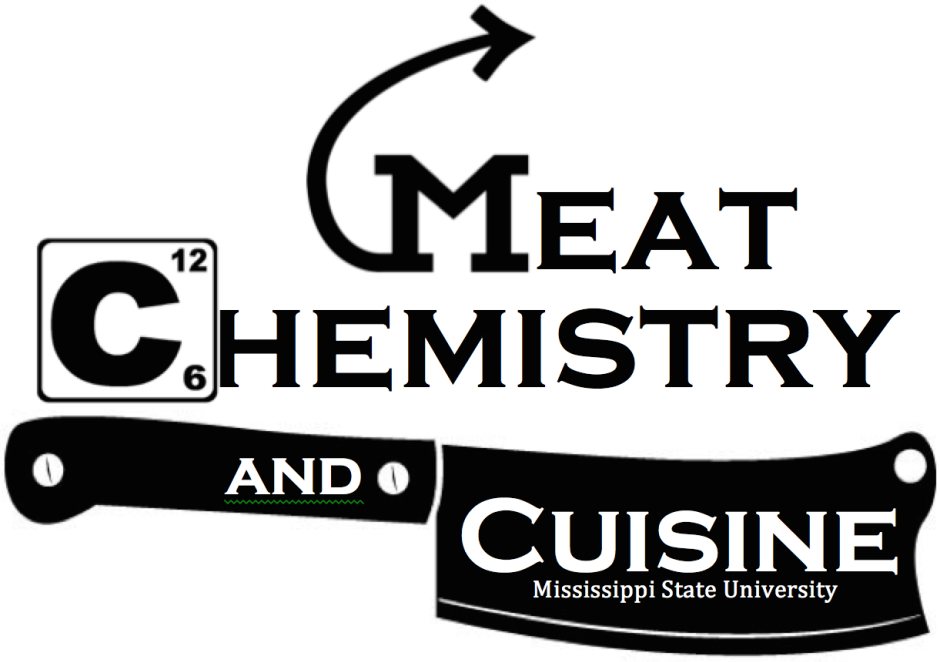

A novel pedagogical system that teaches the Anatomy, Biology, and Chemistry (ABCs) of Meat Animal Production, Processing, and Cookery

Created By:

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Introduction to the Meat Chemistry and Cuisine Concept (Chapter 1)

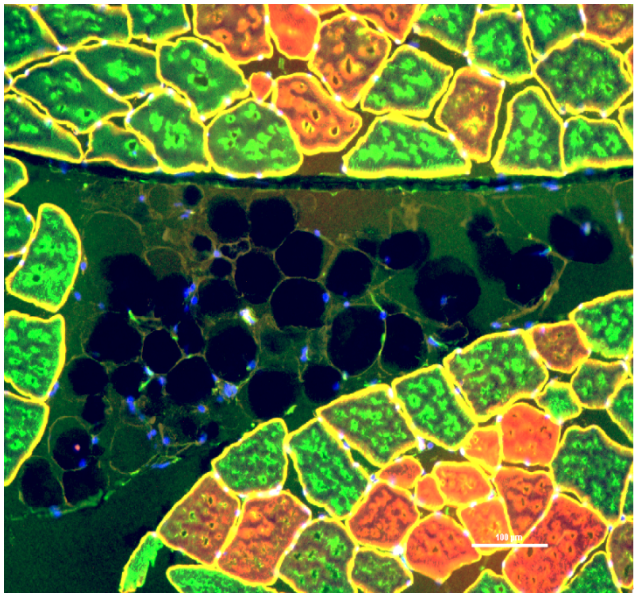
The meat chemistry and cuisine concept is the product of a meeting of the minds between two meat enthusiasts who happen to be trained in meat chemistry and muscle biology. Dr. Derris Burnett (Muscle Biology/Meat Science) and Dr. Thu Dinh (Muscle Chemistry/Meat Science) are current and former, respectively, faculty in the Department of Animal and Dairy Sciences at Mississippi State University with a passion for meat science research and education. Meat represents the end product of livestock production but before it reaches the consumer's dish, there are physiological priorities and biochemical adaptations in skeletal muscle that dictate the composition of the final product. The meat chemistry and cuisine program explores the nexus between these **A**natomical, **B**iological, and **C**hemical paradigms **(ABCs)** and how this ultimately influences meat cookery and cuisine. This curriculum is designed to immerse students in the world of meat animal production, harvest, butchery, further processing, and cookery. The focus on these important components develops a comprehensive understanding of meat animal agriculture from the farm to the fork allowing students to connect these interrelated concepts. This unique pedagogical approach creates an engaging classroom environment where students are active participants and practitioners of the course material and are able to conceptualize the ABC paradigms during real-time preparation of meat ingredients and dishes. Participants become more informed consumers and better capable of dispelling meat myths and misinformation which are becoming more rampant due to special interests and platforms against animal agriculture and meat consumption.

Resource Library Catalog Description: Cooking meat is as much an exercise in chemical reactions as it is in culinary flare. The Chemistry and Cuisine course will teach the principles of Muscle Composition and Meat Chemistry and demonstrate their impact on final product quality. In each meeting we will introduce specific concepts related to meat chemistry and students will be exposed to a range of culinary methods that manipulate the physiochemical composition of the meat product to yield a final dish. This dynamic and engaging learning environment will increase students' understanding of the mediums and mechanisms that convert muscle to meat and meat to masterpieces.

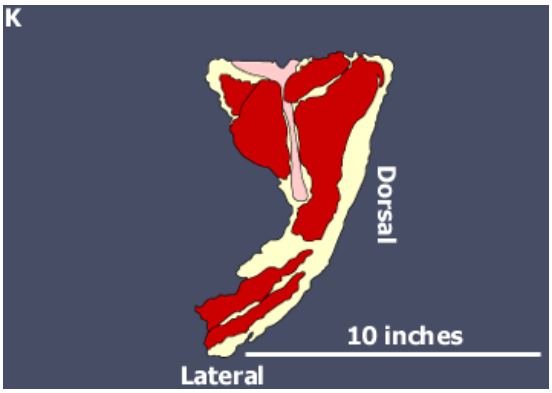
The next few chapters introduce the reader to the **A**natomical (Chapter 2), **B**iological (Chapter 3), and **C**hemical (Chapter 4) paradigms **(ABCs) that exist in muscle and in the conversion of muscle to meat products.**

Anatomy (Chapter 2)

Anatomy is the branch of science that deals with the structure, localization, and interaction of cells, tissues, and organs in animals and other living organisms. Muscle is the precursor for meat and, as it pertains to this course, the principles of anatomy are essential to understanding how groups of individual muscles become meat cuts and ultimately how they become a culinary product. The anatomy of the live animal and the carcass also inform the 5 principles of meat cutting which include separating fat from lean, more valuable from less valuable, more tender from less tender, thick from thin, and separating retail cuts across the grain. With each lesson we focus on how the structural and functional anatomy of specific muscles, bones, and fat depots influence quality, composition, and cookery of meat products. This includes the influence of muscle location and histological structure on muscle composition. In addition, we compare and contrast different species of livestock which may use anatomically similar muscles for different functions which in turn impacts the meat products that arise from these animals in a species-specific manner. These parameters have functional consequences in terms of the selection, processing, and cookery of individual meat cuts.



immunohistochemical cross section of skeletal muscle fibers and associated marbling adipocytes.



Myology of the Short Loin in Beef Animals (https://bovine.unl.edu/)

Additional Resources:

- https://bovine.unl.edu/
- https://porcine.unl.edu/
- http://animalbiosciences.uoguelph.ca/~swatland/ch3_0.htm
- https://www.beef.org/
- https://www.pork.org/

PORCINE CARCASS ANATOMY

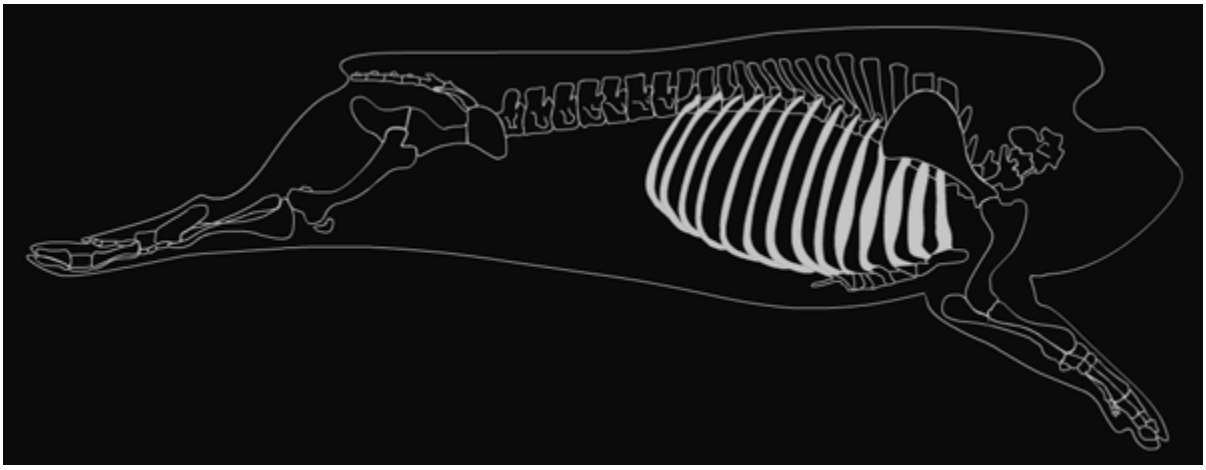
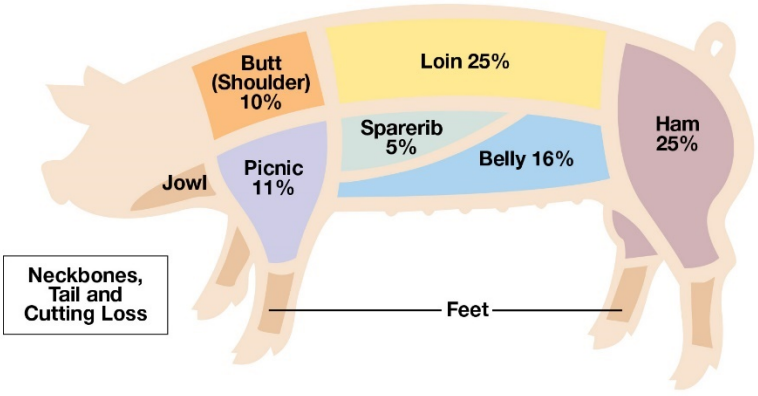


Figure 1. Porcine Skeletal Anatomy (Source https://porcine.unl.edu/)

Figure 2. Pork Carcasses (Source: https://meatscience.org/)

Wholesale USDA Prices for Pork Sub-primals

Primal Cuts	Sub-Primal Cuts	2016 Annual Average (dollars per pound)	2015 Annual Average (dollars per pound)	Year-to-Year Percent Change
Butt (Shoulder) Primal, various styles, 10% of carcass	1/4″ Trim Butt Vacumm-packed	1.02	0.99	3%
	1/8″ Trim Steak Ready Butt Vacumm-packed	1.18	1.15	3%
	1/4″ Trim Boneless Butt Vacumm-packed*	1.20	1.14	5%
Loin Primal, various styles, 25% of carcass	1/4″ Trimmed Loin Vacumm-packed	0.97	1.04	-7%
	1/8″ Trimmed Loin Vacumm-packed	1.04	1.11	-6%
	Boneless Center-cut Strap-on	1.30	1.42	-9%
	Boneless Center-cut Strap-off	1.44	1.59	-9%
	Boneless Sirloin	1.08	1.17	-8%
	Bone-in Sirloin	0.71	0.75	-5%
	Tenderloin	2.29	2.29	0%
	Backribs 2.0 Lbs. or More	2.49	2.51	-1%
Ham Primal, various styles, 25% of carcass	17 to 20 Lbs. Trimmed Selected Ham	0.66	0.69	-3%
	20 to 23 Lbs. Trimmed Selected Ham	0.66	0.65	2%
	23 to 27 Lbs. Trimmed Selected Ham	0.65	0.61	5%
	4 Muscle Ham to Blue	1.32	1.07	23%
	Insides*	1.27	1.09	16%
	Outsides*	1.26	1.09	16%
	Knuckles*	1.22	1.06	15%
	Outer Shank*	0.74	0.69	7%
Picnic Primal, various styles, 11% of carcass	SS Smoker Trim Picnic, Vacumm-packed	0.71	0.71	0%
	RS Smoker Trim Picnic Combo*	0.58	0.64	-9%
	Picnic Cushion Meat, Vacumm-packed	1.04	1.06	-2%
	SS Smoker Trim Picnic, 1 Pc Vacumm-packed*	0.80	0.81	0%
Trim Primal, various styles 10-30% of carcass	42% Trim Combo	0.48	0.55	15%
	72% Trim Combo	0.69	1.05	54%
	72% Trim Boxed, Frozen*	0.77	1.14	48%
	Picnic Meat Combo Cushion Out*	0.85	1.21	42%
	Trim with Trace Combo*	0.42	0.44	5%
Spareribs Primal, various styles 5% of carcass	Trimmed Spareribs – Light	1.45	1.69	-15%
	Trimmed Spareribs – Medium	1.40	1.65	-15%
	St Louis Spareribs, Vacumm-packed*	2.22	2.47	-10%
	BBQ Style Spareribs, Vacumm-packed*	1.69	1.91	-12%
Belly Primal, various styles 16% of carcass	Derind Belly 9 to 13 Lbs.*	1.41	1.39	1%
	Derind Belly 13 to 17 Lbs.*	1.38	1.37	1%
	Derind Belly 17 to 19 Lbs.*	1.32	1.24	7%
	Skin-on Belly 12 to 14 Lbs.	1.27	1.22	4%
	Skin-on Belly 14 to 16 Lbs.	1.24	1.15	8%
Pork Cutout		0.79	0.79	-1%



Note: Primal yields include trim, fat, skin, bone and shrink. Total yields do not calculate to 100 percent due to other products derived from carcass (jowl, neckbones, tail, feet, cutting loss). Trim yield is approximate due to various styles of cutting primals.

Prior to April 2013, prices from the voluntary report were used (USDA Weekly National Carlot Meat Report).

*A number of new items have been added to this report, some of which were not available in the voluntary report.

Source: Steiner Consulting Group using data from USDA's Agricultural Marketing Service Report, LM-PK610

pork checkoff Quick Facts

Figure 3. Porcine Primal Anatomy (Source: https://www.pork.org/)

BOVINE CARCASS ANATOMY

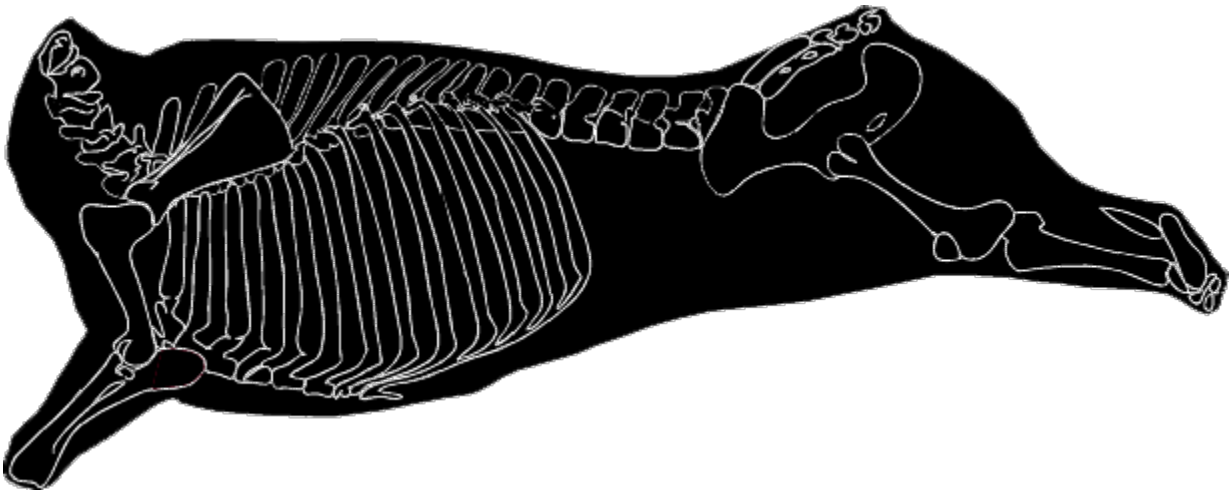


Figure 2. Bovine Skeletal Anatomy (Source: https://bovine.unl.edu/)

Figure 3. Hanging Bovine Carcasses (Source: MSSTATE MSMB Lab)

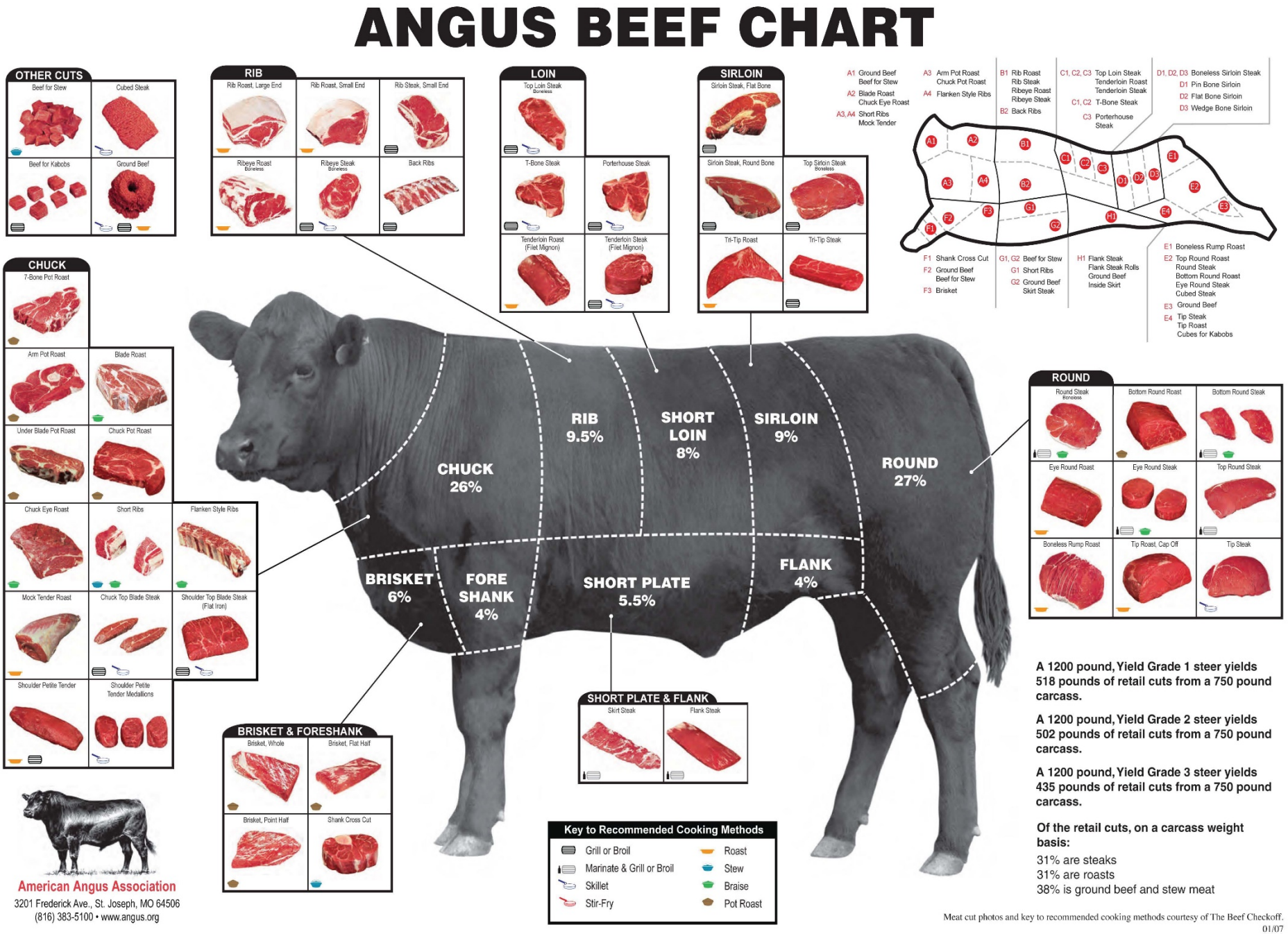


Figure 4. Beef Carcass Anatomy (Source: https://www.angus.org/pub/beefchart.pdf)

LAMB CARCASS ANATOMY

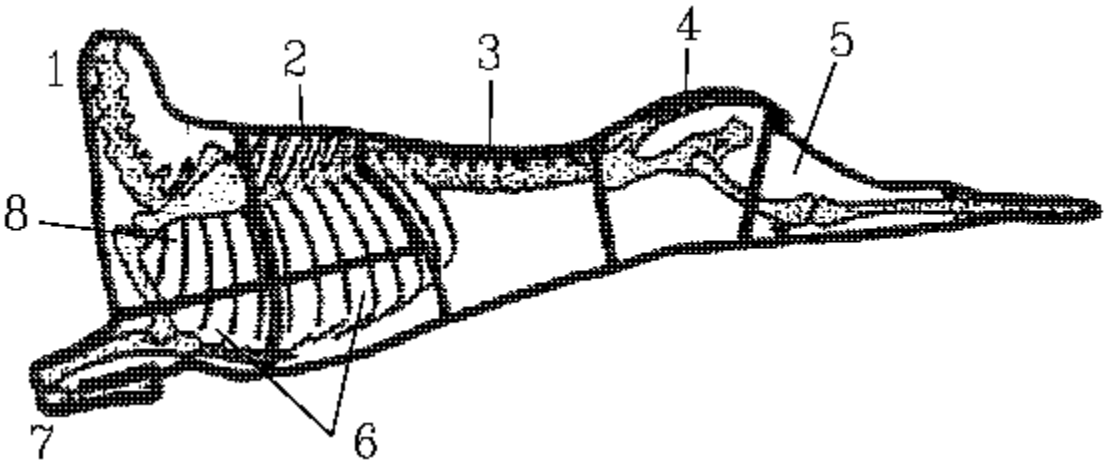


Figure 5. Lamb Skeletal Anatomy (Source: http://animalbiosciences.uoguelph.ca/~swatland/ch3_0.htm)

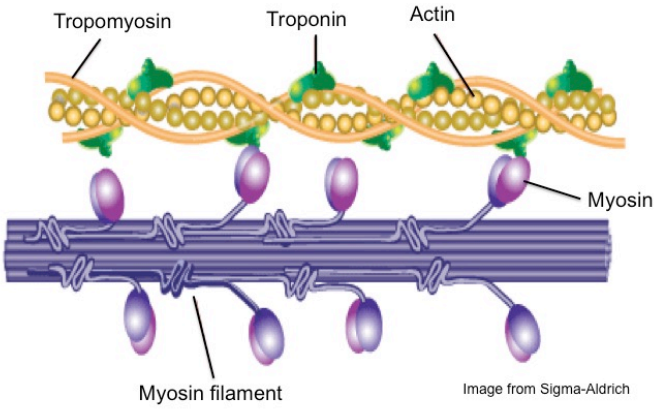
Figure 6. Lamb Carcass

GOAT CARCASS ANATOMY

Figure 7. Whole and Fabricated Goat Carcasses (Source: Derris Burnett)

Biology (Chapter 3)

Biology is the science of life and encompasses all of the processes and molecules that are necessary for growth, development, survival and reproduction in living organisms. Regarding meat animal production and the cookery of the meat products that result, a sound understanding of muscle, bone, and fat biology is an essential component to culinary success and meeting consumer expectations in terms of quality and composition of meat products. The most important to understand about biological contributions to meat composition and quality is that "**physiology comes first.**" That is to say, most biological processes exist out of necessity and consumer preference is a not a priority in terms of these existential considerations. In terms of skeletal muscle which is the primary precursor for meat there are physiological mechanisms that contribute to the specificity of muscle individual muscle functionality. As scientists and producers, we can take advantage of certain processes to produce a more desirable meat product, but these efforts are confined by the restraints of obligatory physiological pathways and the prioritization thereof. The key is to understand how the biological/physiological function of a muscle impacts the quality, composition, and cookery of the subsequent meat products. Muscle is a heterogeneous tissue composed of Protein components, Connective Tissue, IMF, and associated Intermuscular Fat. The relative amount and distribution of these components influence the organoleptic properties of the meat products that result from these muscles. As such they also influence the economic value and the most optimal methods of cookery. Moreover, a cut of meat may contain from one to several muscles and the functional and compositional properties of each of these muscles must be taken into consideration to optimize cookery.



Chemistry (Chapter 4)

- Chemistry is the study of the composition of the elements and compounds that make up matter. Skeletal muscles complex physiology and structure requires the interaction of structural and functional chemical compounds. These compounds and/or their postmortem/post-processing metabolites determine the substrates available for the conversion of muscle to meat. Here we introduce the concepts of chemical composition and how the biological chemistry of skeletal muscle impacts quality, composition, and cookery. The chemical compounds in skeletal muscle before harvest dictates the tissue level reactions that occur in the conversion from muscle to meat. These compounds including water (~70% of most meat products) proteins/amino acids, lipids, carbohydrates, collagen, vitamins, and minerals determine how the muscle will respond to the harvest process, post-mortem aging, fabrication, value-added processing, and cookery. The individual CHEMICAL components can be thought of as **inherent ingredients** that are as influential to ultimate flavor as the garlic salt, paprika, and other seasonings that may be added during preparation. Understanding the chemistry of these components also informs the optimal method and duration of cookery for these products. In this section we discuss species specificity with regards to muscle composition and meat flavors and introduce the principles of oxidation, heating, browning, etc. We also introduce the chemistry principles that underly the Muscle/Meat Color triangle.

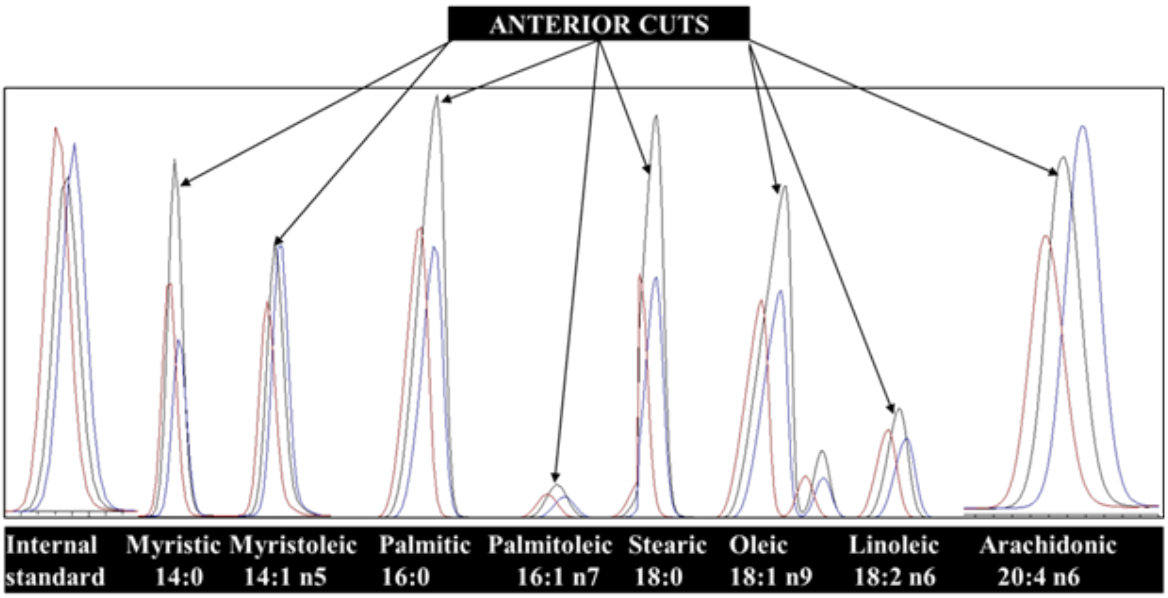


Figure 1. An example of chromatographic peaks of fatty acids (as labeled) of anterior pork chops (indicated by arrows) compared with those of center and posterior chops (other two overlaid peaks at the same positions). Peak height and width are zoomed in to demonstrate comparison within a fatty acid and do not represent relative comparison among fatty acids

The Science of Taste (Chapter 5)

In this section we briefly turn our attention away from the ABCs of the meat product towards the ABCs of the consumer. Hunger is a physiological state in which an individual needs food (nutrients) and the necessary mechanoreceptors and chemoreceptors are activated to simulate the individual to seek out food to satisfy this requirement. Appetite is more of a conditioned emotional response to the sight, smell, or taste of food in which one may have a variable desire for a specific dish or ingredient. In this manner, eating is a complex behavior that involves all aspects of the sensory system. In addition to the physiological need to obtain sustenance for metabolic needs, the emotional desire (or lack thereof) to eat can be stimulated by the sight smell, touch, taste, or even sound of cooking food. Once food is acquired, the integration of the entire sensory system determines the degree of satiety and satisfaction of the consumer during each eating experience.

Humans can detect 5 Basic tastes which include: sweet, salty, sour, bitter, and umami (savory) The relative combination/preponderance of these flavors combined with other sensory factors such as flavor aromatics, aftertastes, and texture or feeling factors makes up the complex flavors we experience we eating any food including meat. This involves integration of the gustatory system made up of billions of taste receptors as well as the olfactory system which is made of scent receptors. The sense of smell is also closely related to taste perception. There are billions of aromatic compounds that can stimulate olfactory receptors. Regardless of receptor type, a chemical signal causes a cascade of events that is integrated into a physiological sensation that we commonly refer to as taste. Taken together, flavor represents the comprehensive integration of the sensory stimuli through the sensory centers and culminates in the eating experience for the consumer. While the nuance of complex flavor may be lost on the average consumer, professional taste testers are able to discern a remarkable number of flavor attributes in even the most complex products. The library of terms to describe specific products or product categories is known as a **flavor lexicon**. The consumer ability to react and perceive flavor compounds also follows our ABC model and can be described as follows:

Anatomy: Eating involves the mouth, teeth, tongue, and other digestive organs. Humans are equipped with a variety of teeth for prehension, and mechanical tearing, shredding, and grinding of food particles.

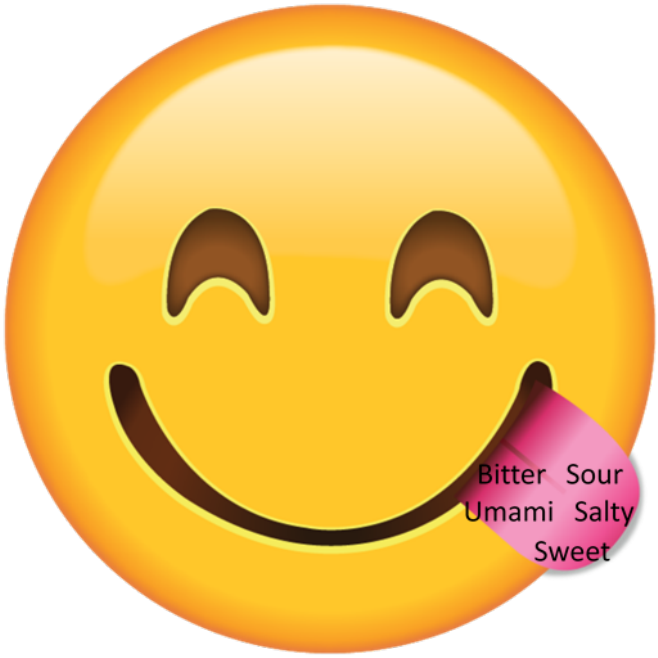
Biology: Even before food enters the mouth, digestive mechanisms are initiated in anticipation of the meal. The process of mastication and lubrication serves to reduce the particle size in increase the surface area of food to an acceptable threshold for subsequent mechanical and enzymatic digestion.

Chemistry: Saliva, digestive juices, and enzymes act on food particles to liberate the constituent macro- and micronutrient molecules contained in the meal. These include a variety of lipases (for lipid digestion), amylases (CHO digestion) and proteases (for protein digestion) as well as chemicals such as HCl and Bicarbonate which have various functions including particle breakdown and buffering of the GI tract, etc.

Example Exercises/Core Competencies

- Meat flavors
- Species specific attributes and lexicons

- Precursors and Volatiles
- Brines, marinades, and other flavor enhancers
- Curing, Fermenting, etc.
    - Flavor anchors experiment (Salt, Sweet, Bitter, Sour, Umami)
    - Same seasoning, same cut, different species experiment
    - Cinnamon experiment to relate the senses of taste and smell
    - Cured and fermented sausage experiments



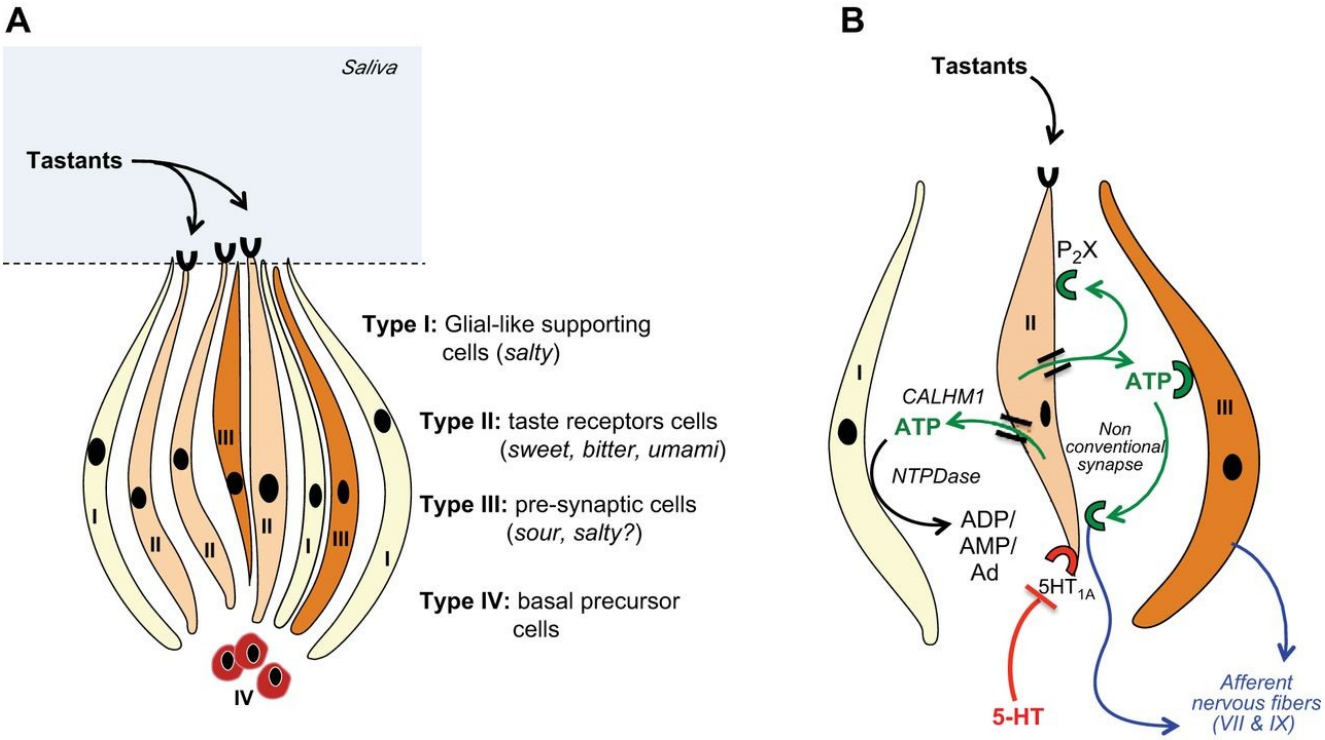


Figure 8. Main cellular and functional characteristics of taste buds. A: functional roles of the different cell types constituting a taste bud. B: role of ATP, as neurotransmitter, in the communication between the different taste bud cells. Ad, adenosine; CALHM1 (Besnard et al., 2015)

Kickin' Flavor
Example of A Meat Chemistry and Cuisine Flavor Lesson Plan

Introduction
Human beings can sense 5 basic flavors which include **Sweet**, **Sour**, **Salty**, **Bitter**, and **Umami**. The combination and interactions of these senses along with contributions from the olfactory system and various other chemical reactions create the perception of overall taste.

Objectives
The objective of this exercise is to introduce students to the concept of taste perception and the 5 universally accepted basic tastes that make up the human sense thereof.

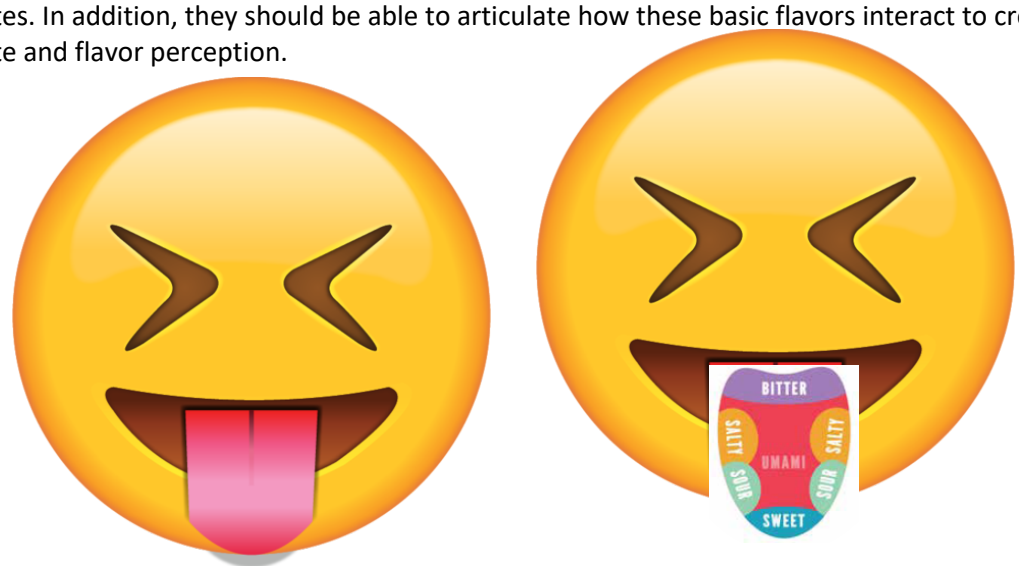
Supplies Needed
- Lemon Juice
- Coffee or Other Bitter Example
- Beef Broth or other Umami Example
- 5-10% Sugar Water
- 5-10% Salt Water
- Ground Cinnamon
- Granulated White Sugar
- Salt free crackers
- Sample Cups and Lids (8 Per Participant)

Methods
Portion each of the samples into small portion cups based on the flavor they correspond to and label them with the following random numbers:

Random ID Number	Flavor	Classroom Example	Official Reference Standard
3	Sweet	5-10% Sugar Water	
1	Sour	Lemon Juice	
2	Salty	5-10% Salt Water	
4	Bitter	Burnt Coffee (No Sugar)	
5	Umami	Beef Broth, Bouillon, MSG	

1. Students will sample individual sample cups with the appropriate solution. In between samples, students will consume unsalted crackers to cleanse the pallet.

Learning Outcomes
After completing this exercise, students should be able to identify and discuss examples of the 5 basic tastes. In addition, they should be able to articulate how these basic flavors interact to create overall taste and flavor perception.



Examples ABC Lectures (Chapter 9)

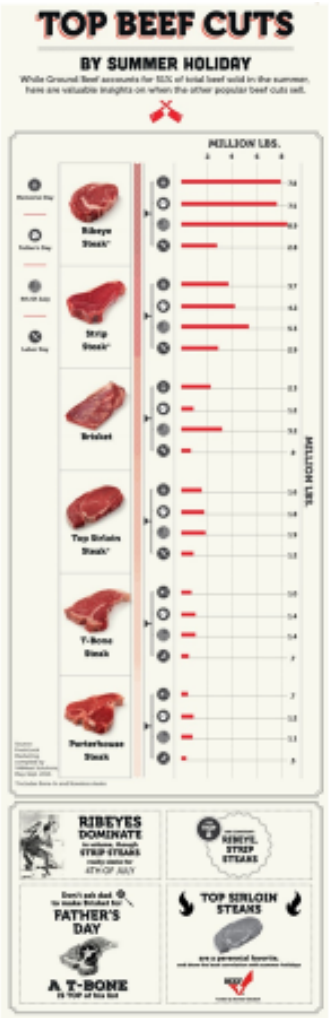
In this section we include a few examples of our ABC Lecture style. Each Lecture begins with the ABCs for a specific cut of meat and ends with the culinary approaches we take to turn the muscle into meat masterpieces. This format can be adapted to various types of meat including fresh and processed meats to create practical and engaging lecture materials that can be used to accompany the cookery of meat products for demonstration purposes. In this manner, students have the opportunity to learn but more importantly, ***experience***, the underlying concepts.

The ABC's of Smoked Brisket: How to master one tough meat cut using the principles of Meat Chemistry and Cuisine!

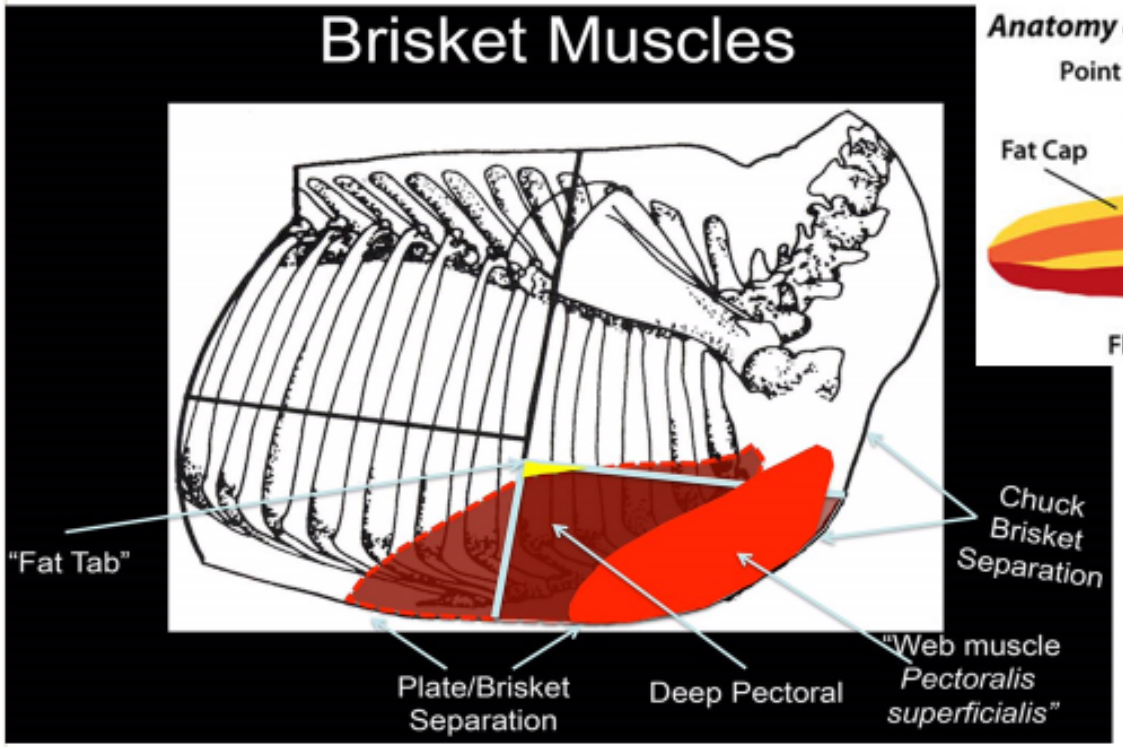
Smoked Brisket – From Start to Finish

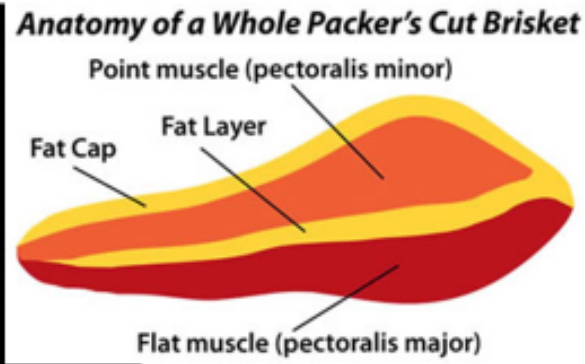
The Meat Chemistry and Cuisine Class

Brisket – a favorite summer beef cut



The Anatomy of Brisket





The Biology of Brisket

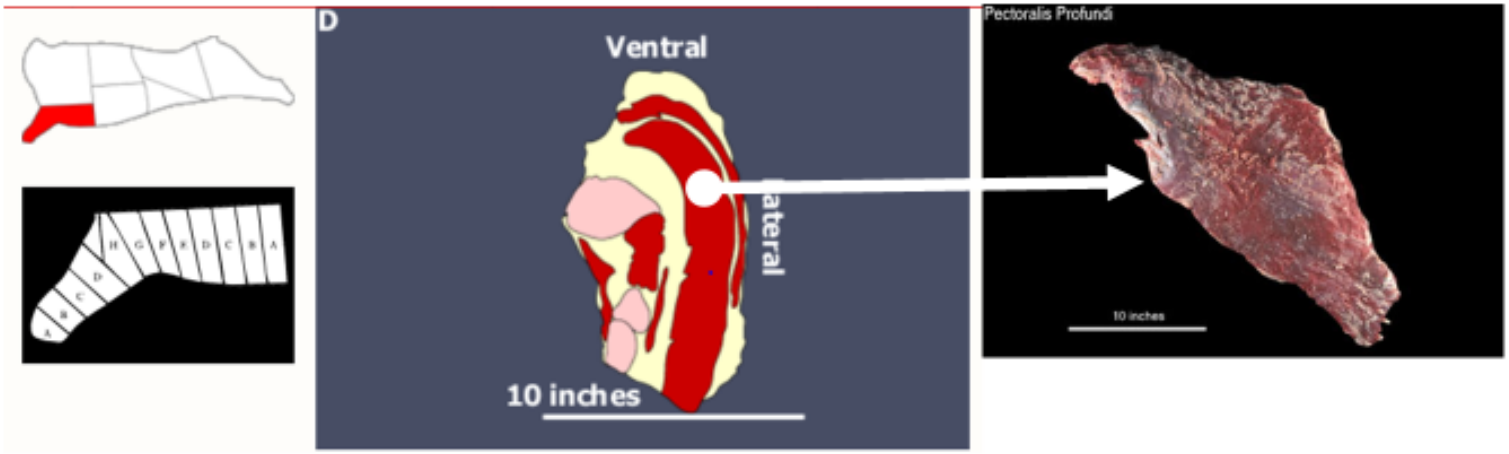
- Why is brisket so tough?

- The Brisket therefore shores the weight of the front end of the animal
- This can be up to 750lbs or more per side!

The Biology of Brisket

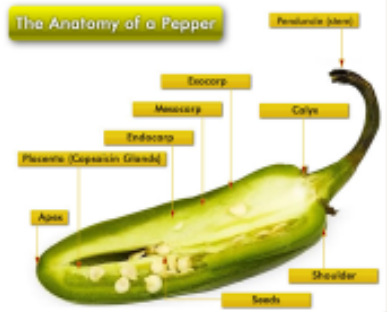
Pectoralis profundi

- Support: carrying weight of fore quarter
- Locomotion: Extending shoulder joint, elevating trunk when limb advances, retracting limb.



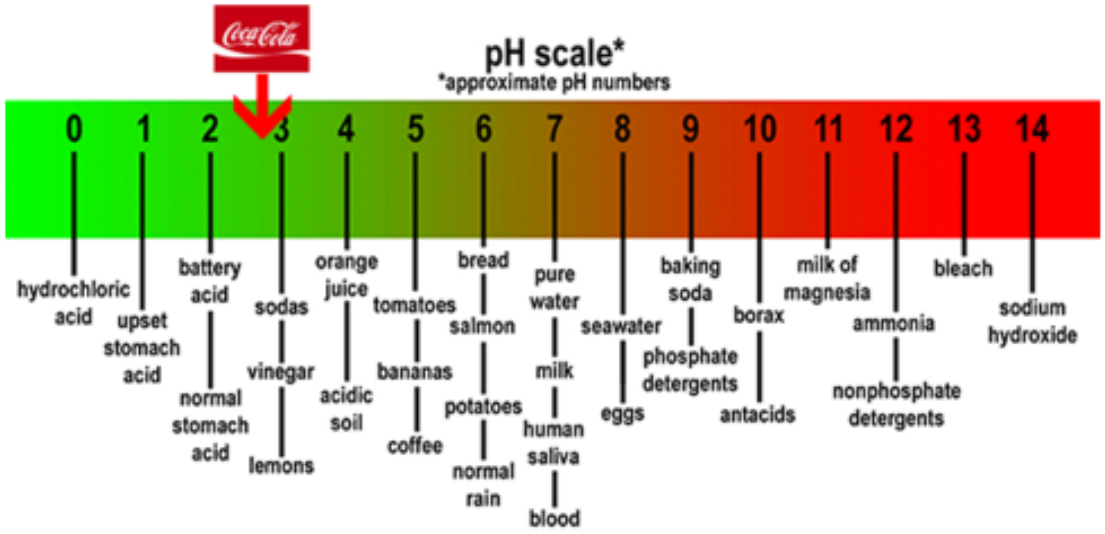
The Chemistry of Smoked Brisket

- The heat from Hawaii
  - Pineapple
  - Jalapeno
- Salt: flavor enhancement
- Sugar: caramelization
  - Flavor
  - Color
  - From fruit, coke
- Other ingredients: garlic, black pepper, coke



The Chemistry of Smoked Brisket

- pH: it makes all the difference
  - Low pH
  - Breaking down connective tissues
  - Contributing to flavor and color development



The Chemistry of Smoking Brisket

- Smoking
  - Aroma and flavor
  - Preservation
  - Color
  - Antioxidation
  - Smoked skin
- Smoke composition
  - Phenols: aroma, flavor, antioxidants
  - Alcohols: carriers of smoke components
  - Organic acids: skin, preservation
  - Carbonyls: color, flavor
  - Hydrocarbons: undesirable, carcinogenic
  - Gases: CO_2, CO, O_2, N_2, H_2O, etc.
- **SLOW, DRY HEAT COOKERY**

How else do people eat brisket

Meat Chemistry and Cuisine

Mississippi State University

Meat Cookery

It's FUN

It's EASY

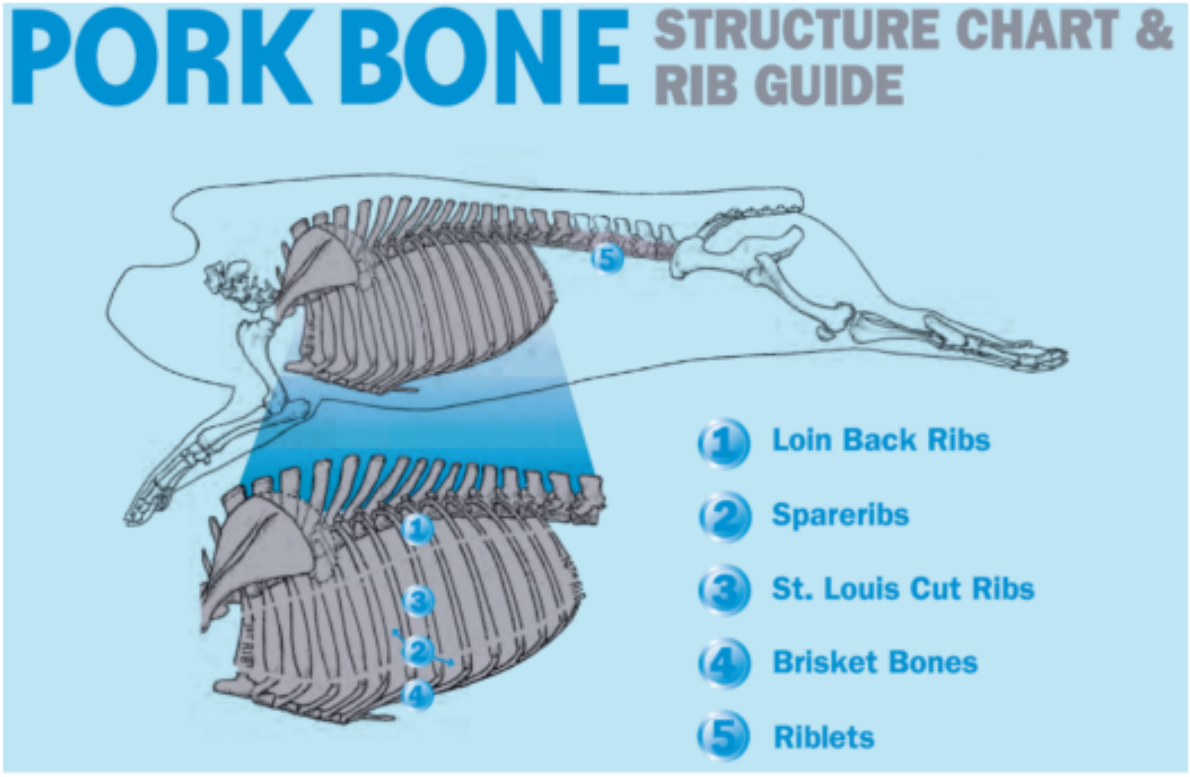
It's **ABC**

The ABC's of Smoked Pork Ribs: From Intercostal Muscles to Fall off the Bone BBQ!

Pork Spare Ribs – From Start to Finish

Meat Chemistry and Cuisine

The Anatomy of Spare Ribs



The Biology of Spare Ribs

- Protection: flexible and shock-absorbent
- Respiration: changing width and depth (volume) of thoracic cage
- Tough diaphragm: need to be removed

The Chemistry of Cooking Spare Ribs

- Dry rub: intense flavor (osmosis)
- Salt: flavor enhancement
- Sugar: caramelization
  - Flavor
  - Color
  - Brown sugar: moist, better color development, mild caramelization
  - Caramelization: dehydration and polymerization of sugar
- Other ingredients: paprika, garlic, black pepper

The Chemistry of Cooking Spare Ribs

- Smoking
  - Aroma and flavor
  - Preservation
  - Color
  - Antioxidation
  - Smoked skin
- Smoke composition
  - Phenols: aroma, flavor, antioxidants
  - Alcohols: carriers of smoke components
  - Organic acids: skin, preservation
  - Carbonyls: color, flavor
  - Hydrocarbons: undesirable, carcinogenic
  - Gases: CO_2, CO, O_2, N_2, H_2O, etc.

MEAT CHEMISTRY AND CUISINE
Mississippi State University

Meat Cookery

It's FUN

It's EASY

It's **ABC**

Final Project Guidelines and Showcase Invitation

Final Project Guidelines

Students, by the end of the course you will have learned all about the principles of meat selection, fabrication, and cookery. As we continue through the semester it is time to begin thinking about how these principles can be applied to a dish of your choice and put your knowledge to the test in creating a delectable meat dish using the Anatomy, Biology, and Chemical Composition of your species-specific meat cut(s) to guide your culinary process.

You will need to create a showcase which includes a 5-7-minute poster or PowerPoint presentation Based on the ABC's:

1. **Discuss the seasoning or marinade strategy you have chosen for your cut.**
2. **Discuss the cookery method you have chosen and why.**
3. **Discuss the meat safety issues associated with the preparation of your dish.**
4. **Discuss the relative value of the cut to the rest of the carcass.**

Team Name (be creative):

Group member names and contact information:

1.
2.
3.
4.
5.

Designated Species: _____ **Cut(s) of meat: _____**

Ingredients needed:

1.	**2.**
3.	**4.**
5.	**6.**
7.	**8.**
9.	**10.**

You will prepare a display and your dish to a panel of food critics. You will be judged on your product as well as your presentation. Be creative with your display. You will need to decorate your booth with items that match your species theme. Make sure the dish has a nice appearance for the judges. You will need a presentation dish for the judges as well as additional product for the rest of the group to taste. You should be prepared to feed **samples** to about 15 people.

You are invited!!!

MEAT CHEMISTRY AND CUISINE
Mississippi State University

Example: Final Project Showcase

The students in the XXX Meat Chemistry and Cuisine class have been working hard this semester and it's time for their final product showcase. The students have been assigned either Beef, Pork, Lamb, or Goat species and have selected meat cuts to prepare their final dishes. They will discuss the Discuss the Anatomy, Biology, and Chemical Composition (ABC's) of their meat cut(s) and how they factored these considerations into their final dish.

Based on the ABC's the students will:

Discuss the seasoning or marinade strategy they have chosen for their cut.

Discuss the cookery method they have chosen and why.

Discuss the meat safety issues associated with the preparation of their dish.

Discuss the relative value of the cut to the rest of the carcass.

Principles of Meat Cutting

1. Separate **Tough** cuts from **Tender** cuts.
2. Separate **THICK** cuts from **THIN** cuts.
3. Separate **Fat** from **Lean**.
4. Separate **valuable** from **less valuable.**
5. Cut **Perpendicular** to the grain.

MEAT CHEMISTRY AND CUISINE
Mississippi State University

MEAT CHEMISTRY AND CUISINE

You are invited!!!

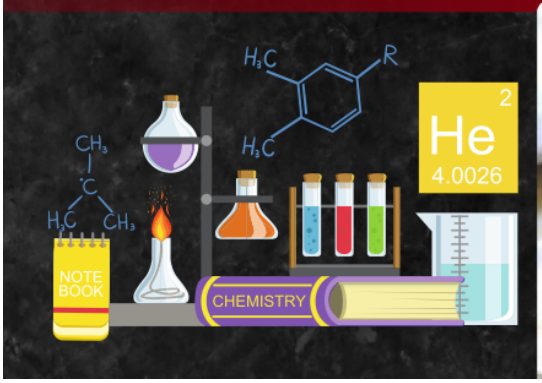
Final Project Showcase

The 2023 ACRES Scholars in Meat Chemistry and Cuisine have been working hard this morning and it's time for their final product showcase.

These scholars have been challenged to produce a winning sausage formulation

They will discuss the ABC's:

- Anatomy
- Biology
- Chemical Composition



ACRES 2023
Meat Science Laboratory
Sausage Production Challenge

Objective: The objective of this exercise is for participants to develop a unique processed meat (in this case sausage) product and detail the entire process from trim production through packaging and labeling. Participants will utilize their understanding fabrication, further processing to approach a typical scenario faced in the contemporary meat industry.

Challenge: A new sausage company has contacted your team and would like you to develop a novel sausage product for to launch their boutique sausage line. You have been assigned a red meat species to develop your product from and you must detail the entire process from species of origin through to packaging and labeling. They also want a general cost of production for the product so you must include the **per pound** economics including price of trim, seasoning, casing, and packaging to make your product.

Approach: You will have **1 hour** to season, grind, and stuff your formulation in preparation for packaging. We will take official images of the process as you go. Once completed, you will then need to package and label your product. You will develop your novel product and present it to a panel of "company representatives" who will select the winning formulation. Your final presentation should discuss each of the following in detail:

1. **Species of origin** including unique attributes and considerations
    a. Current cost of trim for this species
2. **Fabrication** of species into primal cuts, and portions typically used for trim
    a. Include principles of meat cutting as justification
3. **Seasoning and grinding of trim**
    a. What is composition of your trim (lean: fat)? Any added fat? Why? What are the implications/strategy behind this?
    b. What is the purpose of grinding (Beyond the obvious, discuss the underlying basis)?
    c. What are the seasonings you chose? Add before or after grinding? Why? What are the implications?
    d. Meat Chemistry and Meat Safety Considerations….
4. **Stuffing sausage**
    a. What are casing options and what casing did you choose? Why?
5. **Label design**
    a. Regulatory requirements
    b. Ingredients, allergens, etc.
    c. See anatomy of a label document
    d. Etc.
6. **Packaging**
    a. Packaging decisions (Bulk, links, cut, etc.)
    b. Portion sizes? Why?
    c. Implications for ends, etc.
7. **Marketing and pricing**
    a. Create a short advertisement or TikTok video for your product
    b. Calculate Profit over cost

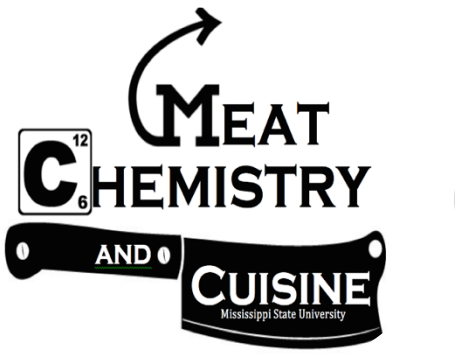
Notes

ACRES 2023
Meat Science Laboratory
Sausage Production Challenge

Label Component Checklist

- **Product Name** _____
- **Company Name/Address** _____
- **Company Logo**

- **Ingredients List**
  - _____
  - _____
  - _____
  - _____
  - _____
  - _____
- **Safe Handling Instructions**
- **Inspection Bug**
- **Handling Statement**



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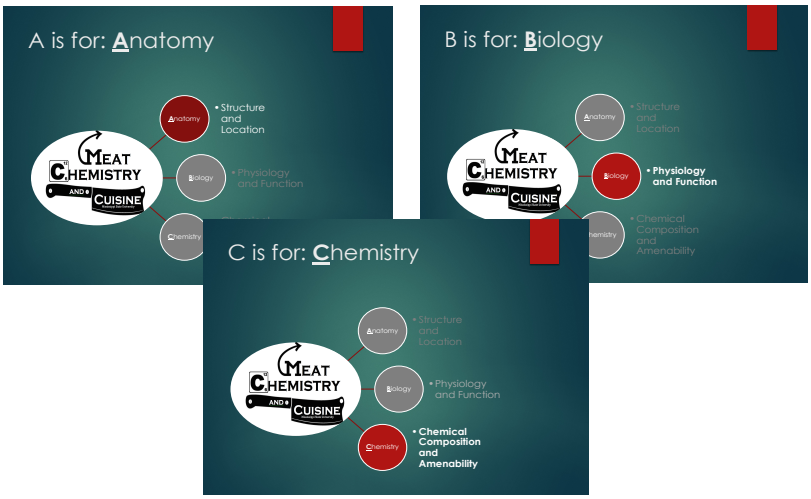
A is for: Anatomy
Anatomy
• Structure and Location
Meat Chemistry and Cuisine
Biology
• Physiology and Function
Chemistry
B is for: Biology
Anatomy
• Structure and Location
Meat Chemistry and Cuisine
Biology
• Physiology and Function
Chemistry
• Chemical Composition and Amenability
C is for: Chemistry
Anatomy
• Structure and Location
Meat Chemistry and Cuisine
Biology
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Chemistry
• Chemical Composition and Amenability

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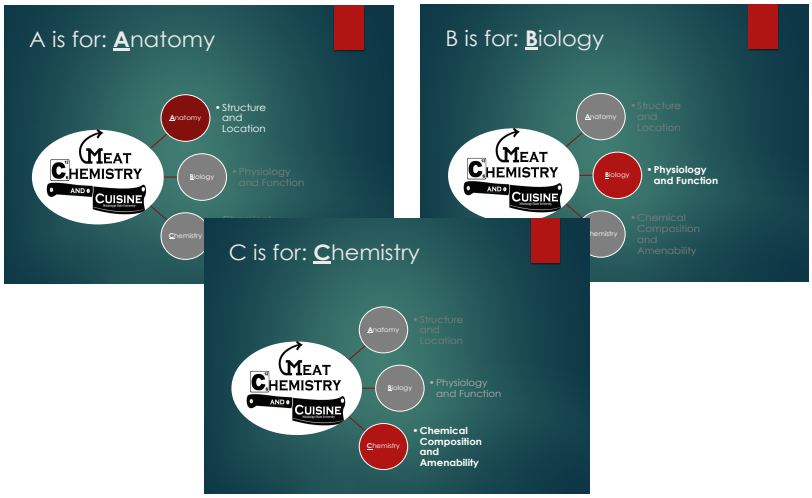
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