



Feed manipulation to produce designer pork

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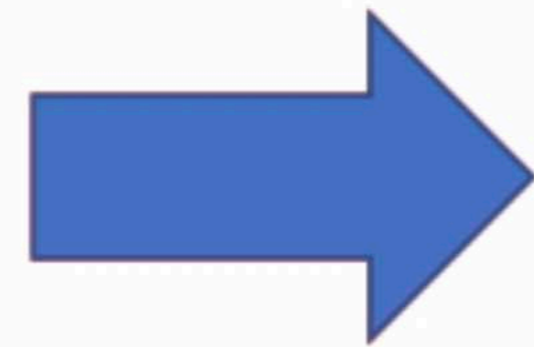
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Feed manipulation to produce designer pork



Designer foods

- **Designer foods are normal foods with health promoting ingredients.**
- **Designer food or functional foods are gaining greater importance due to their role in prevention and health promotion.**

Why designer Pork ?

Composition of pork (per 100g)

- Water: 76 g
- Calories: 109 kcal
- Protein: 21 g
- Fat: 2.17 g
- Magnesium: 27 mg
- Phosphorus: 247 mg
- Potassium: 399 mg
- Iron: 0.98 mg
- Selenium: 30.8 µg
- Thiamine: 0.998 mg
- Vitamin B12: 0.51 µg

Compared to chicken and beef, pork has a **lower content of unsaturated fatty acids** in intramuscular fat.

A **high content of saturated fatty acids** in food and an **unfavorable ratio of n-6 and n-3 groups of polyunsaturated fatty acids** may be the cause of a number of diseases, in particular cardiovascular diseases

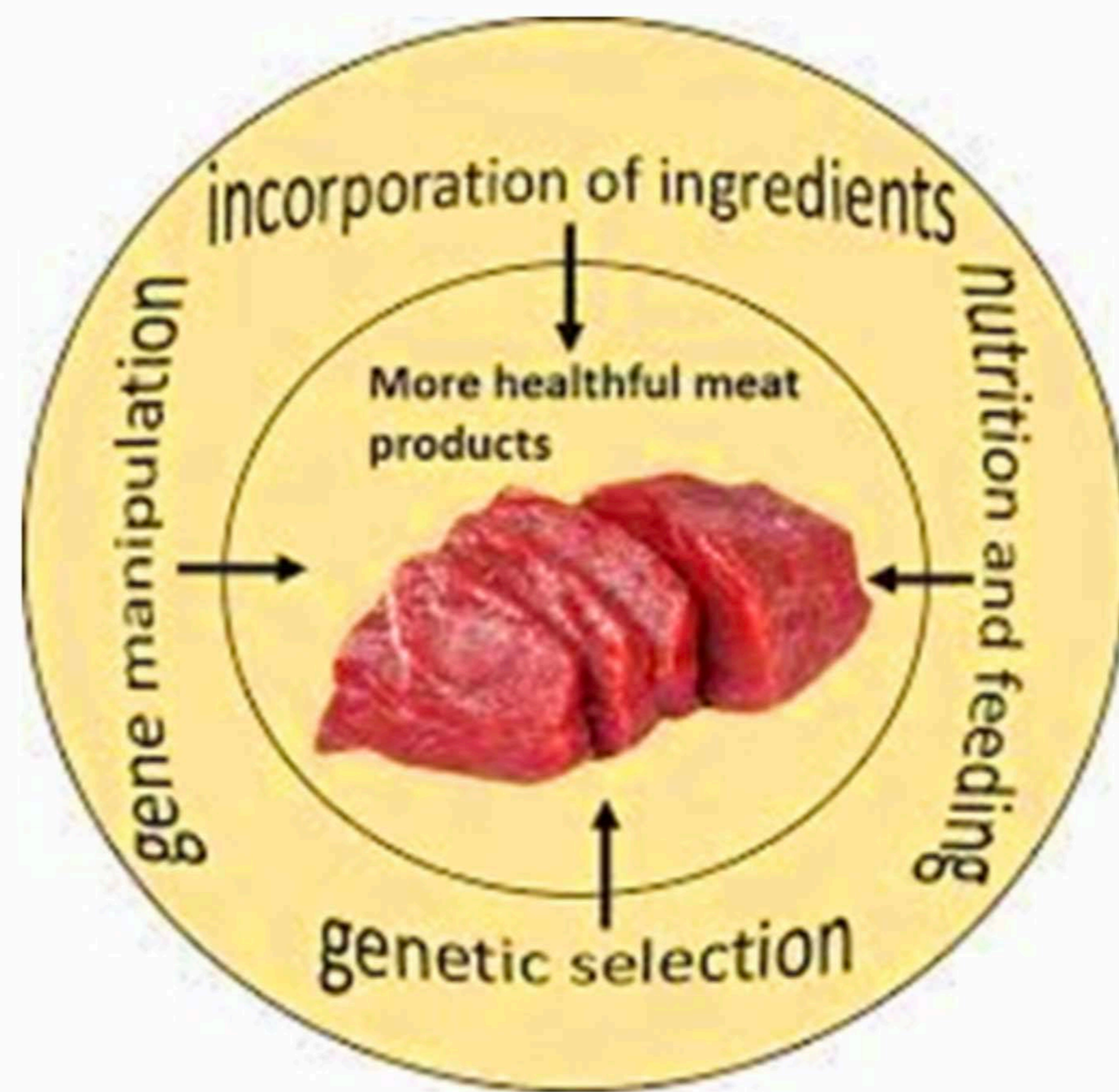
There is **growing public concern** towards coronary heart disease and arteriosclerosis with the consumption of meat.





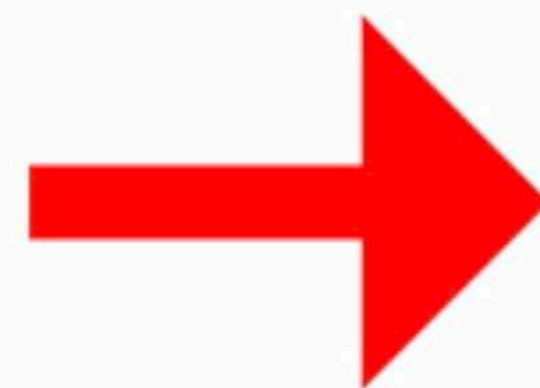
Designing nutritional profile of pork through dietary approaches

- ▶ Is relatively simple and economical
- ▶ Reformulation of feed of swine
- ▶ Supplementation of specific nutrients



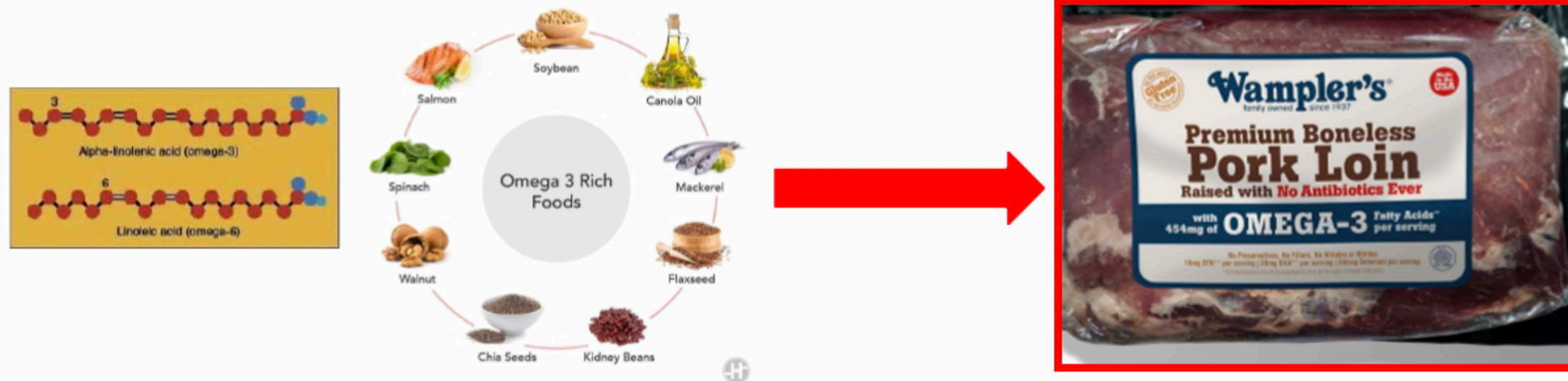
Lean pork production

- ▶ Lean growth, or lean meat deposition, represents the gain of the valuable parts in the pig's body.
- ▶ Due to the high water and low fat content, it is energetically approximately 4 times more efficient to produce 1 kg of lean meat than 1 kg of fat tissue.
- ▶ Feeding low-energy, high-fiber diets with an adjusted lysine-to-calorie ratio and remove any growth-promoting technologies



n-3 polyunsaturated fatty acids supplementation

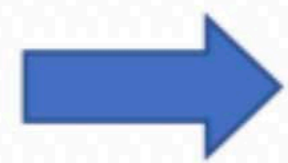
- ▶ Feeding sources of n-3 polyunsaturated fatty acids to pigs, mainly from marine origin (rich in eicosapentaenoic and docosahexaenoic acids), increases their content in pork, thus improving the health value of its fatty acid profile.



Problem?

- ▶ Increasing the polyunsaturation of pork fat leads to the development of soft fat.
- ▶ Soft fat cause carcass handling and fabrication difficulties; reduced bacon yields; oily, almost opaque-appearing, unattractive products; reduced shelf-life; and, more importantly, discrimination by domestic consumers and export partners.

Feeding corn-soybean meal diets

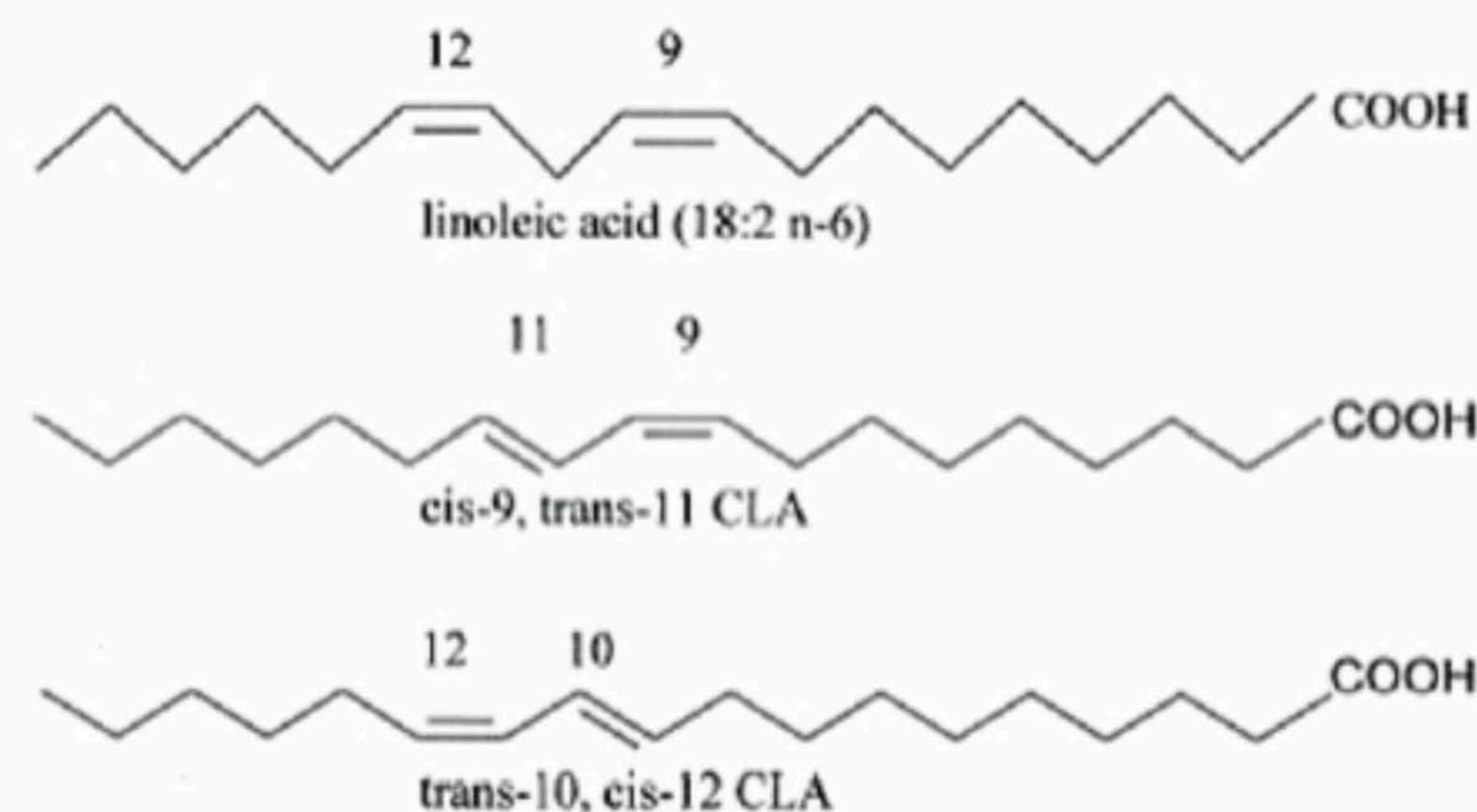


Feeding a high proportion of unsaturated fatty acids.



Conjugated linoleic acid (CLA) supplementation

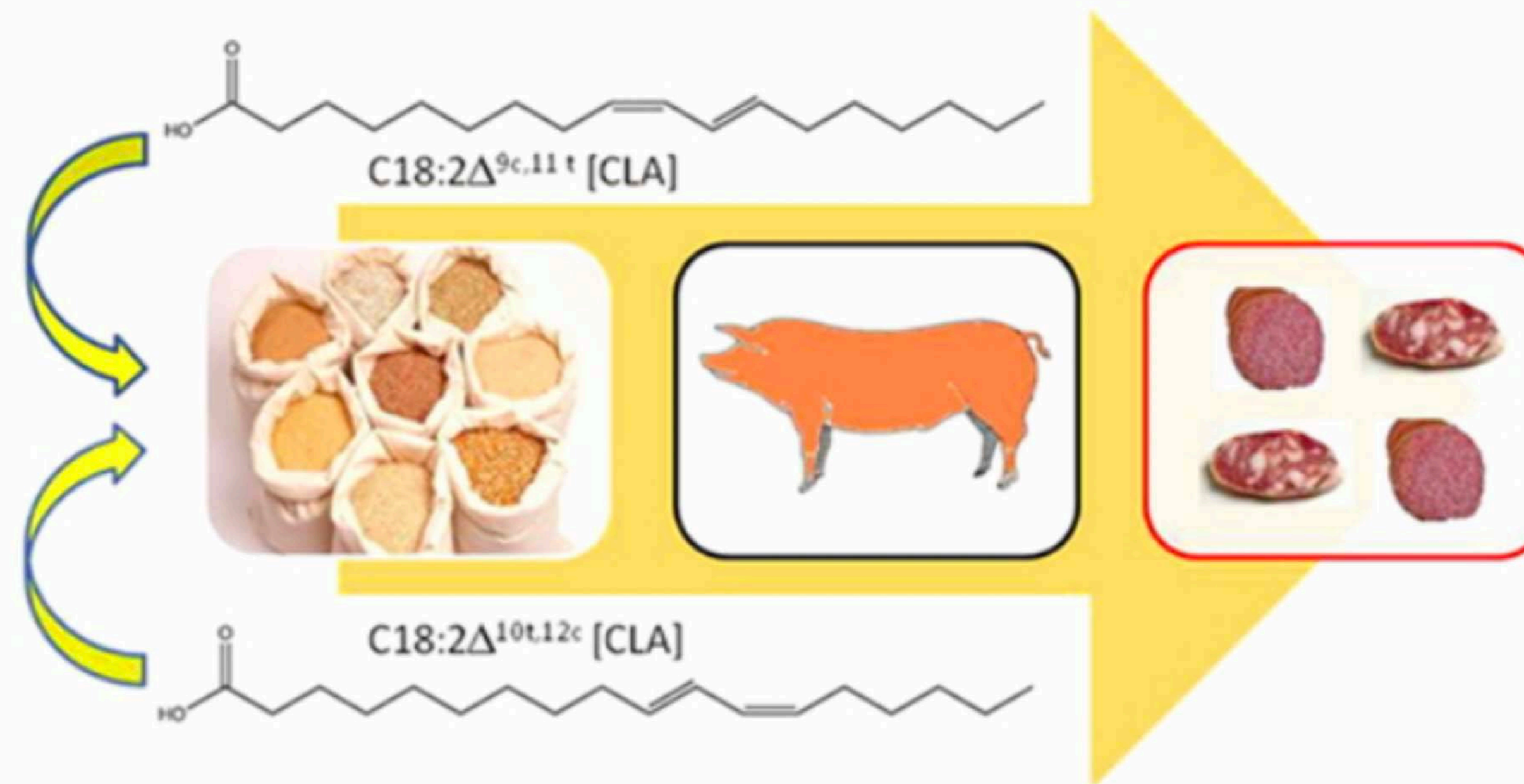
- ▶ CLA is naturally present in ruminant meats and milk products it is a protective agent against cancer and heart disease.



- ▶ CLA-enriched pork through feeding 0.6% CLA for 4 to 8 weeks prior to slaughter.

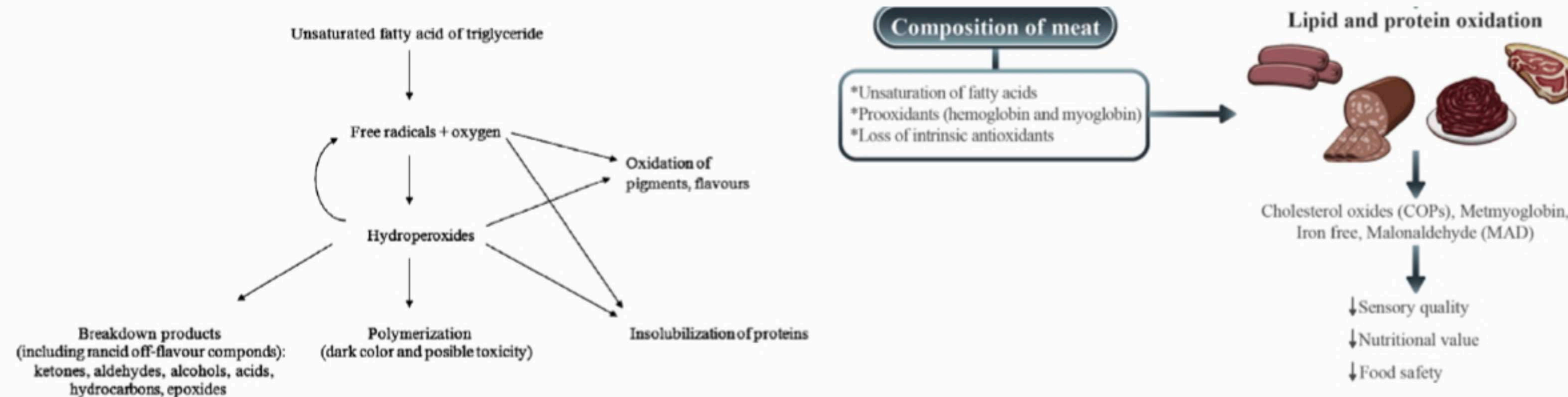
Conjugated linoleic acid (CLA) supplementation

- ▶ CLA supplementation has been reported to reduce backfat, improve feed conversion, carcass leanness, loin marbling and carcass fat firmness.
- ▶ CLA may provide a nutritional tool to counteract carcass fat and belly firmness problems from feeding dietary unsaturated fats and may enhance the overall value of extremely lean carcasses



Antioxidant supplementation

- ▶ Improving pork quality parameters and prolonging the shelf life are important for both producers and consumers.
- ▶ Lipid oxidation is one of the spoilage phenomena affecting pork quality. The PUFA in the diet leads to high concentration of PUFA in adipose tissue of pigs and can undergo oxidation



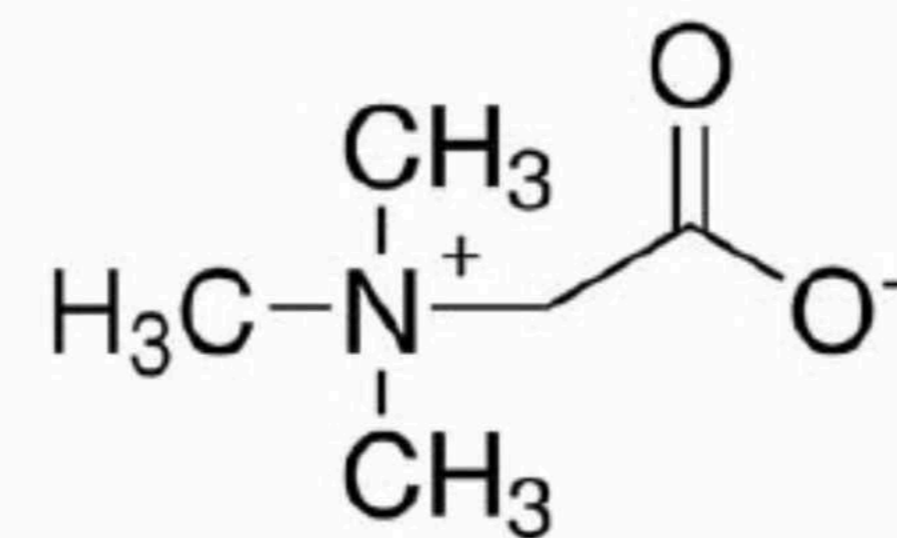
Antioxidant supplementation

▶ Antioxidants

- Beta-carotene
 - Lutein
 - Lycopene
 - Selenium
 - Vitamin A
 - Vitamin C
 - Vitamin E
- ▶ Feeding pigs an additional 100 to 200 mg/kg of dl- α -tocopherol acetate effectively delays the onset of lipid oxidation in fresh whole-muscle pork cuts and ground pork, as well as precooked and cured pork products



Betaine supplementation



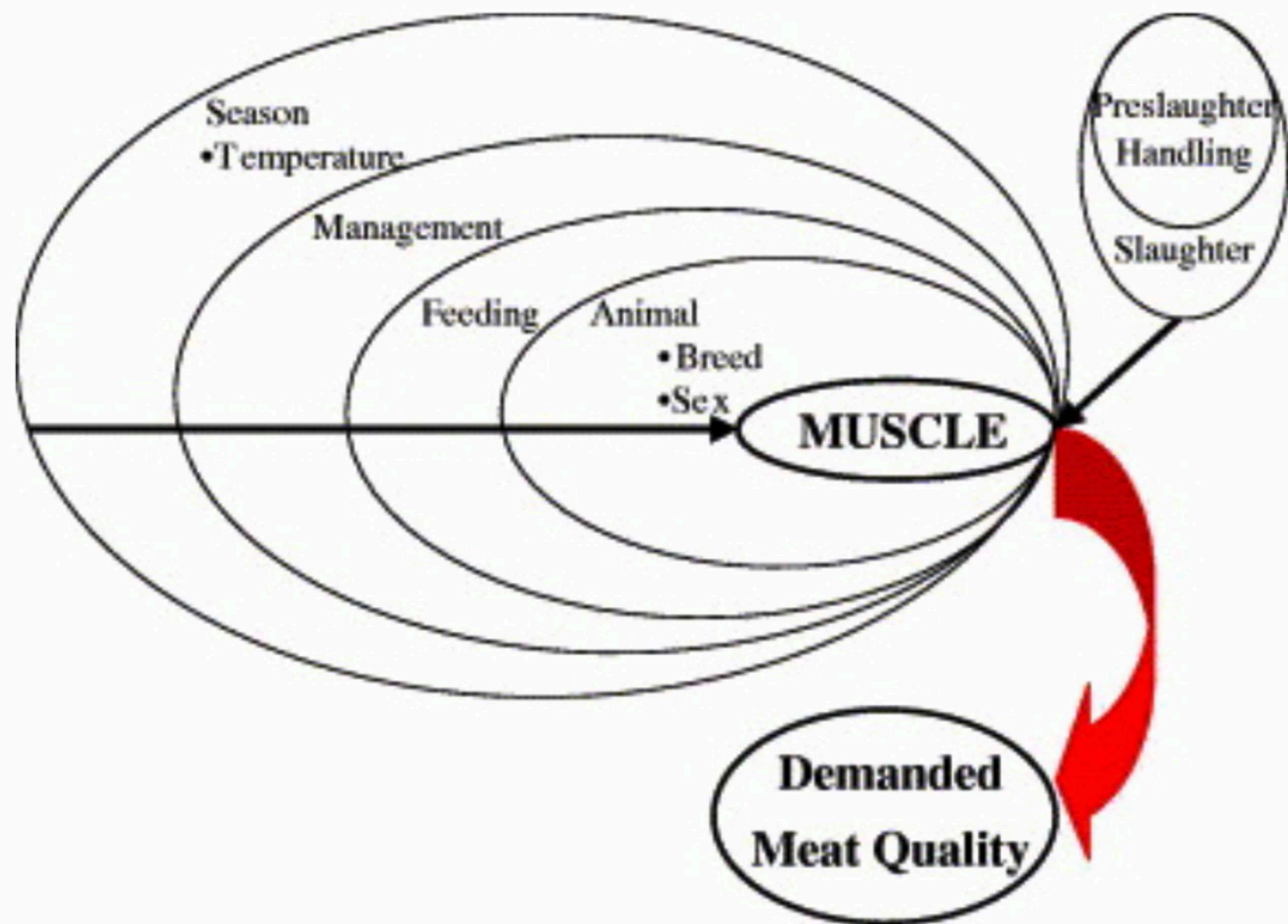
- **Lipotropic effect of betaine**
- **Betaine can decrease back fat and increase carcass leanness**

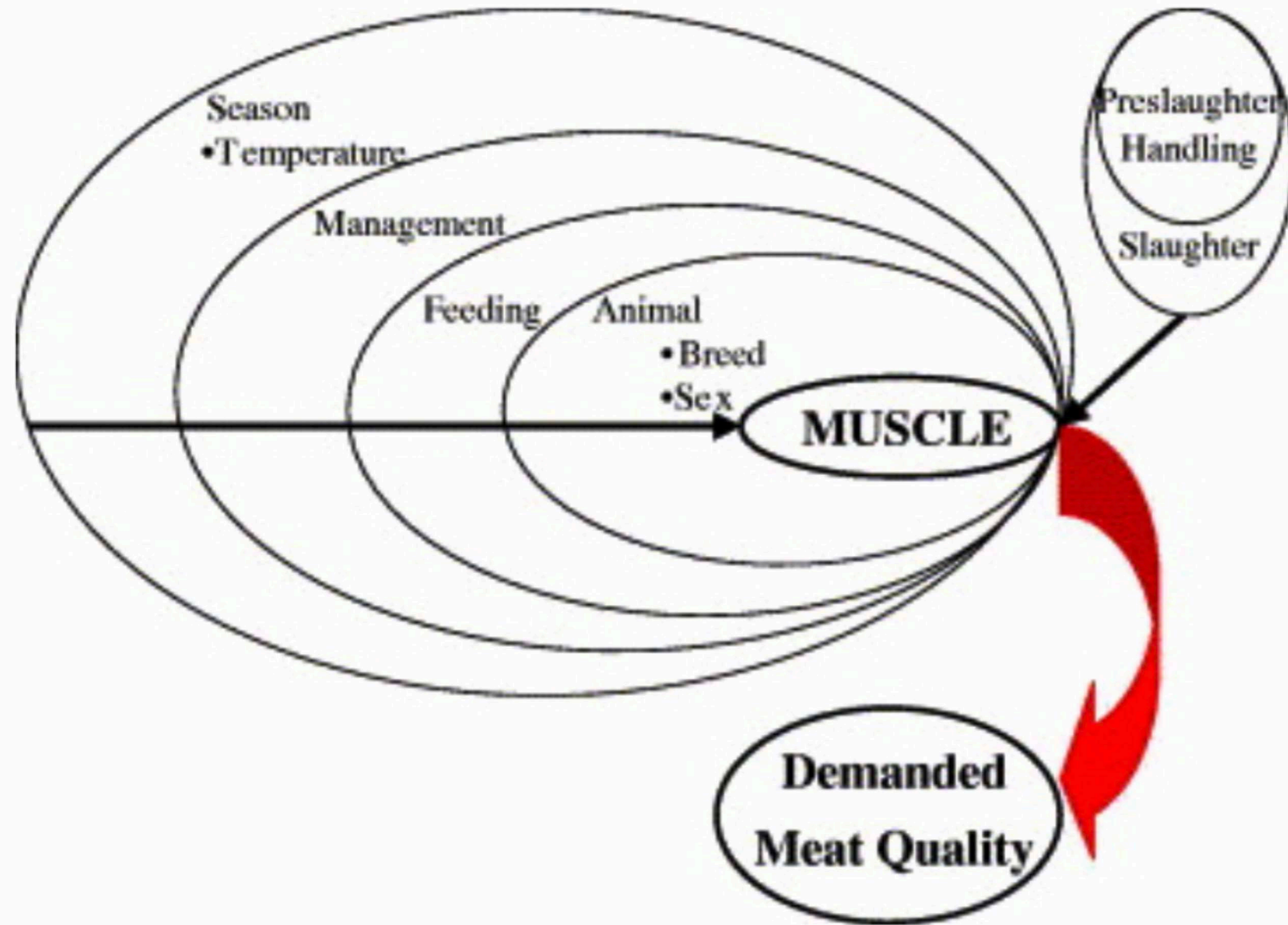
Usage of betaine in the different swine categories:

Piglets	<ul style="list-style-type: none"> - Replacement of choline chloride in the feed - Improve performance - Protect gut and improve gut morphology - Supply methyl groups (e.g. for creatine synthesis)
Grower/Finisher pigs:	<ul style="list-style-type: none"> - Replacement of choline chloride in the feed - Improve performance (weight gain, feed efficiency) - Improve carcass characteristics (less back fat, lower carcass fat and higher dressing %) - Heat stress protection
Sows	<ul style="list-style-type: none"> - Heat stress protection - Reproductive performance (reduced WEI, more total piglets born, lower body condition loss)
Boars	<ul style="list-style-type: none"> - Heat stress protection - Reproductive performance

Arginine Supplementation

- ▶ Arginine effectively promotes muscle gain and reduces body fat accretion in growing-finishing pigs
- ▶ The amount of total skeletal muscles increased by 5.2 % in the arginine supplemented pigs, while the total fat content decreased by 11.2 %
- ▶ The intramuscular lipid content in the M. longissimus dorsi increased to about 3 g/100g, which is seen as ideal for pork flavour, tenderness and juiciness of the meat.





What was learnt

- ▶ **Lean pork production**
- ▶ **Omega 3 rich pork**
- ▶ **Improving shelf life of pork through feeding**



Thank you