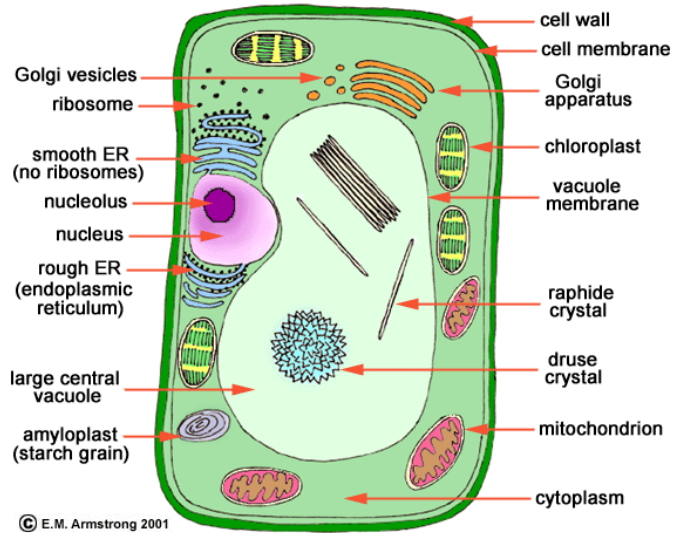


Plant Structure

Cells
and
cell
walls



© E.M. Armstrong 2001



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Image: <http://waynesword.palomar.edu/lmexer1a.htm>

Cell Wall

Structural, prevents dehydration

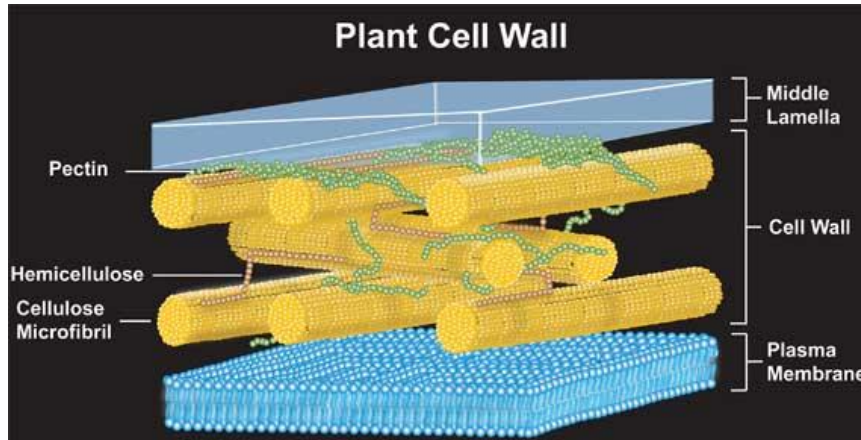
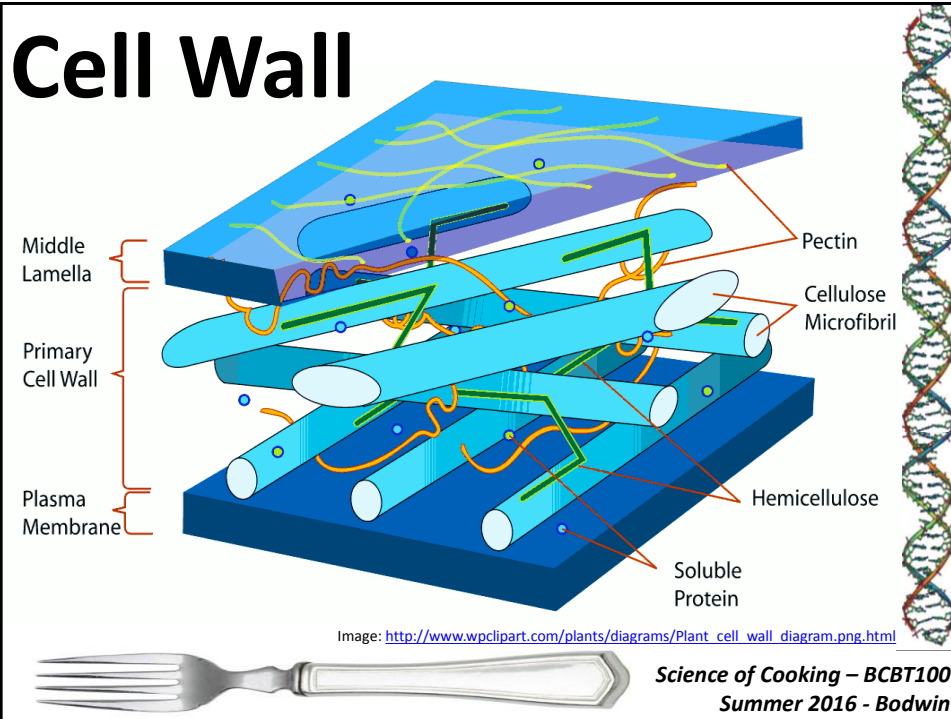


Image: <http://www.sigmaaldrich.com/life-science/metabolomics/enzyme-explorer/learning-center/lysing-enzymes.html>



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Vacuole

“Fullness” alters rigidity of plant
Contains water & water soluble bits
Acids, sugars, proteins, pigments,
enzymes, etc

The diagram shows a large, clear, rectangular vacuole within a cell. The vacuole is filled with a light blue liquid, representing water and water-soluble substances. The vacuole is bounded by a single membrane. A vertical DNA double helix is shown on the right side of the diagram. A silver fork is positioned at the bottom left of the diagram for scale.

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Chloroplasts

Contain chlorophyll

Makes green plants green (leaf)

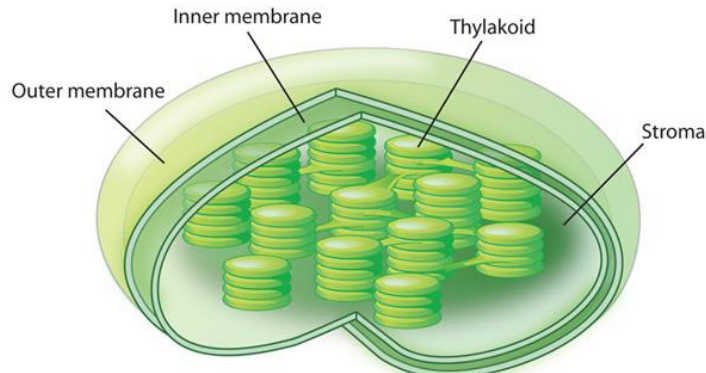
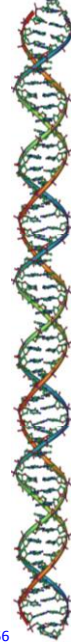


Image: <http://www.nature.com/scitable/topicpage/plant-cells-chloroplasts-and-cell-walls-14053956>



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Plant Tissues

Ground

Most of the cell mass, thin cell walls

Vascular

Nutrient transport, tough & fibrous

Dermal

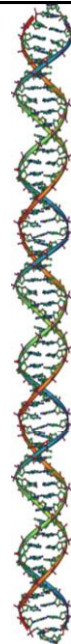
Surface (“skin”), epidermis/periderm

Secretory

Oozes things...



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What do we eat?

Roots
Stems
Leaves
Flowers
Fruits
Seeds



Image: <http://sagharborfoodpantry.com/>



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Cooking!

Consider the molecules
Cell walls = rigid/tough, fiber
Cooking removes non cellulose part

Removing water?



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Cooking Plants

Chlorophyll

Acid or base
hydrolysis

Displace Mg^{2+}

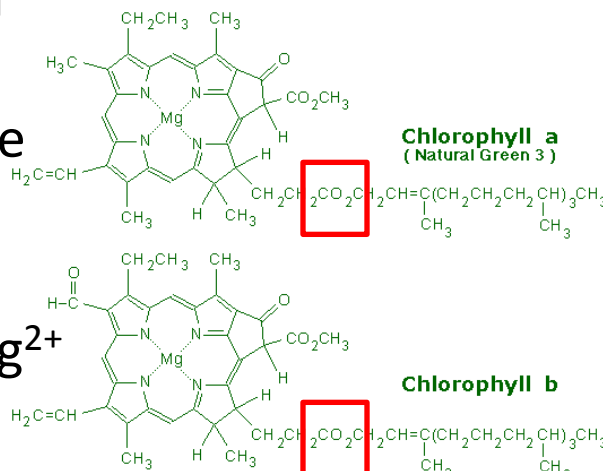


Image: http://www.bio.miami.edu/dana/226/226F08_10print.html



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Keeping them green

Neutralize acid with baking soda

Baking soda = Sodium bicarbonate



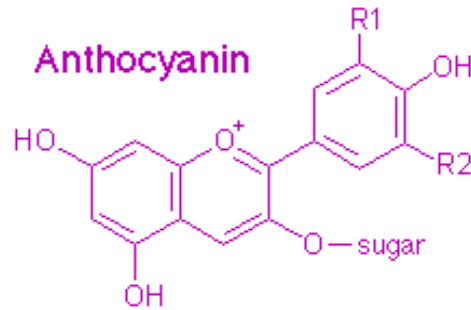
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Cooking Plants

Anthocyanins and Anthoxanthins

pH sensitive

Keep acidic?



R1, R2 = H, OH, OCH₃
sugar = glucose, arabinose,
galactose

Image: <http://www.succulent-plant.com/glossary/images/anthocyanin.png>



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Cooking plants

Texture = firmness of cell walls

Acid + “hard” water = firm

“hard” = metals with +2 charge = bridge

Base + salt = soft

Sodium = Na⁺¹ = cap



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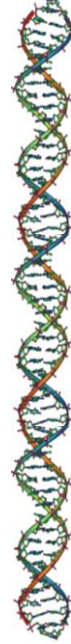
Starchy plants

Starch grains are hard, BUT absorb water and swell when heated
Heat breaks down cell walls, starch absorbs water that's released

figure on p. 282 in McGee book...



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Starch

Starch is hydrophilic, but hard
Gel loses water, crystallizes

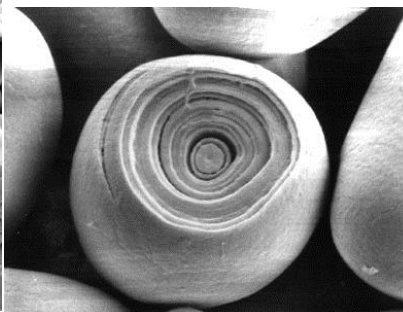
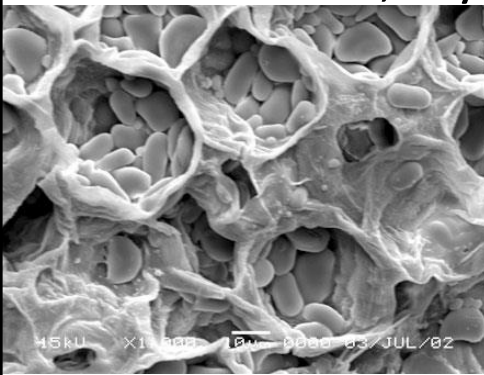


Image: http://www.roid.org/gallery/held/starch_grains.php

Image: <http://sciencegirlsrock.wordpress.com/2011/05/30/women-of-outstanding-achievement/>



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