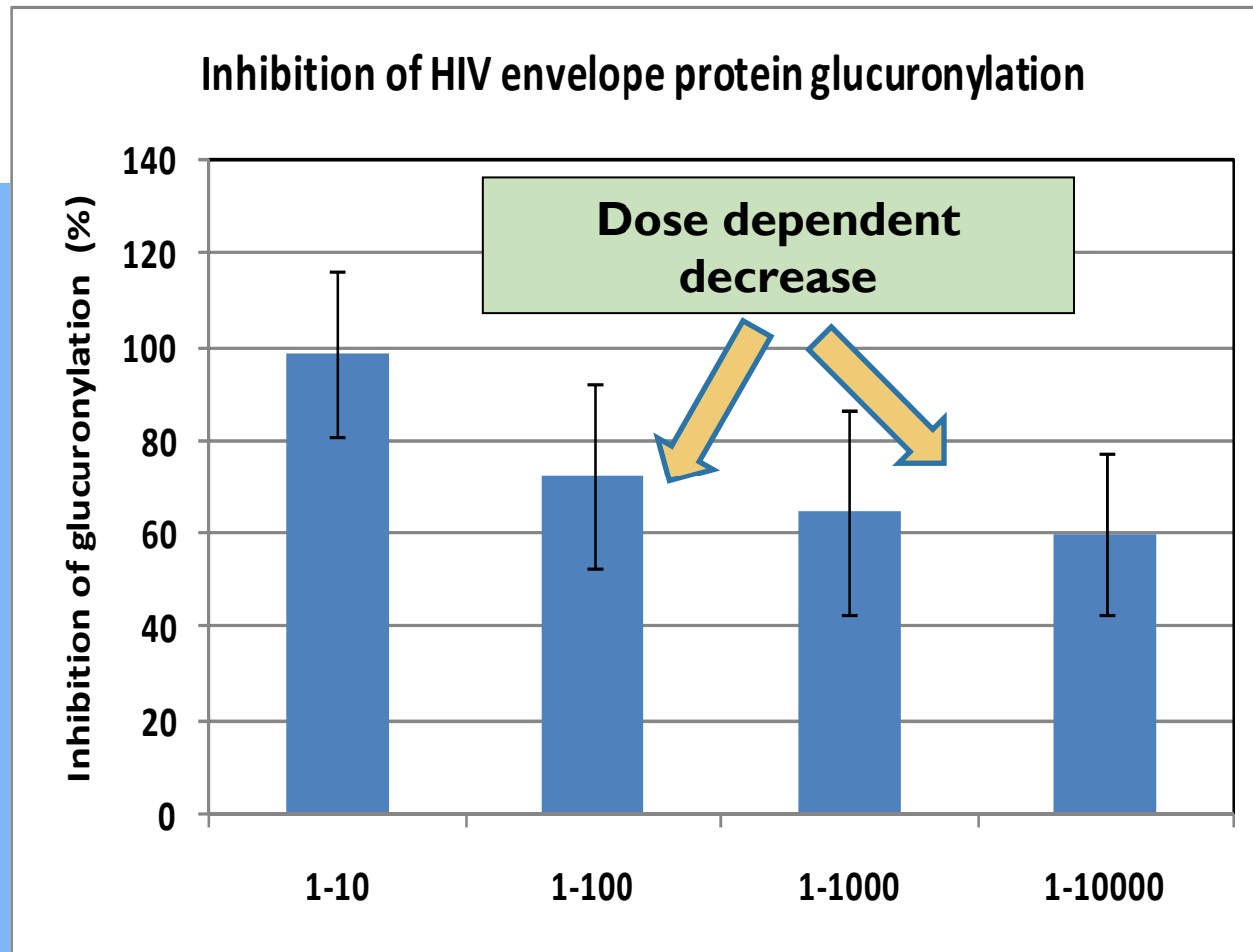
Glucosylhydrolase

- ▣ Glycosylhydrolase enzymes are found in the eukaryotic host cell's Golgi apparatus
- ▣ Inhibition has been found to decrease the infectivity of the HIV virion
- ▣ Two enzymes do this:
 - ▣ **Glucosidase**
 - ▣ **Glucuronidase**
- ▣ They add sugars to the viral envelope
- ▣ **More inhibition the better!!**

ALKA V-6 & Glucosidase

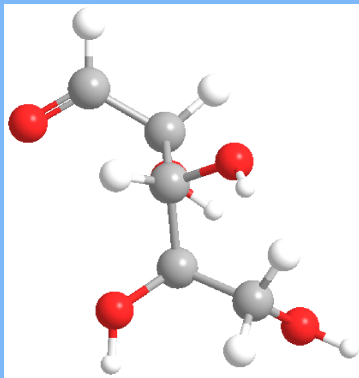


ALKA V-6 & Glucuronidase

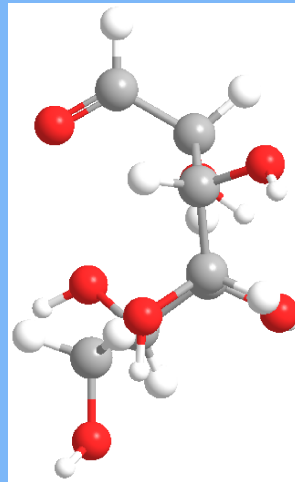


ALKA V-6 & Sugar composition

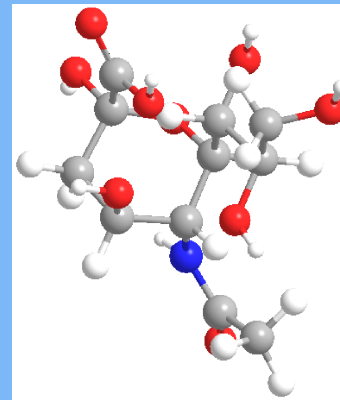
- Can ALKA V-6 effect the sugar composition ?
 - Looking or changes not increase/decrease



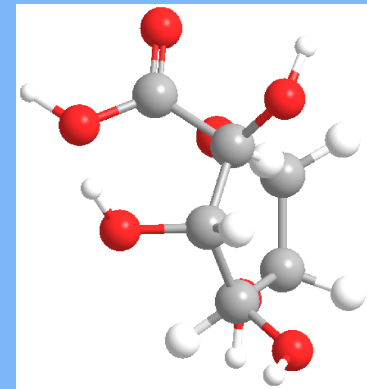
Ribose



Heptose

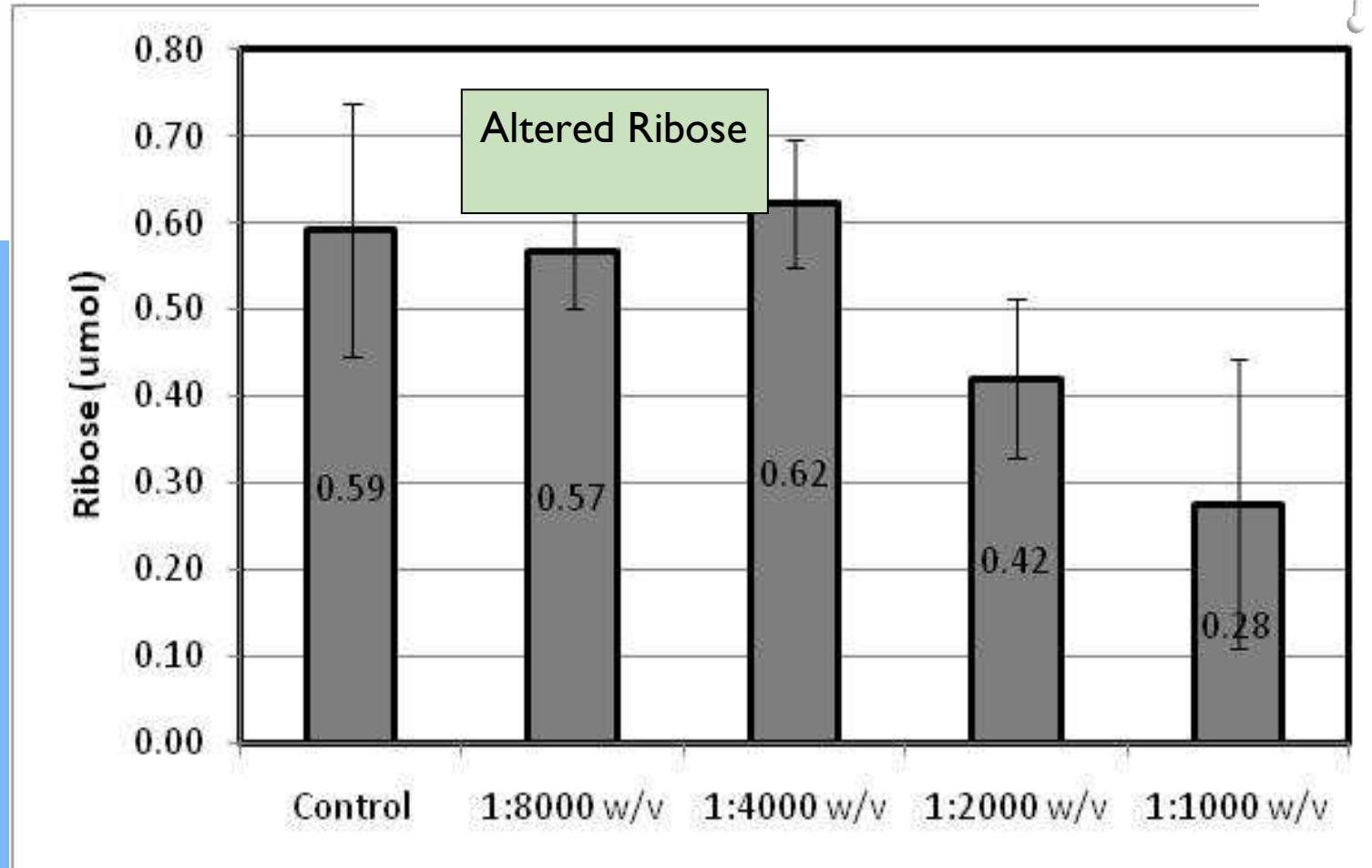
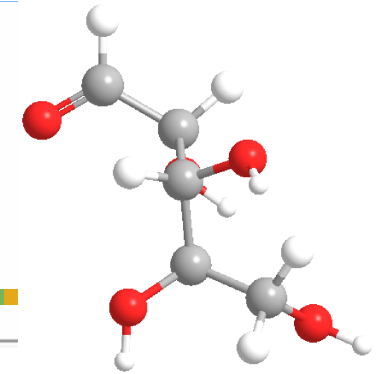


Sialic acid

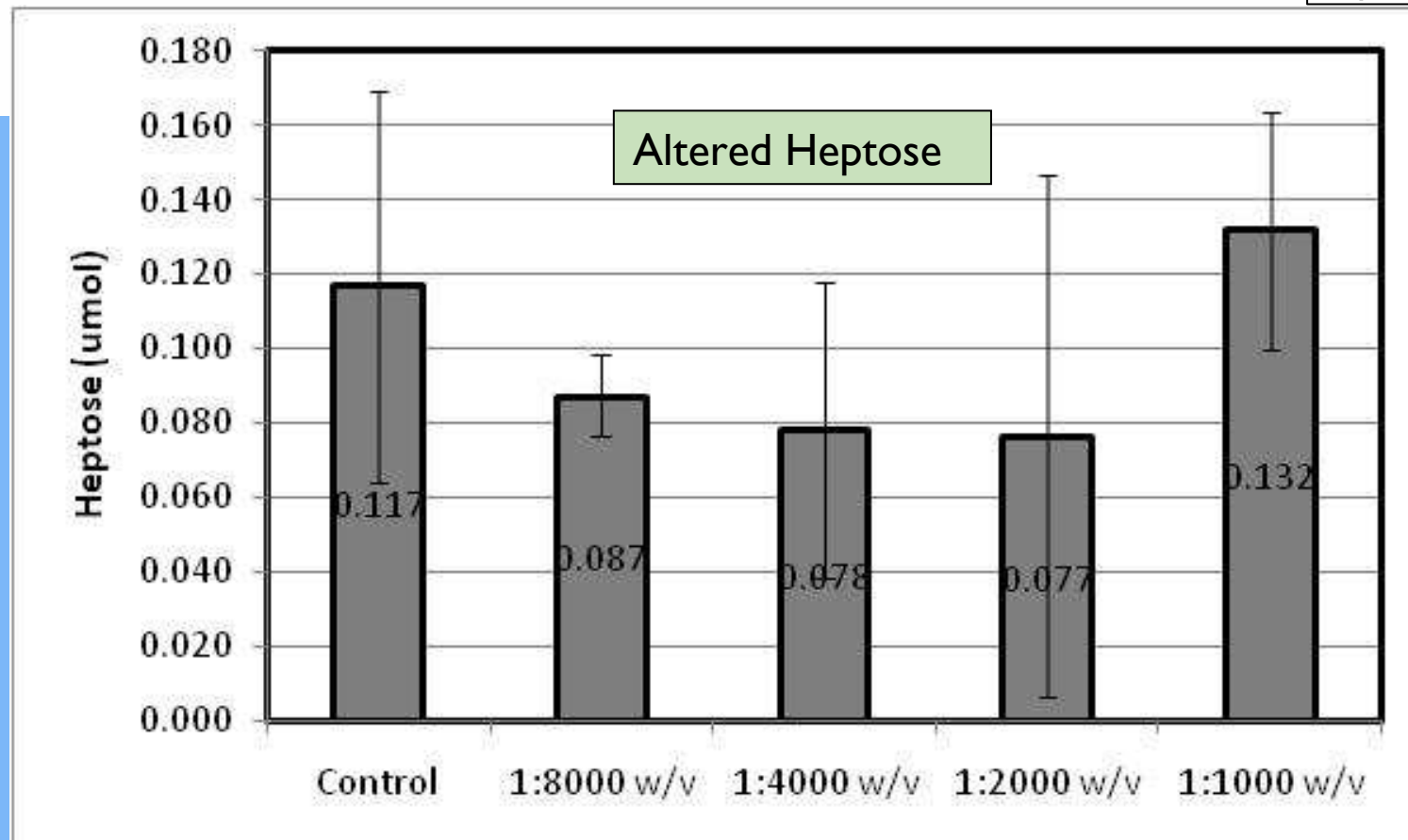
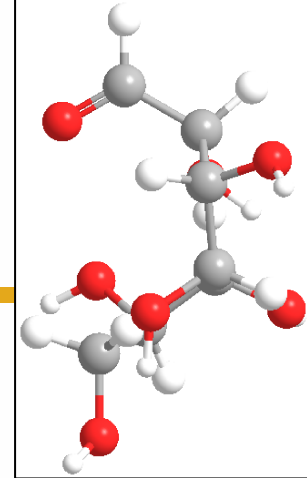


Uronic acid

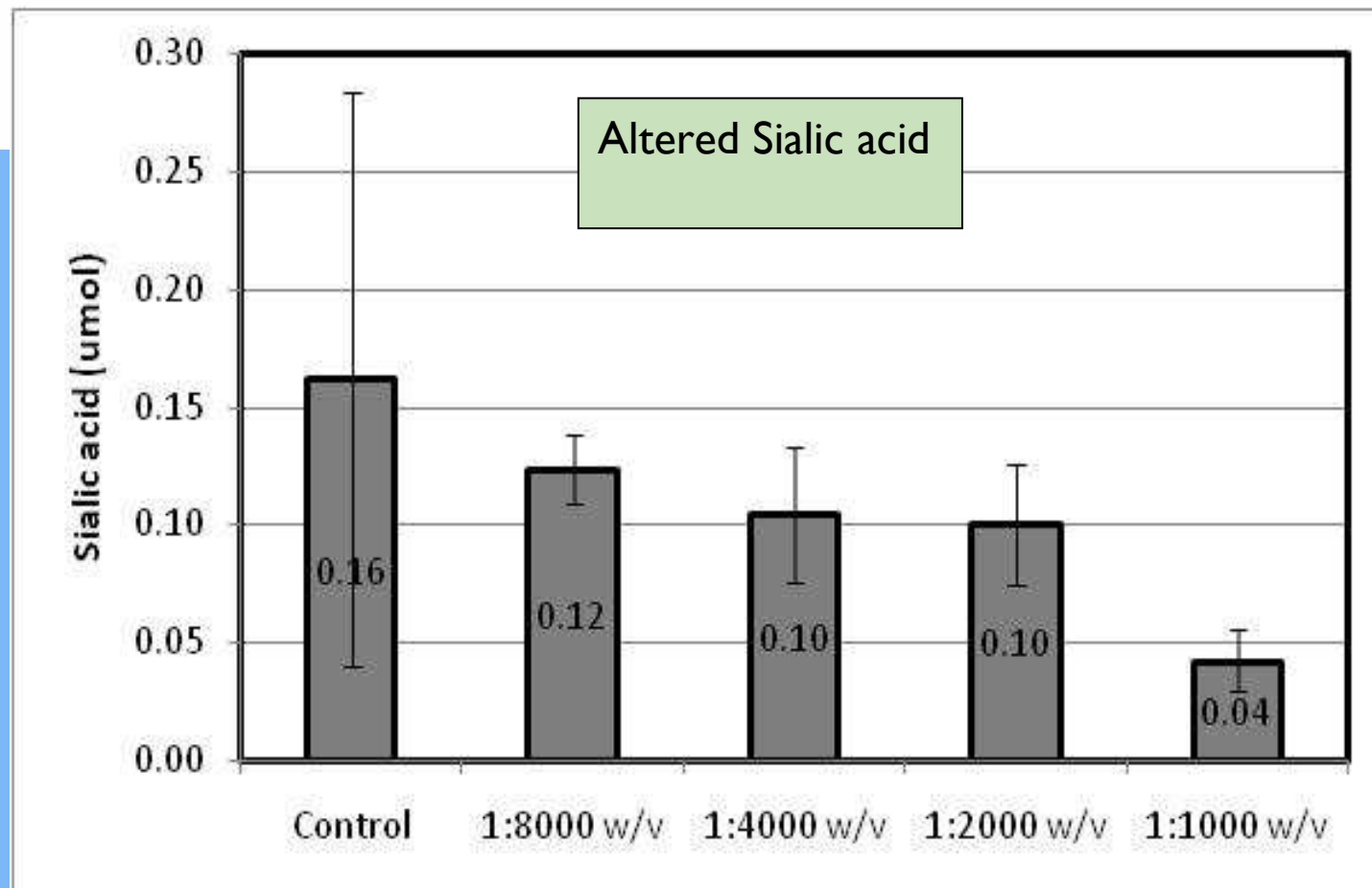
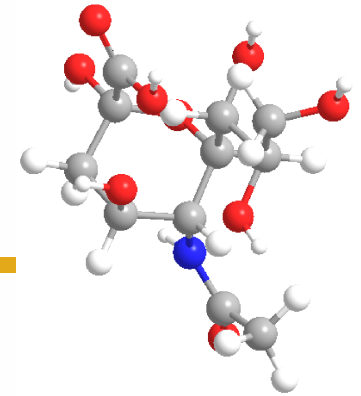
ALKA V-6 & Ribose



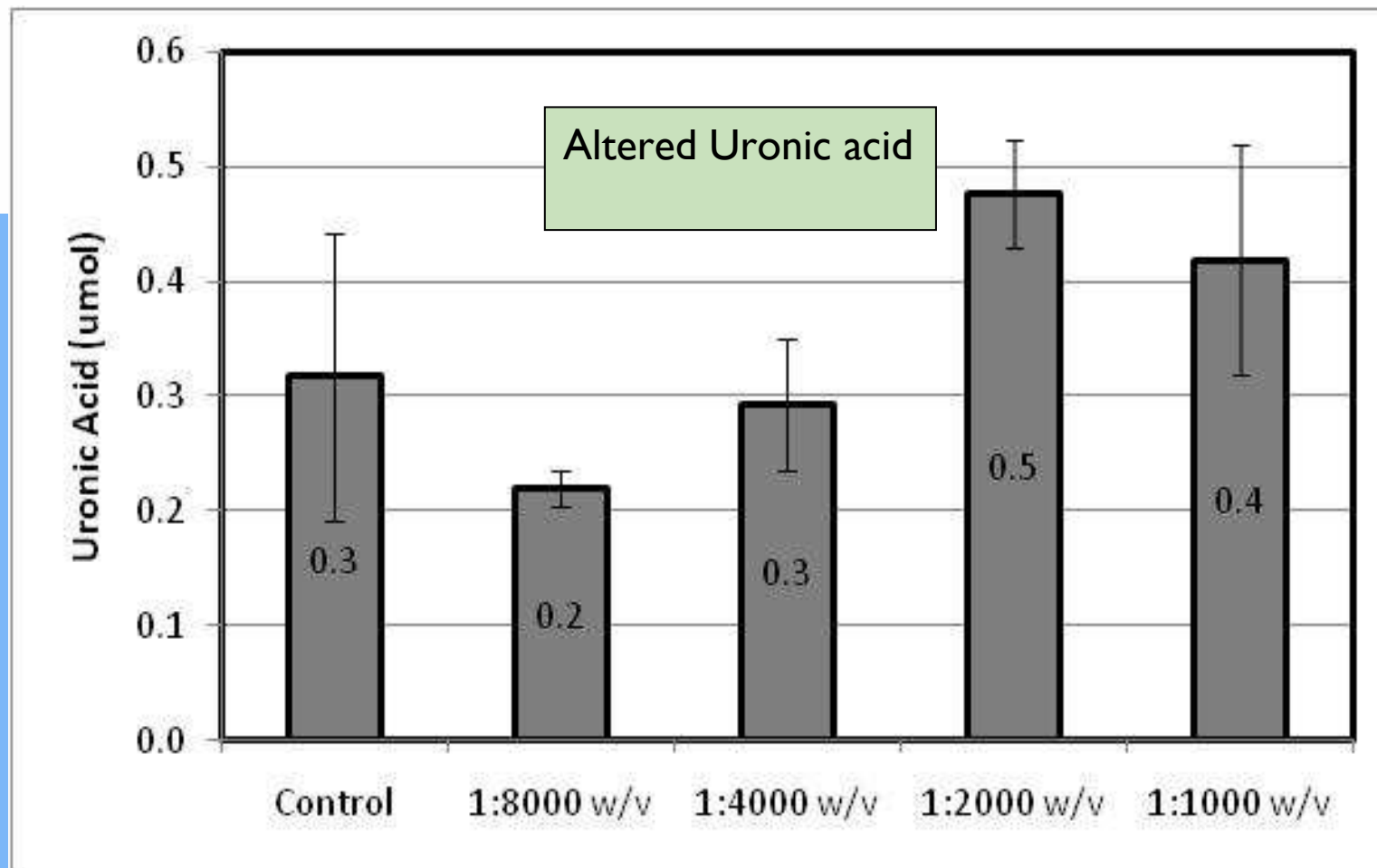
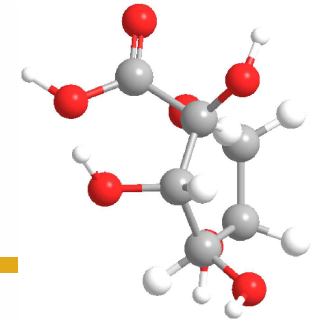
Heptose & ALKA V-6



Sialic acid & ALKA V-6



ALKA V-6 & Uronic acid



Future Directions

- Using In-Vivo systems Determine
 - Mechanism of action
 - Toxicity
 - Dosages
 - Half-life
 - Pharmacokinetics
- Chick embryo model
 - Physiological model
- C. elegans model
 - Genetic model
 - 3 Nobel Prizes in past 6 years
- Well established