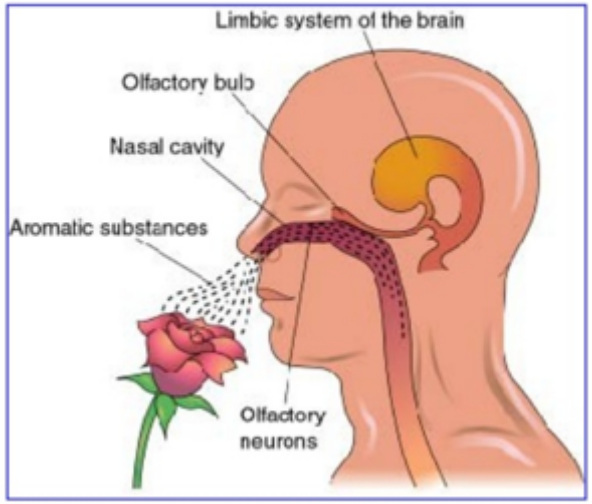
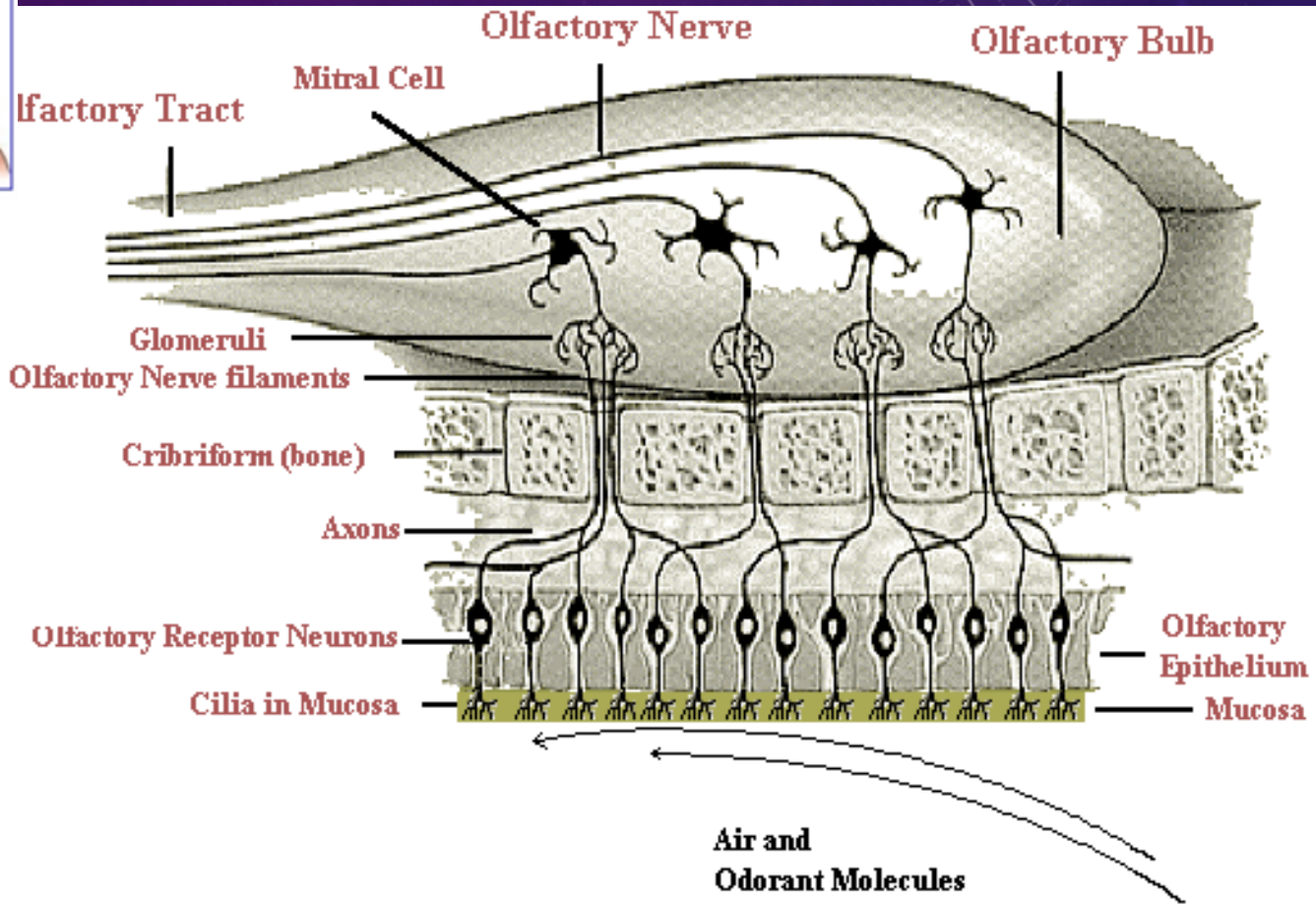
WINE AROMAS

WHITE WINE, RED WINE AND THEIR MARKERS

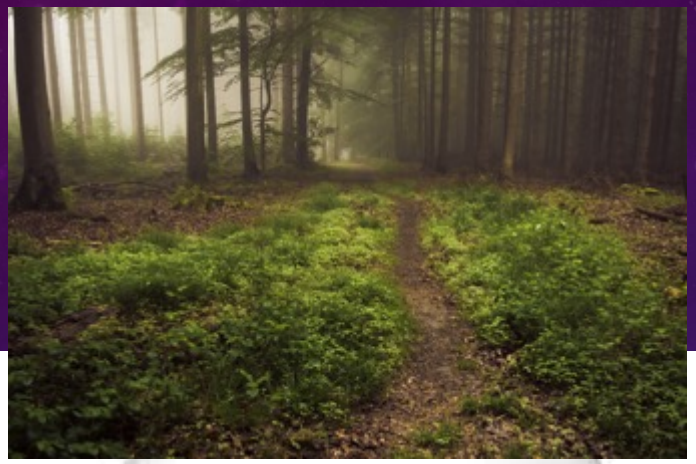
THE SENSE OF SMELL

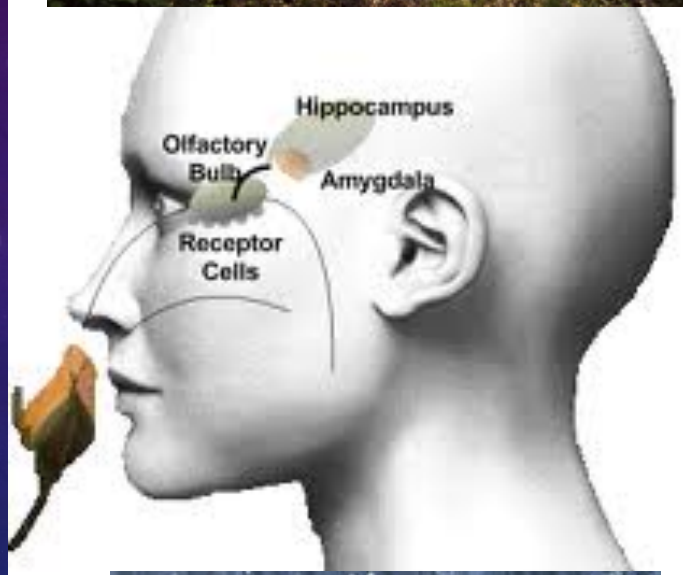


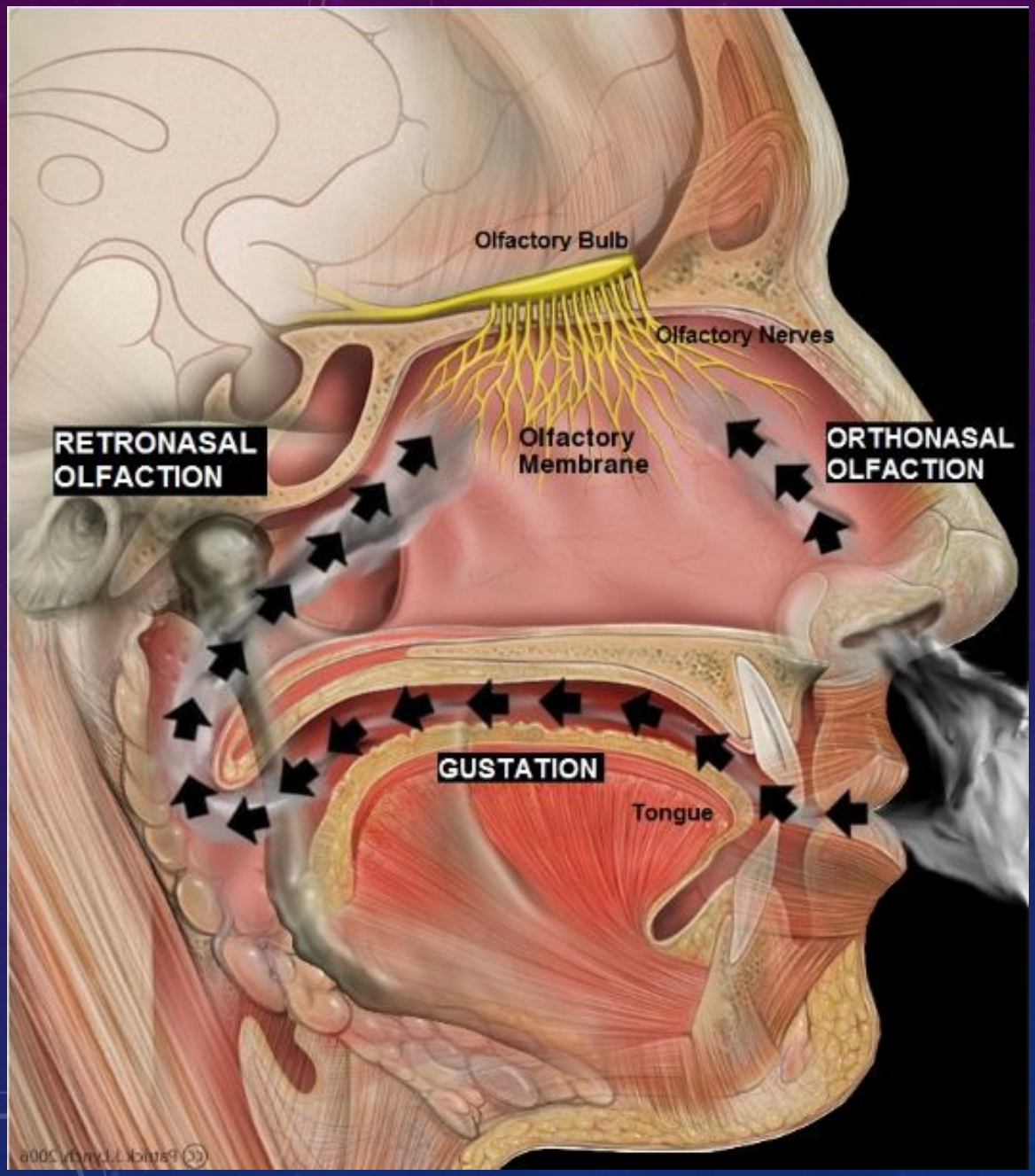


HOW WE SMELL AROMAS

- Most odors are not defined in our brain
  - Odor patterns are matched to memory patterns
  - Odors are matched to patterns in the brain (aroma library)
  - Blending of aromas will confuse what we are smelling – individual identification is important
  - Increase memory of aromas BY SMELLING EVERYTHING!




Hippocampus
Olfactory Bulb
Amygdala
Receptor Cells



1. When you smell directly through your nose, you are PULLING molecules up from the aroma that you are smelling.

2. The olfactory bulb sensors that are connected to your brain and interpret the aroma - if you have smelled it AND defined the it before.

3. When you get the same wine on your palate and swallow or spit the wine out - **AFTER** you spit or swallow and breath out, the same molecules hit your olfactory bulb a second time.

4. Everyone is different in how they interpret and assess the aroma based on their biology, history of food and wine, thresholds and preferences.

Senses and Sensations

Organs	Senses and sensations	Characteristic perceptions	
	Vision Visual sensation	Shades, fluidity, limpidity, effervescence	ASPECT
	Smell (Directly in nasal passage) Olfactory sensations	Aromas and bouquet	ODOR
	Smell (Retronasal) Olfactory sensations	Aromas from the palate	FLAVOR
	Tasting Taste sensations	Flavors: salt, bitterness, sour, sweet	TASTE
	Mucus reactions	Astringency and sparkling	TOUCH
	Chemical sensitivity Tactile sensations	Savory, salty, prickly, etc.	
	Temperature sensivity	Spice, heat, etc.	

The Aromatic Families

Fruity(Blackberry, plum, cherry, raspberry, strawberry, cherry, redcurrant, lemon, lime ,grapefruit, orange, peach, pear, apple, apricot, nectarine, grape, quince, pineapple, mango, passion fruit, lychee, apricot, marmalade, figs, prune, jam, honey, hazlenuts, almonds, walnuts

Mineral: (Flint, quartz, schist,chalk, limestone, graphite (lead pencil)

Balsamic: (Syrup, balm, cough mixture)

Woody: (Oak, cedar, pine, white tobacco, pencil shavings, cigar box, wood planks, cardboard, dusty old wood, TCA aromas

Animal: (Game, venison, bacon, musky, bloody, cigar box, musk, damp dog, stable, sweat (phenol smell from Brettanomyces), cat pee, damp wool, goat cheese)

Chemical: (Alcohol, iodine, petrol, tar, chlorine, sulfur, rotten eggs, styrene, glue, rubber)

Spicy: (Vanilla, cinnamon, nutmeg, ginger, clove, liqorice pepper, anise, fennel, mint, eucalyptus, rosemary, thyme, lavender, sage, bay, marjoram

Vegetal: (Tertiary aromas - age – undergrowth, truffle, forest mushrooms, tobacco,

Floral: (Violets (betianone molecule) rose, lilac, lily of the valley, iris, violet, hyacinth, ylang ylang, jasmin, lime blossom, orange blossom, acacia, magnolia, honeysuckle, geranium)

Empyreumatic: (Fire, smoke, toast, caramel, chocolate, coffee, charcoal)

Ethereal: (Green apples, boiled sweets, pear drops, unripe bananas, bubblegum, candle wax, fermented dough, wheat, beer, cider, wine lees, yogurt, butter)

PRIMARY AROMAS

- Varietal aromas that come with the variety of grape
- Provenance (where the grapes are grown)
- Before the winemaker adds aromas
- Can vary with vintage, weather, climate, elevation, orchard management, etc.

Secondary Aromas

- Techniques used through production
- ML (malo-lactic fermentation)
- Oak fermentations and maturations in oak
- Yeast – type used during fermentation
- Temperature and methods in wine production

Tertiary Aromas

- Created during the aging process
- Can be a result of extended barrel aging
  - Dried flowers
  - Tobacco
  - Mushroom
  - Forrest floor
  - Cigar box
  - Leather
  - Wax and lanolin
  - Soy, balsamic, etc.

Aromatic Styles

RED WINES (black fruit)

(Cabernets, Syrah)

- Black and Blue Fruits
- Blackberry
- Blackcurrant
- Blueberry
- Spices
- Leather
- Plums

DRY WHITE WINES

- Lemon
- Grapefruit
- Bell Pepper
- Jalepeño
- Exotic fruits
- Acacia Flower
- Kiwi
- Green Melon

RED WINES (red fruit)

(Merlot, Pinot Noir)

- Red fruits
- Cranberry
- Pomegranate
- Violet
- Cherry
- Liquorice
- Truffle
- Tobacco

SWEET WHITE WINES

- Acacia
- Quince
- Apricot
- Exotic fruits
- Peach – fresh & dried

ROSÉS

- Raspberry
- Redcurrant
- Cherry
- Strawberry
- Rhubarb
- Watermelon
- Melon
- Pink Grapefruit
- Orange rind
- Citrus Blossom
- Iris

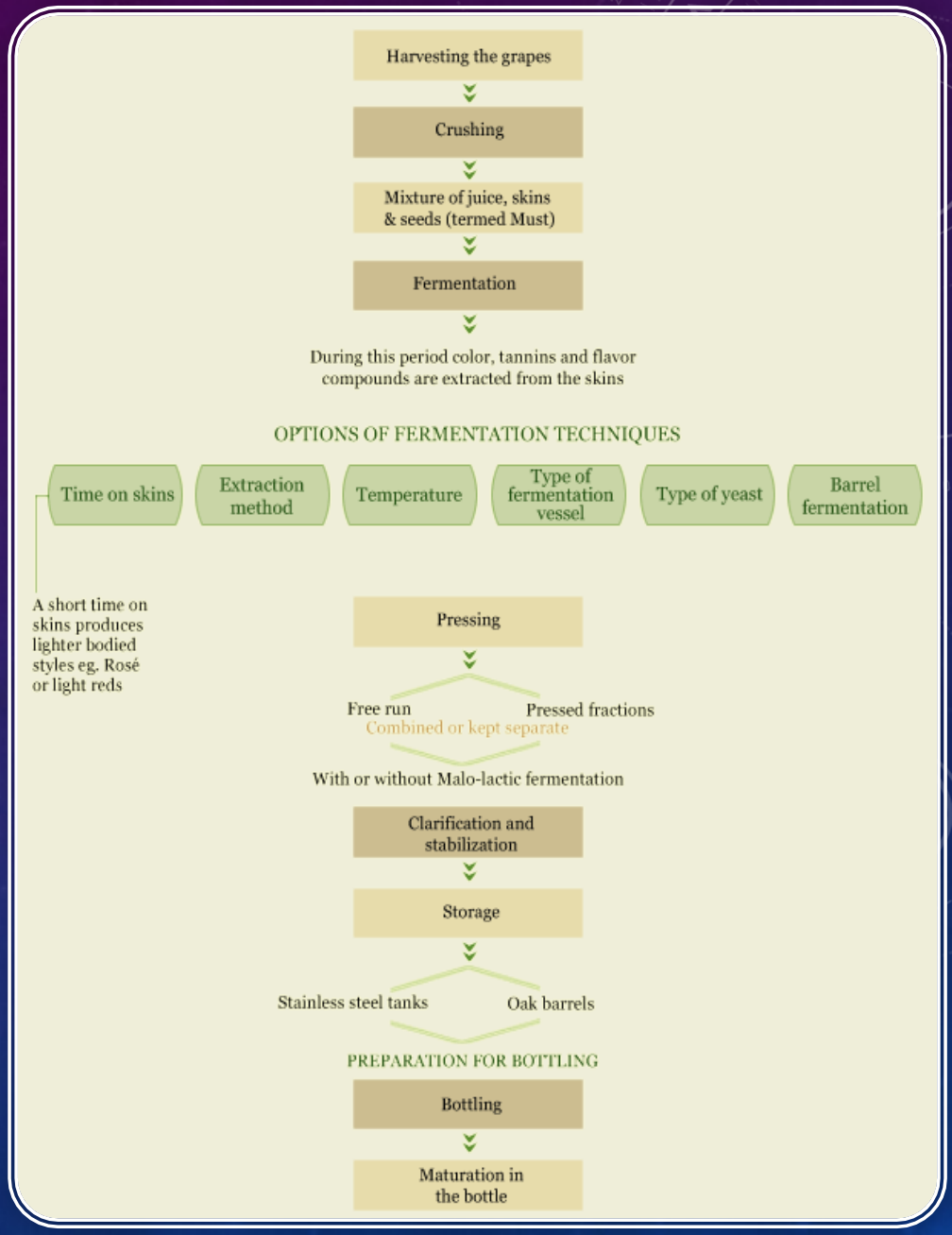
Barrel aged wines: vanilla, grilled and toasted aromas

Skin Contact

Aromas are impacted by:

- Grape Variety
- Provenance
- Vintage
- Fermentation
- Maturation

* Extraction of anthocyanins and tannins
  - Deepens color
  - Adds antioxidants
  - Aids in aromatics



Generally, most grapes are harvested based on:

- Sugar (ºBrix)
- Titratable Acidity
- pH

* Skins will influence: color, tannins, and flavor characteristics
* Levels of maturation of grapes need to be evaluated when making harvest decisions
* Important considerations:
  - Skin condition (freedom from rot) is particularly important in red wine production
  - Proportion of skins to juice (depending on berry size)
    - The accumulation of some components such as color and tannin will closely follow the accumulation of sugars.
    - But this may not hold true for the flavors and aromas
    - Aroma development may follow a different pattern.
    - To fully understand fruit composition and factors such as region, climate, variety, and viticultural practices is essential in determining optimum fruit maturity, and the time of harvest.

CRUSH

Crushed grapes consist of pulp, skin, and seeds, (Must).

* Approximately 30 mg/L of free SO_2 will be added during crush
* The SO_2 addition is to prevent the development of unwanted microbes such as indigenous yeast and harmful bacteria
* With red winemaking, some winemakers add a small (15 - 20%) of whole berries and/or stems to the must
* The stem addition is intended to extract more tannins
* Stems can be beneficial but can also contribute to bitter green aromas

Cold Soak or Cold Maceration

An Option:

* The must is cooled to 15 -20 ºC (40 -68 ºF) which slows down the onset of fermentation by indigenous yeast
* Contact between skins and juice is promoted
* Allows for extraction of pigments and other phenolic compounds from skins in the absence of ethanol
* Cold soak/maceration happens for 1-2 days, the must is pumped over or mixed to increase phenolic extraction
* Cold maceration is thought to improve color, body, and mouth-feel but will depend on variety, fruit composition and the condition of the fruit

Must Adjustments

Chaptalization

* Grapes harvested at low ºBrix may not have sufficient amounts of sugar for balanced alcohol levels
* Sugar addition can be added to the must to increase alcohol
* These additions can be done to the must at the beginning of fermentation
* A sugar syrup in place of dry sugar can be used as well – known as amelioration
* The advantage of amelioration is that while sugar content increases, the acid level decreases due to dilution

Increasing Acidity

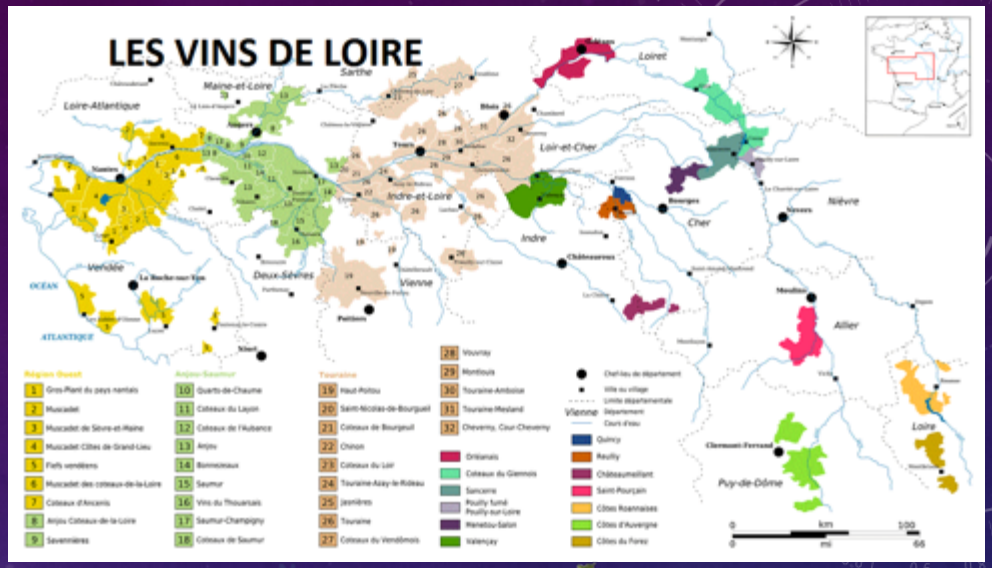
* Acidity in the range of 5.5 to 7.5 g/L and a pH value of 3.0 to 4.0 is most common
* If the grapes are low in acid (less than 5 g/L) then the acidity can be raised by acid additions
* A small portion of tartaric acid will be lost by precipitation of potassium bitartrate following fermentation and cold stabilization
* Added acid will assist in balancing the wine

Must Adjustments

* For Color, Aromas and Body, increasing extraction and making must adjustments will transform the character of the wine
  * Aromas can increase and intensify
  * More grip and astringency can occur in red wines
  * More intensity of color – deeper or dense tones depending on variety
  * During fermentation: alcohol can create higher extraction rates
    * as alcohol increases so do extraction rates
* Adjustments to the must (sugar also known as chaptalization or acid)
  * Increase alcohol (chaptalization)
  * Increase mouth feel (chaptalization)
  * Increase weight and intensity (chaptalization)
  * Balanced acidity (acid additions)

SAUVIGNON BLANC

- Productive and hardy
- Can have too much vigor
- Naturally pronounced in aromas
- Best in cool climate
  - Shows SB markers
  - Retains aromas and acidity
- Produced mainly in:
  - Loire Valley
  - New Zealand
  - Bordeaux
  - California
    - AKA: Fume Blanc



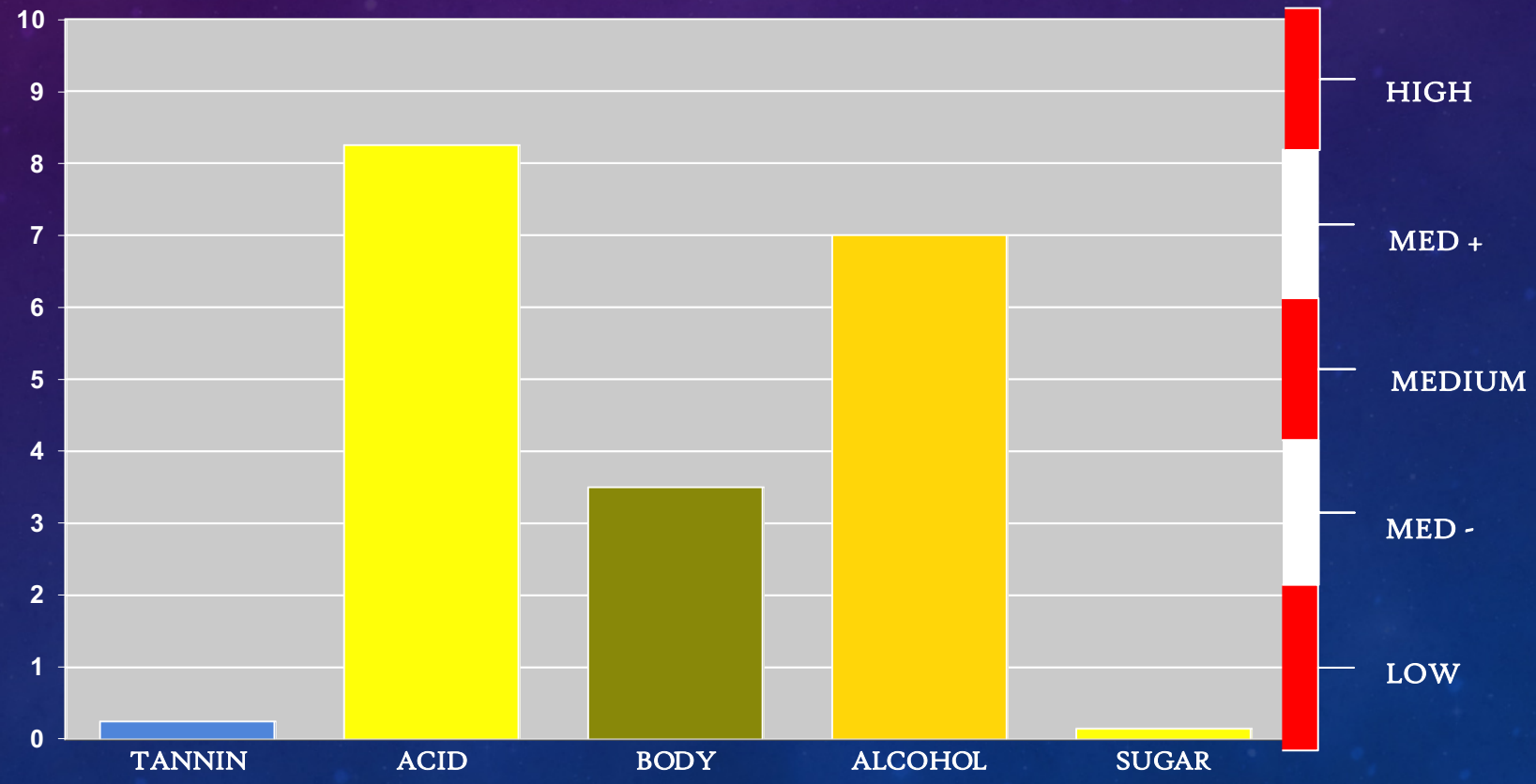
Sauvignon Blanc

(11.5%-14.0%)

(DRY, LITTLE / NO OAK)

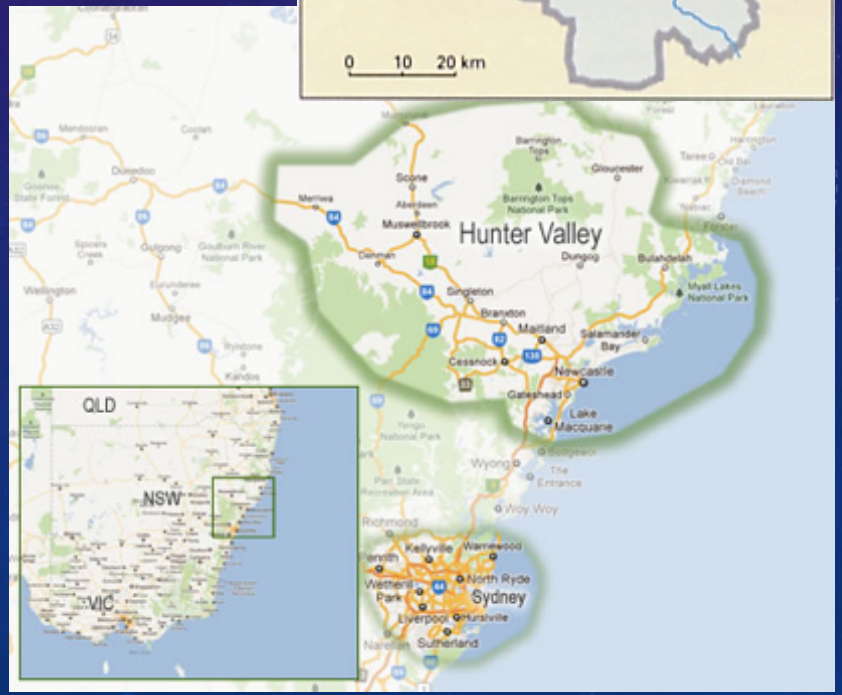
Aromas / Flavors: Pronounced primary aromas

Primary Aromas: Bell Pepper, Gooseberry, Grapefruit, Lemon / Lime Citrus, Tropical Notes (passion fruit & kiwi) Grassy, Herbaceous, Vegetal, Minerals (flint), Salty-Sea shell



SÉMILLON

- Origins in Bordeaux
- Susceptible to rot – NOBLE
  - Thin skinned
  - Easily oxidized – prone to rot
- Productive and vigorous
  - Ripens early, needs humidity
- Similar to Sauv. Blanc when picked early
- Naturally low acid
- NON- aromatic
- Does well in moderate climate – can take heat
- Produced mainly in:
  - Bordeaux
  - Australia
    - Hunter Valley



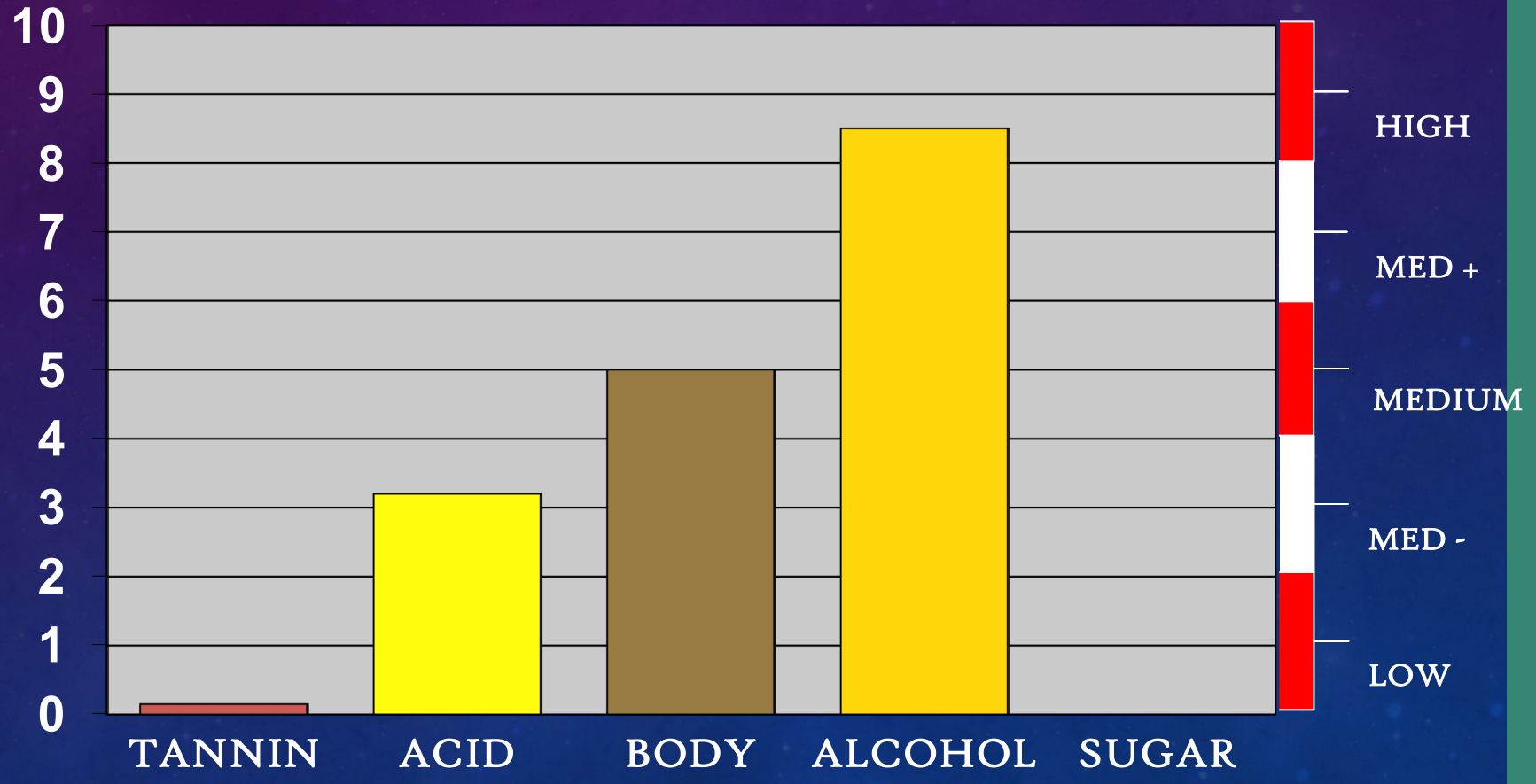
Sémillon

(9.5%-14.0%)

(DRY, WITH OR WITHOUT OAK)

Aromas / Flavors: Non-aromatic when dry

Primary Aromas: Lemon citrus, herbal, grass, lanolin, mild aromas of banana when young, Golden plum, stone fruit, toast, wax



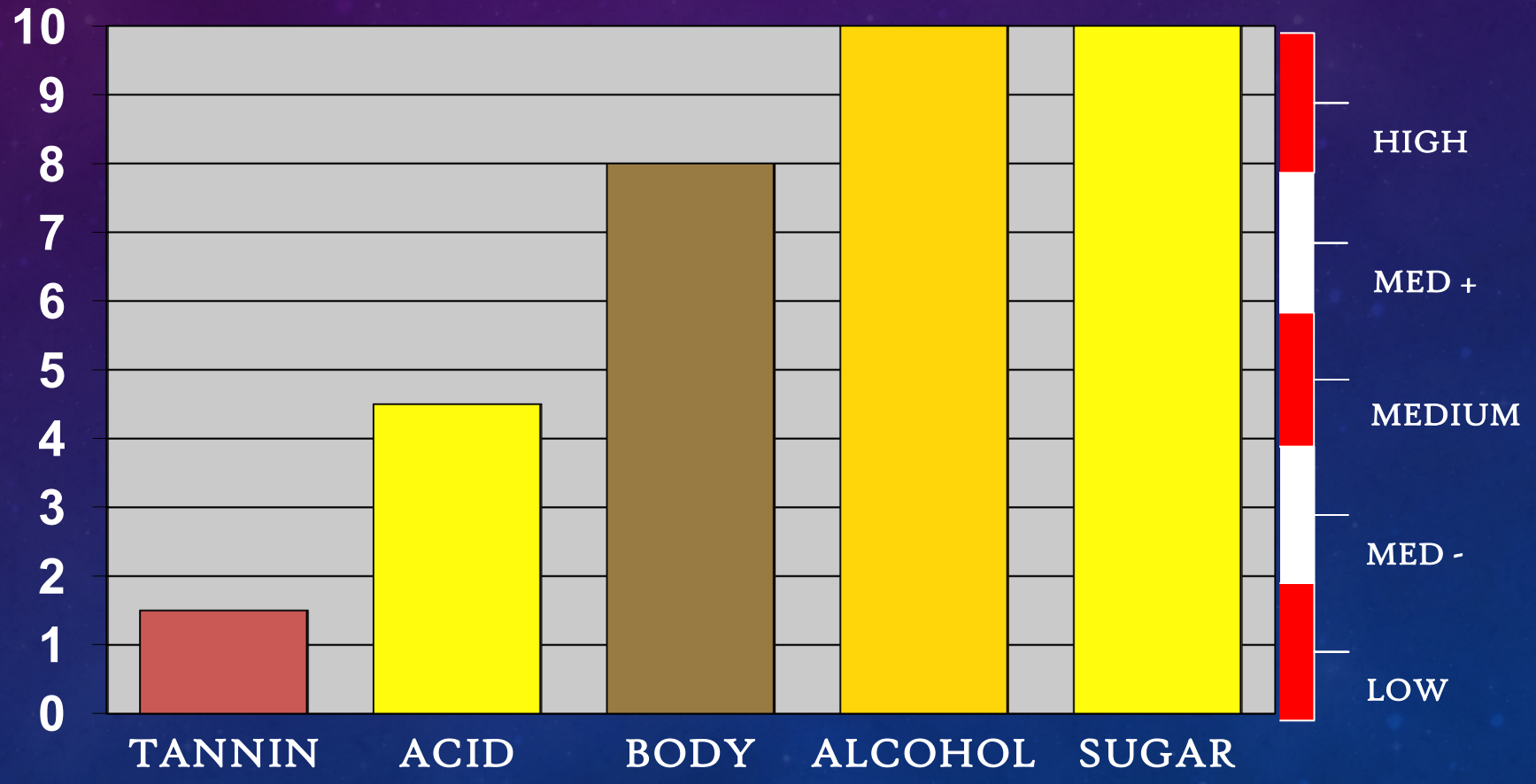
Sémillon

(9.5%-14.0%)

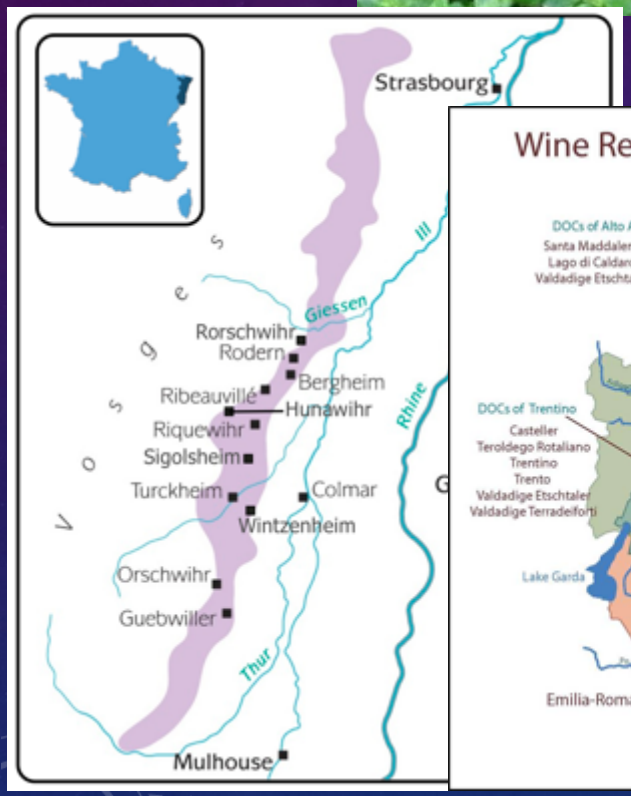
(BOTRYSIZED, OAK)

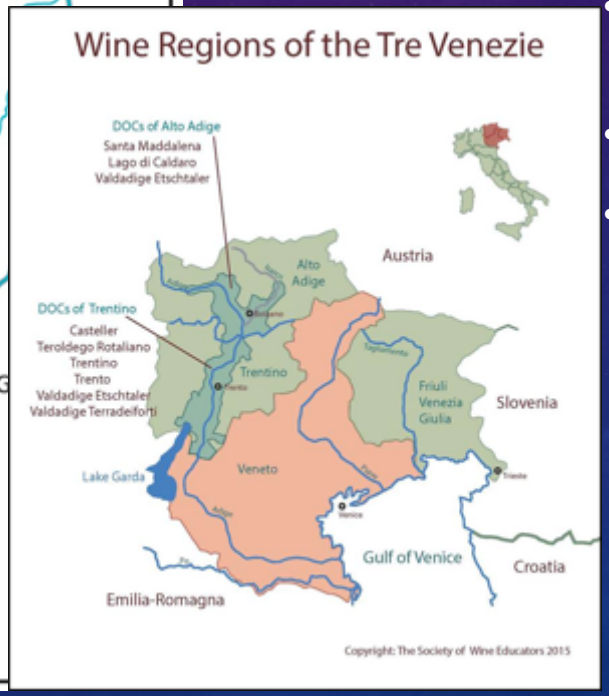
Aromas / Flavors: Aromatic when NOBLE ROT is present

Primary Aromas: Lemon curd, nutmeg/cinnamon, mushroom, lanolin, pineapple, chlorine pool, apricot, orange marmalade, fig, tropical fruit, toast, bees wax



PINOT GRIS





- Native to France but grown extensively in Italy and Oregon
- Genetically identical to Pinot Noir
  - Mutated from PN
- Blue-grey and Pink-copper skinned
- Non-aromatic variety
- Manages cool climate well, best in cooler conditions
- Can develop botrytis
- Produced in:
  - Alsace
  - Northern Italy
  - Oregon
  - Germany

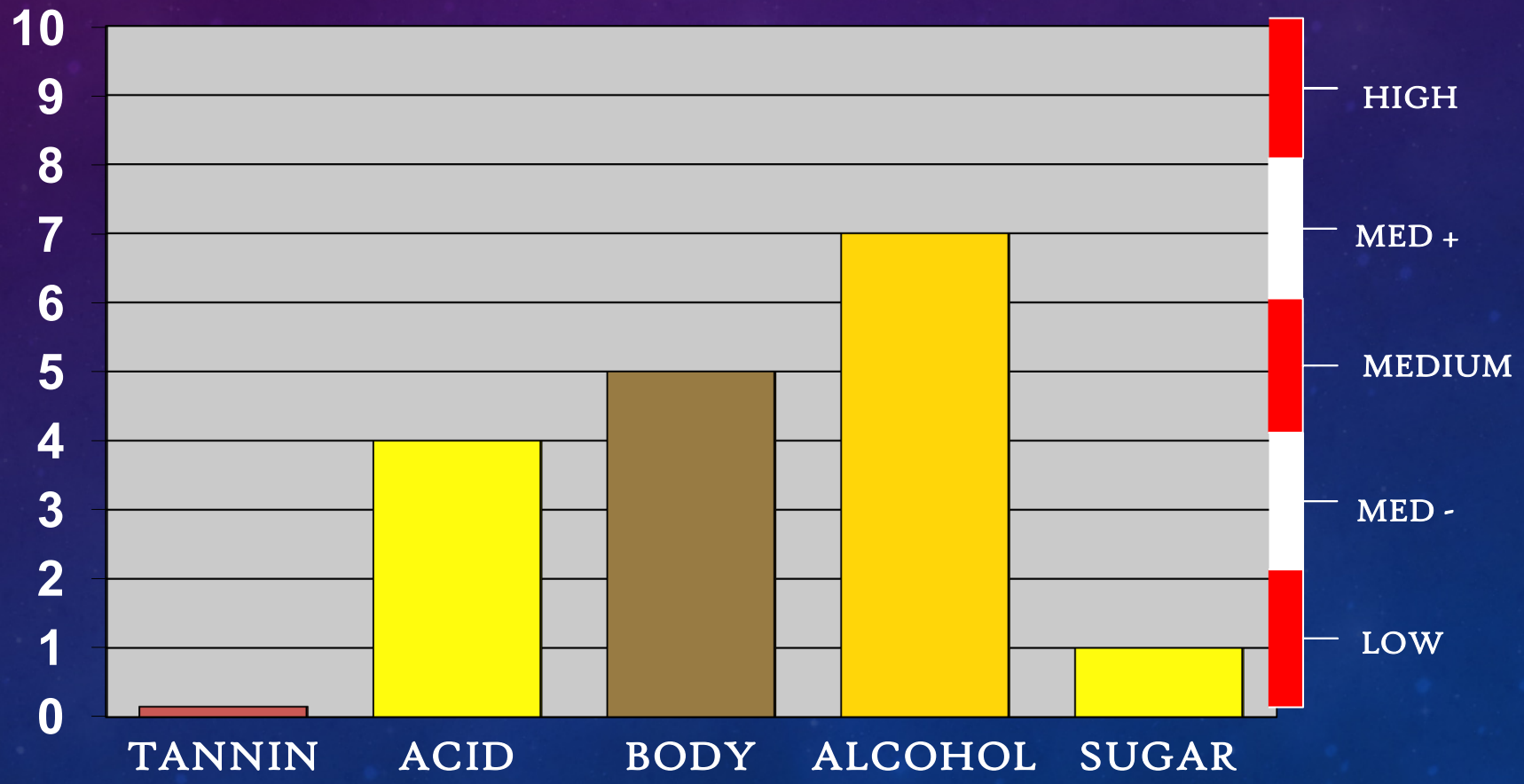
AKA: Pinot Grigio, Rulander, Rieslander, Grauburgunder

Pinot Gris/Grigio (9.5%-14.0%)

(DRY, NO OAK)

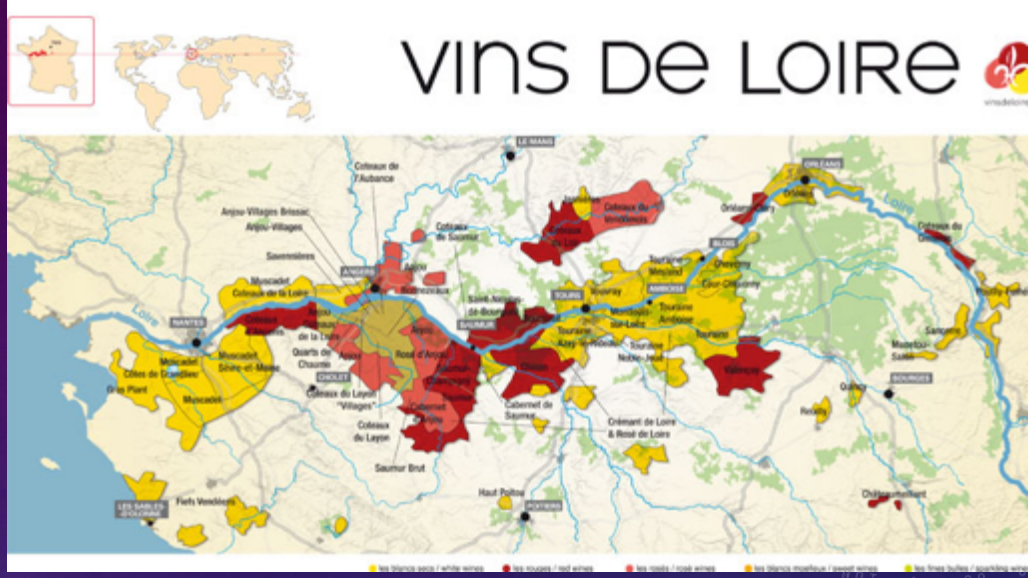
Aromas / Flavors: lightly-aromatic in some regions

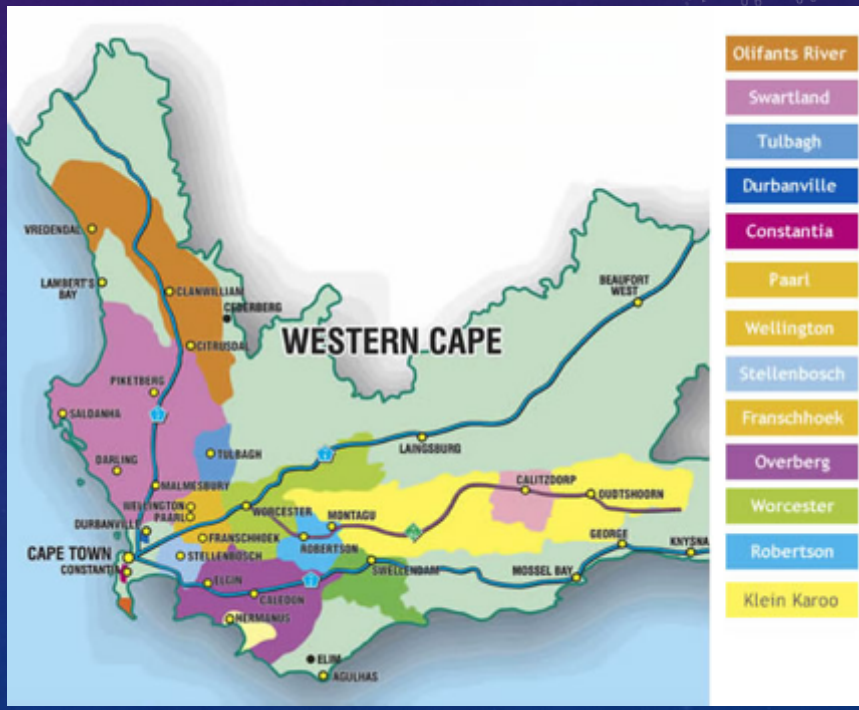
Primary Aromas: Apples (Green), Lemon Citrus, Lemon Zest, Fruit Cocktail, Melon, Slight Bitterness.



CHENIN BLANC

- Versatile – can grow in a variety of climates
  - Cold climate hardy
  - Vigorous & Prolific
- Native to Loire Valley
- Long growing season – buds early, ripens late
- High acidity, high extract
- Takes well to botrytis
  - One of three grapes known for noble rot
- Produced mainly in:
  - Loire Valley/France
  - South Africa
  - USA
- AKA: Pineau, Pineau de la Loire, Steen



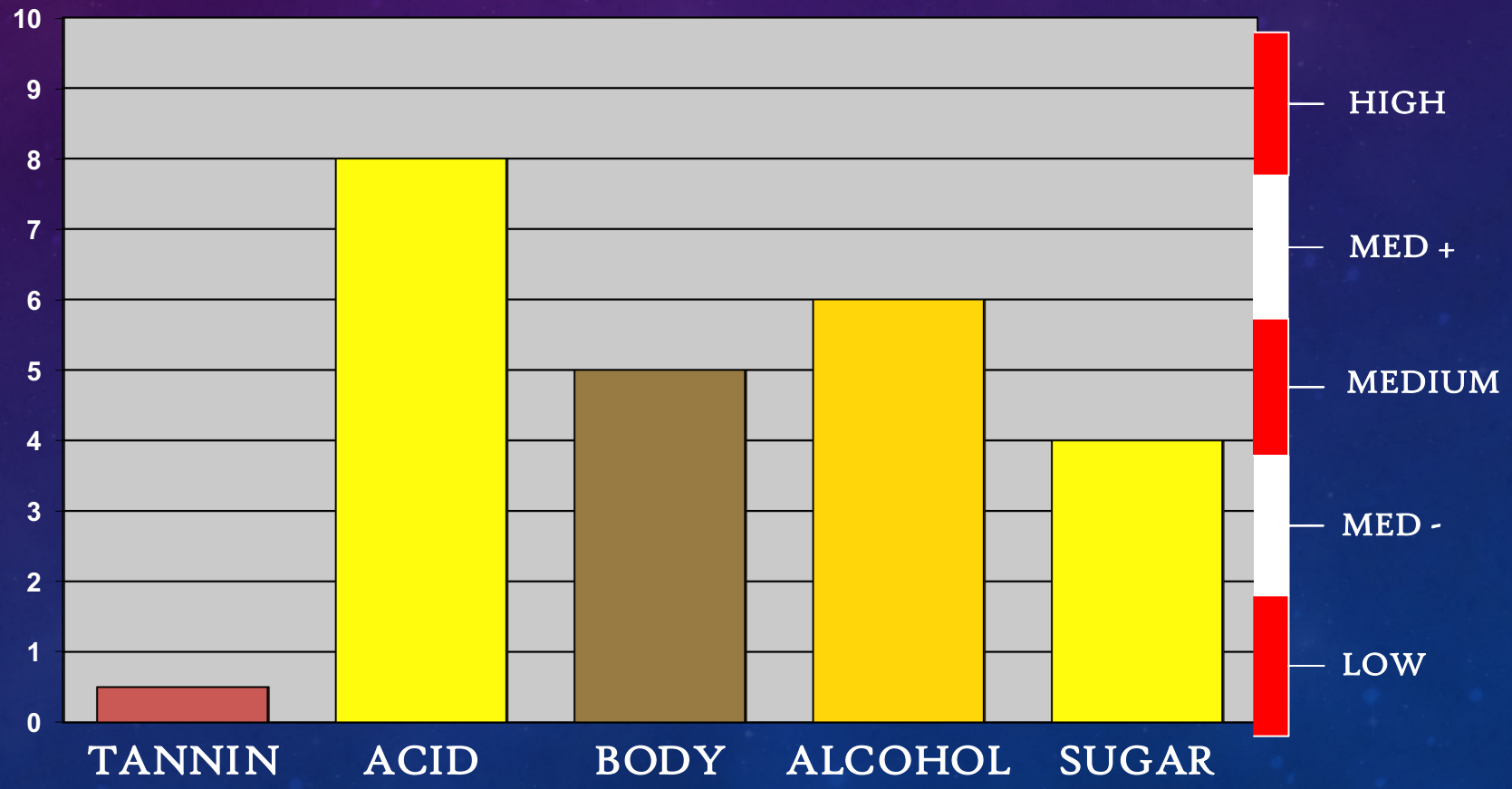


Chenin Blanc (11.5%-14.0%)

(DRY, OFF DRY, MEDIUM SWEET WITH NO OAK)

Aromas / Flavors: Pronounced primary aromas

Primary Aromas: Green apple, sweet quince, floral nuances, earthy minerals, damp hay; Sweet: Honey, peach, apricot, hay, wet earth, spice



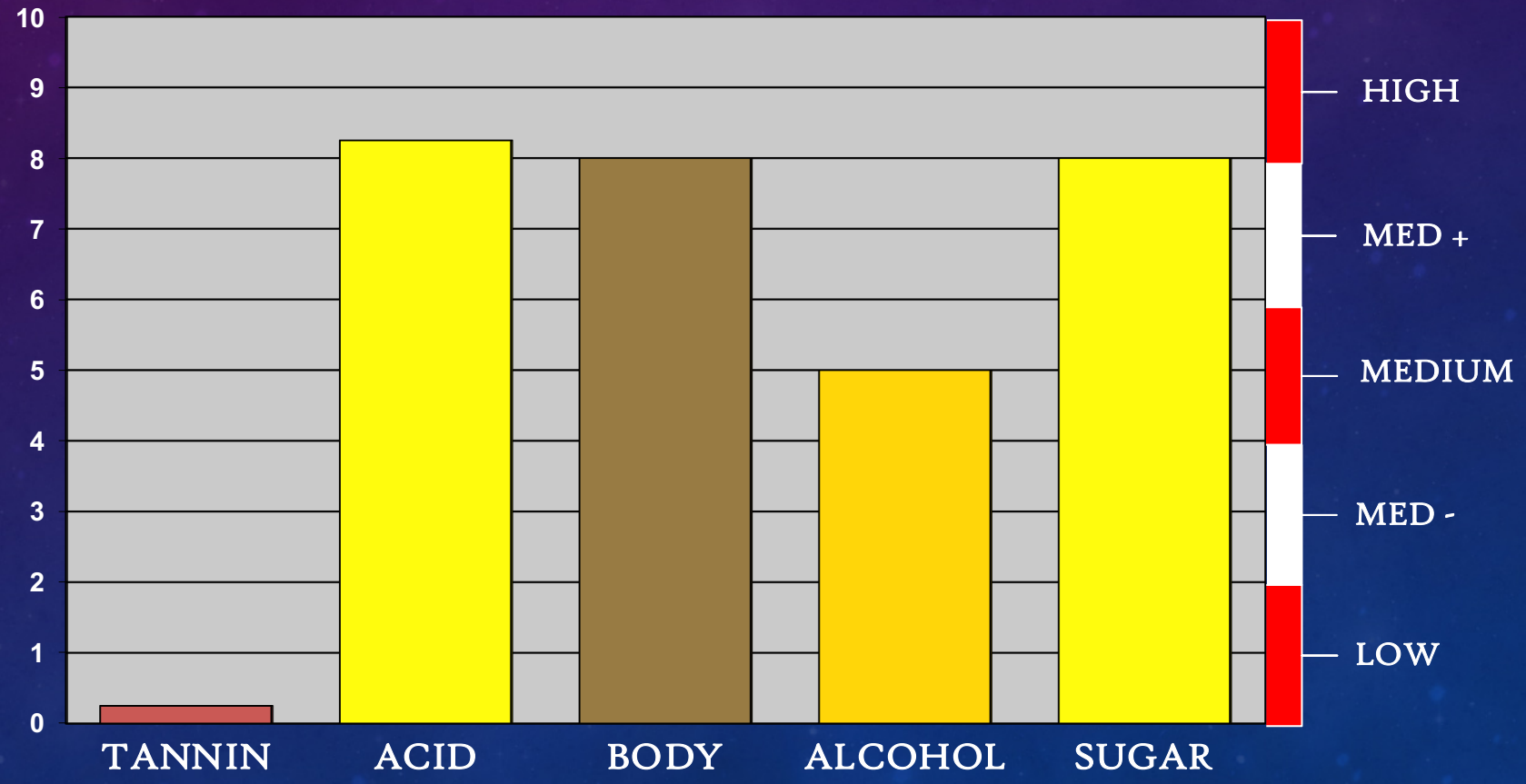
Chenin Blanc

(11.5%-14.0%)

NOBLE ROT, SWEET WITH NO OAK)

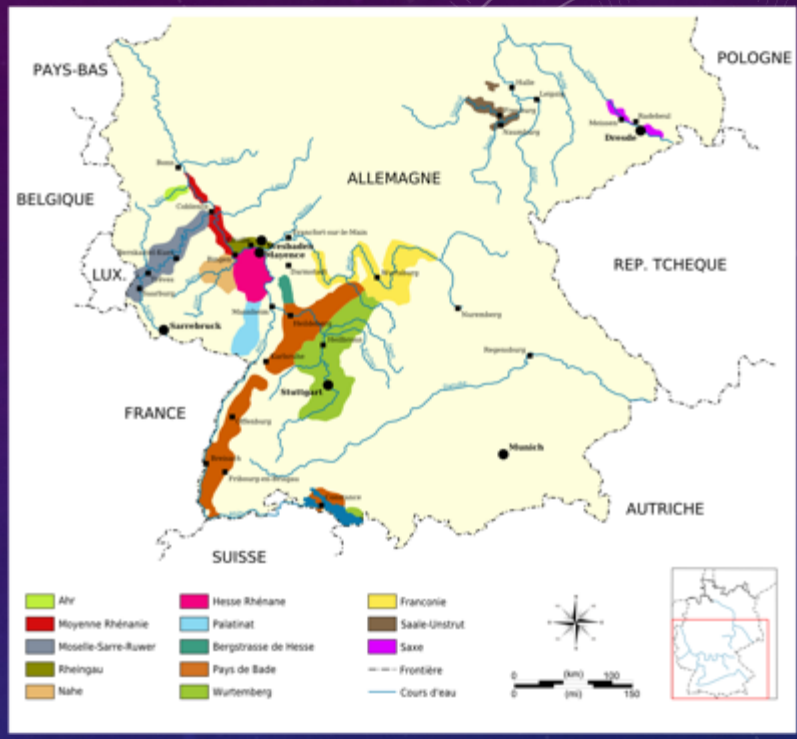
Aromas / Flavors: Pronounced primary aromas

Primary Aromas: Apricot and quince jam, Orange Marmalade, Peach, Grilled Pineapple, Mushroom, Mustard, Ginger, Honey, Horseradish, Golden Plum



RIESLING

- Identity is preserved wherever it is grown.
- Naturally high in tartaric acid and preserved at all levels of ripeness
- Hardy –frost resistant
  - Manages cold climate and ripens
- Pronounced aromas at most ripens levels
- Produced mainly in:
  - Germany
  - Austria
  - Alsace
  - Australia
  - USA



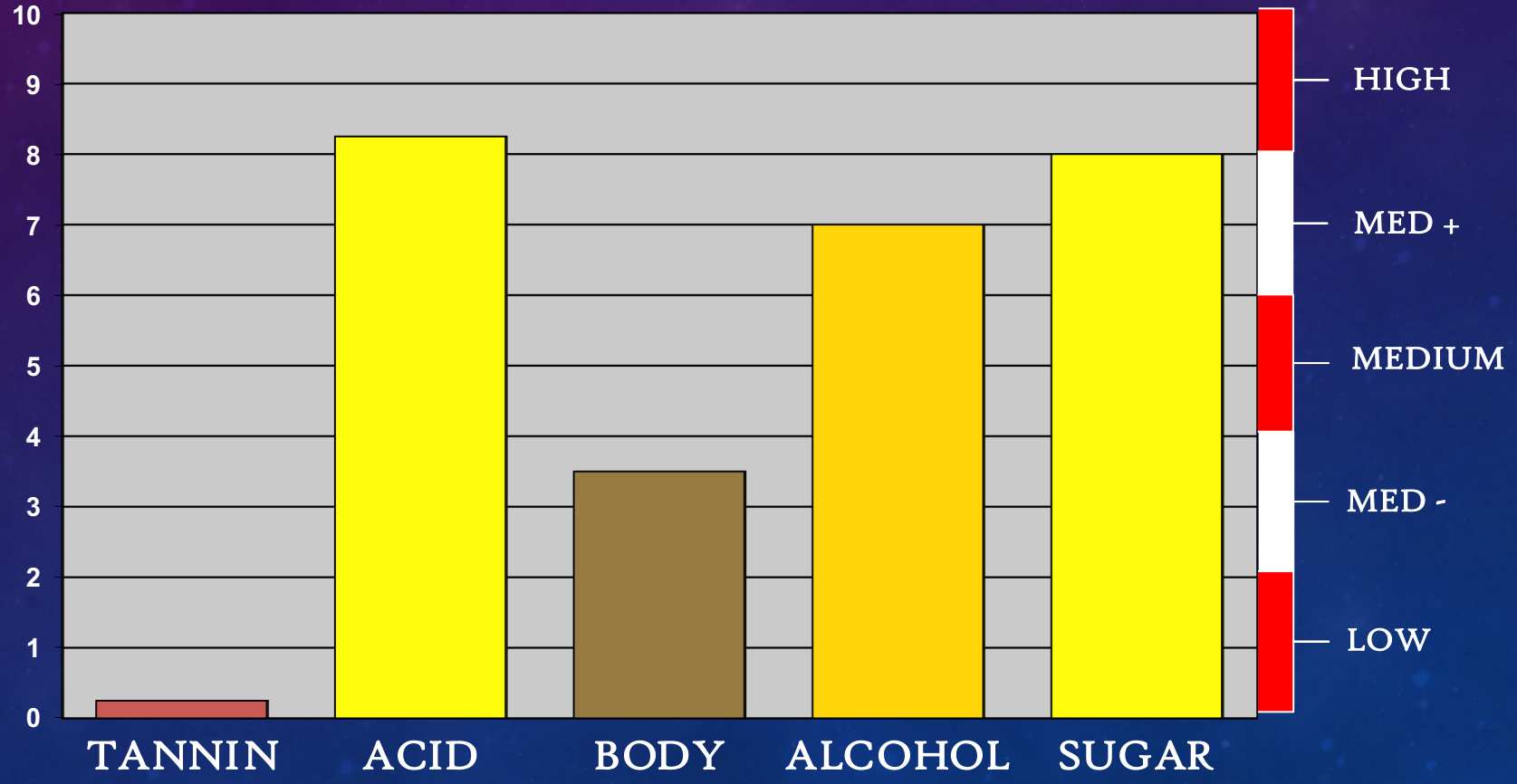
Riesling

(11.5%-14.0%)

(DRY, OFF DRY, SWEET WITH NO OAK)

Aromas / Flavors: Pronounced primary aromas

Primary Aromas: Lime, Lemon Citrus, Apricot, Tropical Notes (passion fruit, mango) Honey, Diesel, Minerals (flint),, Plastic/Petrol



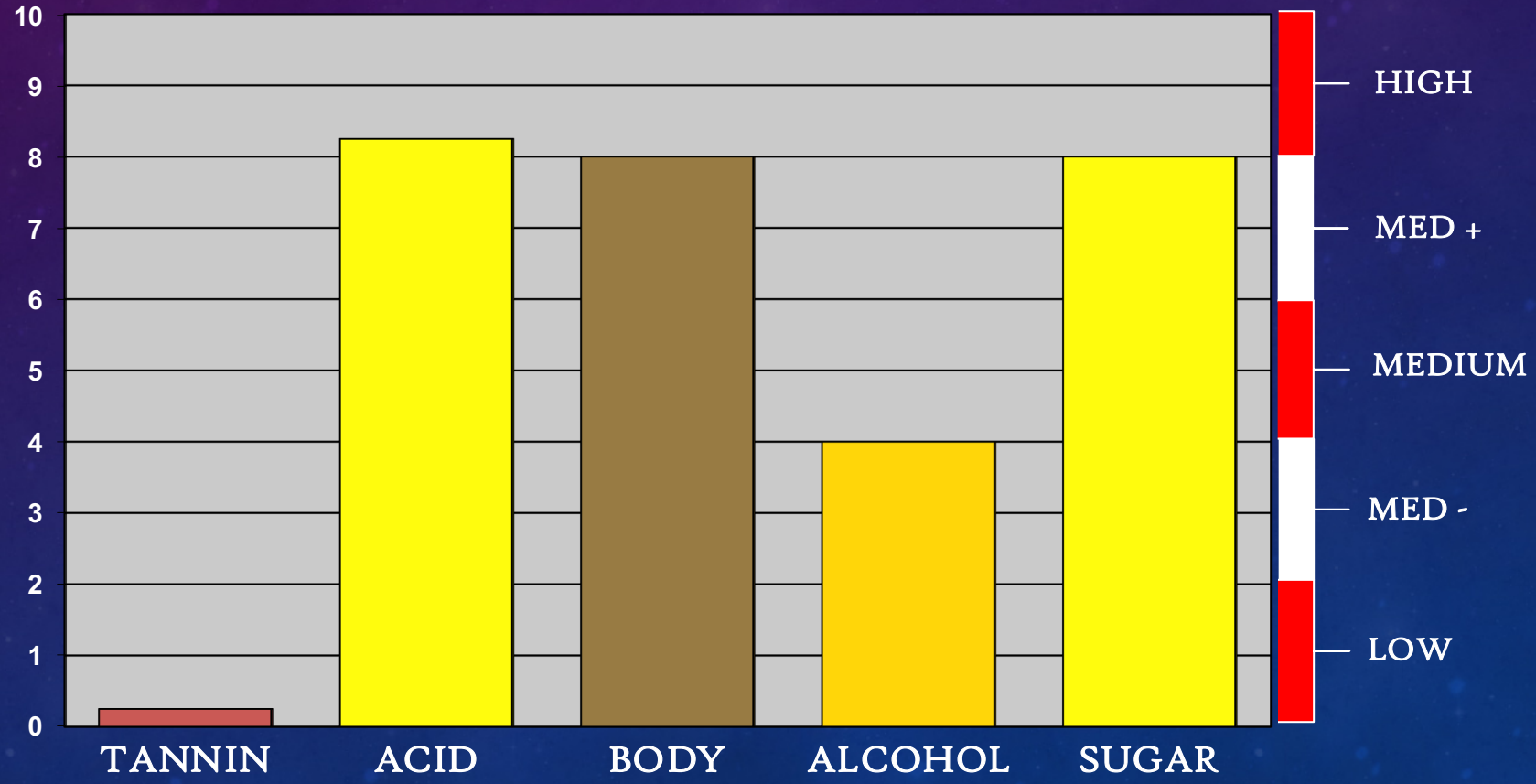
Riesling

(11.5%-14.0%)

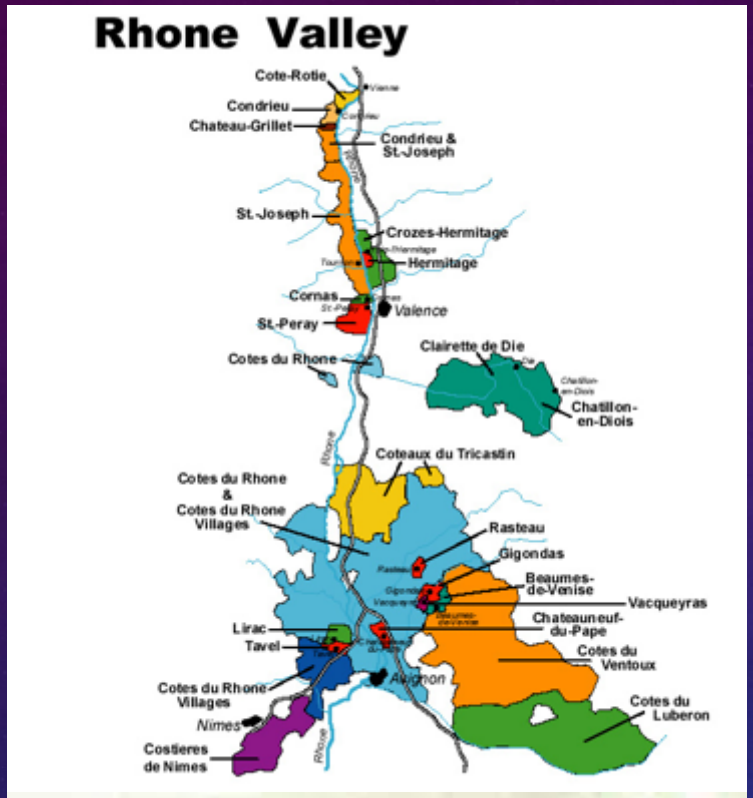
NOBLE ROT, SWEET WITH NO OAK)

Aromas / Flavors: Pronounced primary aromas

Primary Aromas: Dried and overripe Apricot, Orange Marmalade, Peach, Grilled Pineapple, Mushroom, Mustard, Ginger, Honey, Horseradish, Vinegar



VIOGNIER



- Originated in Southern France
- Difficult to grow, ripens unevenly and prone to coulure
- Thin skinned
- Low yielding
- Late ripening
- Needs warmth, can manage to ripen in cool climate with low fertility soils
- High sugars/alcohol, low acid, high extract
- Produced in:
  - Rhone, Languedoc-Roussillon
  - Australia
  - USA

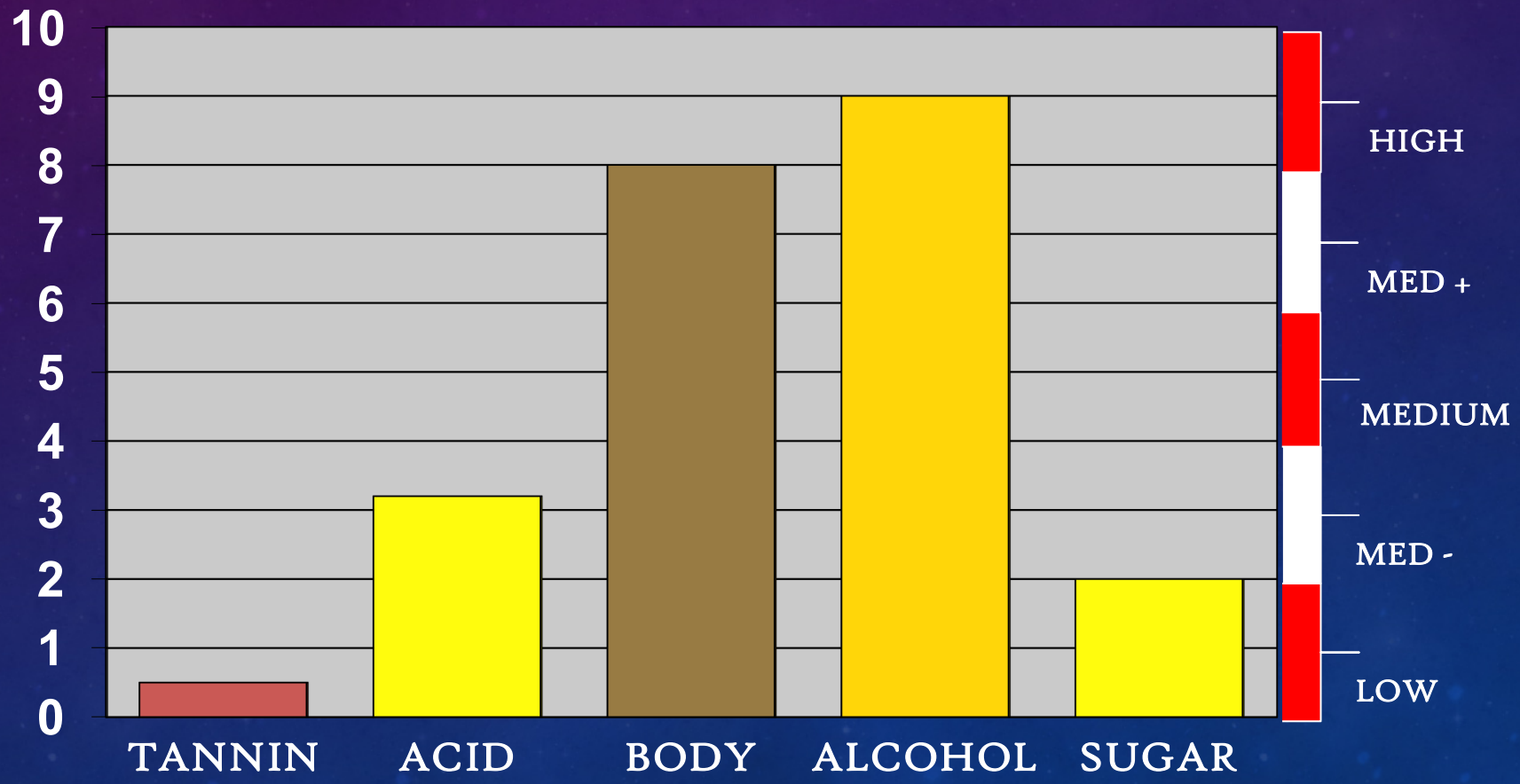
Viognier

(9.5%-14.0%)

(DRY, WITH OR WITHOUT OAK)

Aromas / Flavors: Aromatic, medium primary aromas

Primary Aromas: Orange citrus, peach, golden plum, stone fruit, floral-gardenia, lanolin, smoky wax with age, vanilla, toast and nutmeg/hazelnut with oak



CHARDONNAY

- Versatile, reliable, hardy and prolific
- Generally hardy and resistant to frost
- Can have uneven development of fruit
- Excessive heat can cause grapes to lose acidity
- ripens early and does well in a variety of soils and climates
- Produced all over the world in every region
- Famous in:
  - Champagne, Burgundy
  - California/Oregon/Washington
  - Tuscany

  AKA: Morillon

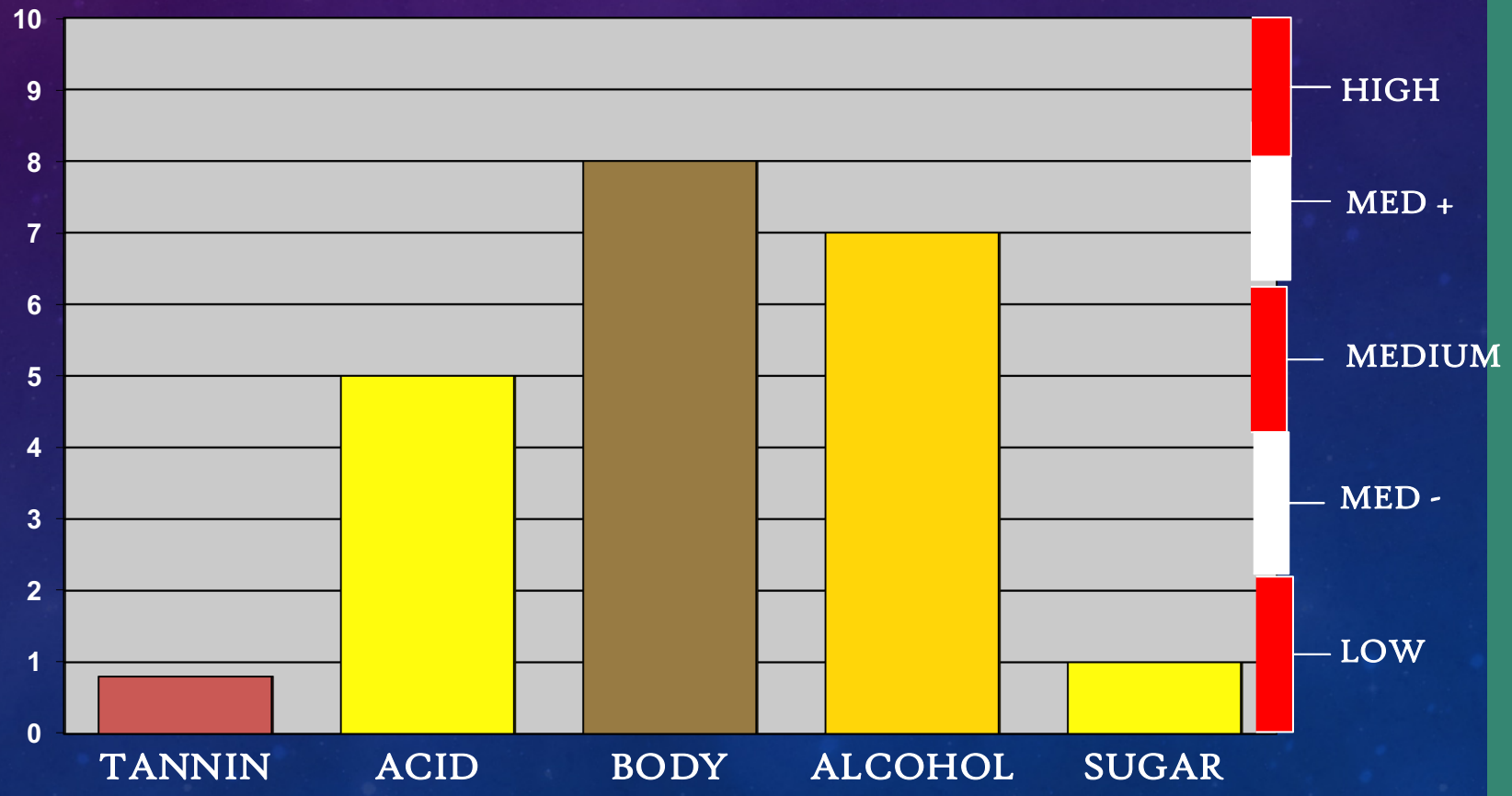
Chardonnay

(12.5%-14.5%)

(DRY, Most are with OAK and barrel fermentation)

Aromas / Flavors: Non-aromatic primary aromas, most aromas from secondary and tertiary aging

Primary Secondary & Tertiary: Apples (Green / Golden, Red), Pear, Pineapple, Mango, Lemon Citrus, Butter, Nuts, Vanilla, Spices – ginger, nutmeg, Smoke



- Very productive variety, head trained for lowering yeilds
- Thick skinned, large berries
- Ripens in late midseason
- Classic grape variety in Beaujolais
- Does well in warm climate
- Does well with Carbonic Maceration
- Low in tannins, medium to high acid
- Similar aromas to Pinot Noir
- Some have age ability
- Famous in: Beaujolais

Gamay

Gamay

Color: pale to medium purple or ruby dependent on age of wine, carbonic is usually purple-blue

Garnet-brown if aged

Acidity: medium to medium plus

Tannins: Medium-low

carbonic maceration has very light tannins

Alcohol: medium to medium plus

Aroma level: moderate to pronounced

Body/texture: light to medium bodied, juicy and bright if carbonic, fuller and closer to medium with traditional fermentation and oak maturation

MARKERS:

Cool climate (ripe): red raspberry, sweet cranberry, ripe bing cherry and sweet red fruit

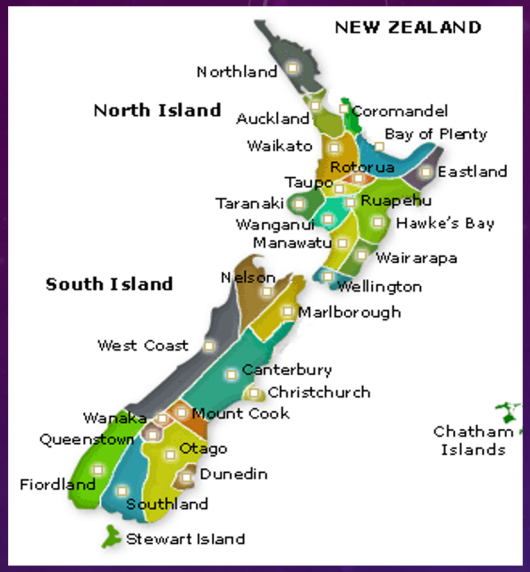
Cool climate (less ripe): tart cranberry, tart cherry, pomegranate

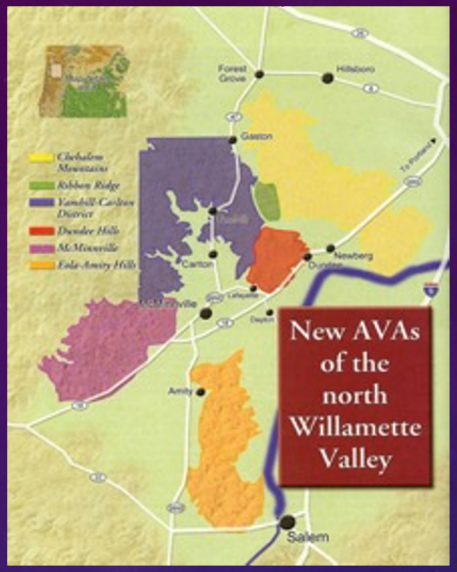
Warm climate: overripe/dried red fruit, cooked strawberry, and burnt rubber

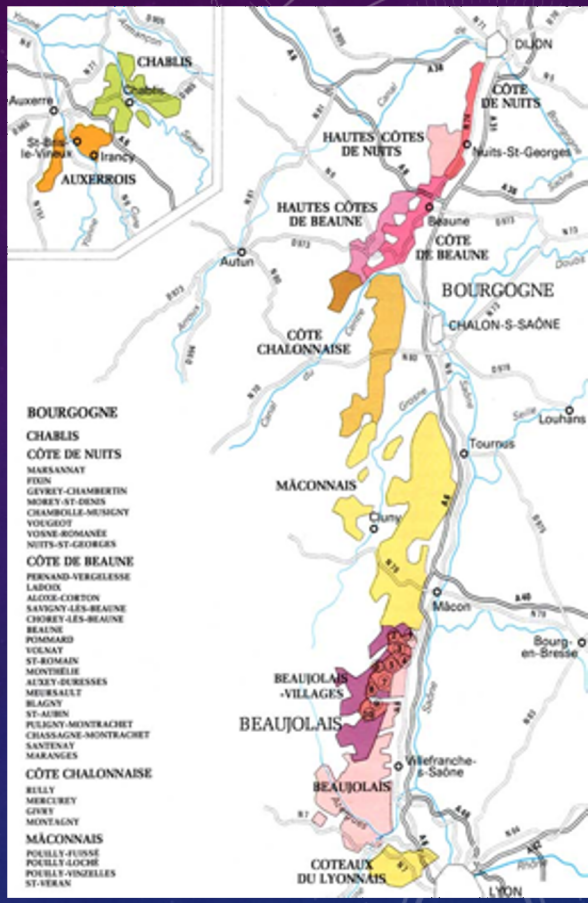
Carbonic Maceration aromas: YOUTHFUL! **Banana,** raspberry bubblegum, grapey, fruity - less complex

- Little new oaked used
- Palate similar to aromas

Gamay Aromas







- Can be very hard to grow, prone to diseases and finicky – fussy vine
- Thin skinned, low to moderate color
- Low to moderate tannins – usually smooth and elegant
- Very high to moderately high acids
- Does not do well with over-manipulation in both the vineyard and winery
- Will reflect winemaking and oak easily
- Does best in cool climate and with cool temperatures
- Early ripening grape
- Famous in: Bourgogne, Oregon - WV, New Zealand

Pinot Noir

Pinot Noir

Color: pale to medium ruby-red, or ruby-garnet, shows more garnet with age

Acidity: high, medium-high

Tannins: Medium-low to moderate

(the riper the more tannic)

(whole/partial cluster will add astringency)

Alcohol: moderate to medium-high

Aroma level: Medium plus to pronounced, usually very aromatic

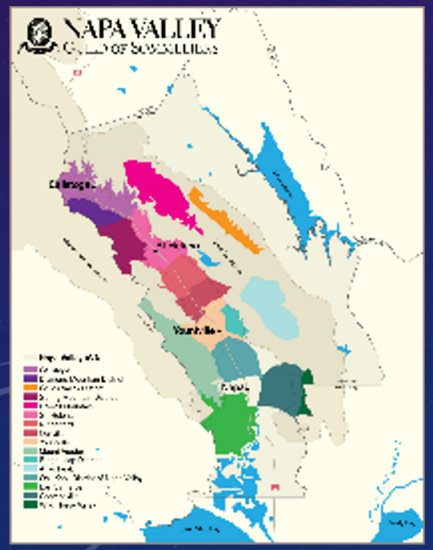
Body/texture: medium with a smooth tannins, elegance and finesse

Pinot Noir

MARKERS:

- **Cool climate (ripe):** bing or black cherry, pomegranate, ripe raspberry, root beer/cola, smoke and cardamom when oaked
- **Cool climate (less ripe):** rhubarb, tomato stem, dill, pomegranate, raspberry, herbaceous
- **Warm climate:** jammy red fruit, overripe strawberry, stewed/cooked fruit, tar/burnt rubber
  - Easily marked by new oak
  - Palate similar to aromas
  - Youthful aromas – juicy and bright with fruit
  - Aged aromas – dried herbs, leaves, tobacco, soy sauce, dried fruit

- Strong viticultural insurance in marginal climates
- Adapts well to a wide range of soils
- Grows in most climates, likes warmth
- Ideal partner to Cabernet Sauvignon – smooths and calms tannins in a blend
- Ripens earlier than Cabernet Sauvignon
- Smooth texture, round creamy mouth feel
- Takes well to oak
- Famous in Bordeaux, Napa Valley, WA State and Australia



Merlot

- **Color:** medium to deep ruby with purple in youth and garnet with age
- **Acids:** medium
- **Tannins:** medium to medium plus
- **Alcohol:** medium-plus to high
- **Aroma level:** Medium to medium plus
- **Body/texture:** medium to full, creamy and silky

Merlot

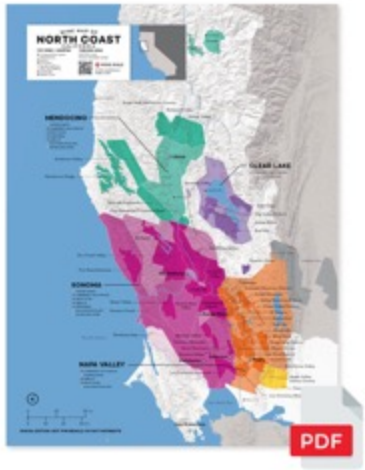
MARKERS:

- **Cool climate:** bell pepper, red fruit, herbal, plum, slight vegetal note
- **Warm climate:** blueberry, blackberry, plum, violet, jammy black/red fruit, shows spice with oak aging
- **Youthful aromas:** Blueberry, blackberry, cherry, plum, oak, vanillin, smoke, licorice
- **Tertiary aromas:** mown grass, mushroom, truffle, exotic spice, fruit cake, can be very complex from good vintages/vineyards/producers

Merlot

Cabernet Sauvignon

- Makes a good blending partner for most grapes
  - Adds structure and tannins, aromas and mouth feel
- Late ripening grape, last one to harvest most years
- Improves lesser grapes by adding longevity
- Ages very well
- Makes complex wines
- Grows in a variety of climates/soils – likes moderate to hot climates, does well in warmth and heat
- Famous in: Bordeaux, Napa Valley, WA State, South Australia



Cabernet Sauvignon

Color: medium to deep ruby-black, in youth purple, with age deep ruby with some garnet

Acids: medium plus to high almost always

Tannins: high, med-high dependent on the extraction from the winemaking process

Alcohol: medium plus to high (climate and picking date dependent)

Aroma level: pronounced and intense with age

Body/texture: full and rich, can be highly extracted

* Cross of Sauvignon Blanc and Cabernet Franc

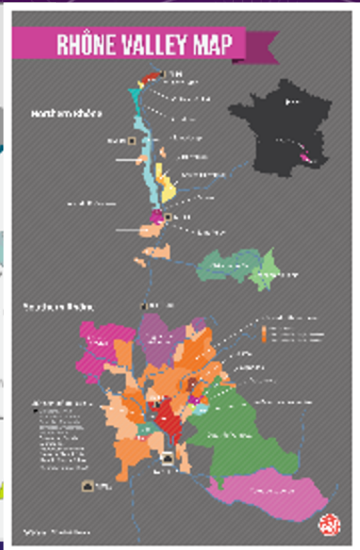
- MARKERS:

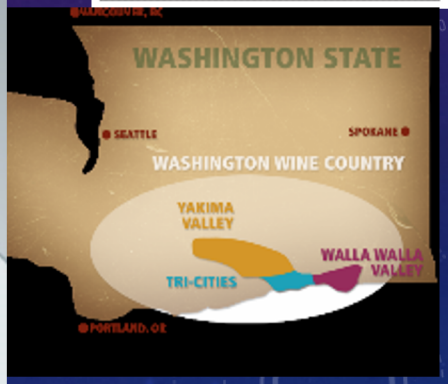
- **Cool Climate:** bell pepper, green olive, blackberry, cassis, herbaceous
- **Warm climate:** mint, eucalyptus, cassis, jammy black fruit, black pepper, cassis
- **Young wine:** black fruit, mint, cedar, and licorice from oak
- **Older wine:** sweet blackberry, earth, tobacco, cedar, smoke, cigar and caramel
- Flavors are similar to aromas

Cabernet Sauvignon

Syrah

- Blends well, improves other grapes by broadening the blend
- Responds well to oak
- Needs the warm to hot climate
- Responds dramatically to terroir/soils
- Buds later than other warm climate reds
- Ripens earlier than most reds
- Ages well when produced with oak
- Also known as Shiraz
- Famous in: Rhone Regions, WA State, CA, Spain & Australia





- **Color:** inky-purple, lighter when from cool climate
- **Acids:** moderate to high
- **Tannins:** firm to dry (cool), can be intense from hot climates
- **Alcohol:** moderate (cool) to high (warm climate)
- **Aroma level:** medium-plus to pronounced and intense
- **Body/texture:** medium to full, silky elegance

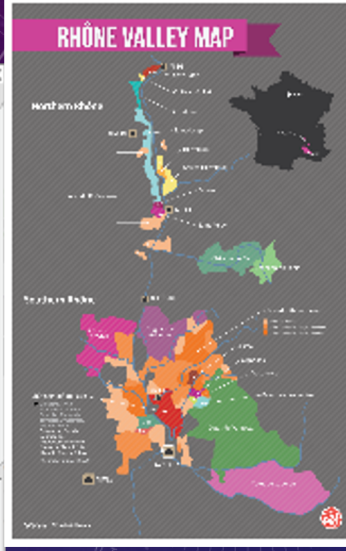
Syrah

- MARKERS:
- **Cool climate:** redcurrant, blackcurrant, green olive, white pepper, burnt rubber (too cool)
- **Warm climate:** blackberry, blackcurrant, violets, black pepper, licorice, smoked-bacon, eucalyptus
- **Young wine:** Black fruit, violet, licorice, smoked-bacon, white/black pepper
- **Old wine:** roasted meat, leather, coffee, raisin

Syrah

Grenache

- One of the most widely planted grapes worldwide
- Ideally suited to being grown as a water-seeking bush vine in hot, windy areas
- Know to set relatively little fruit, naturally restricting yields
- Generally late ripening - grown successfully in hot to very warm regions
- More old vines throughout the world than any other variety
- Grown in Southern France and Spain where it is second only to Tempranillo
- Also known as: Cannonau and Garnacha
- Famous in: Rhone Regions of France, Spain, Sardinia, and Australia



- **Color:** pale to medium ruby-garnet, tends towards browns faster
- **Acids:** moderate – med-low in some regions/climates
- **Tannins:** light, dry, but not intense, can be more intense in hot climates
- **Alcohol:** high in most climates
- **Aroma level:** moderate to intense
- **Body/texture:** light to medium – juicy body

Grenache

- MARKERS:
- **Hot climate:** dried strawberry, dried cherry, white pepper, spice, licorice, intensity in flavor
- **Warm climate:** cherry, raspberry, notes of white pepper and spice – more fruity
- **Young wine:** red cherry fruit, white pepper, licorice, juicy and soft
- **Old wine:** soy, leather, tobacco, dried cherries

Grenache