FUNCTIONS OF CARBOHYDRATES:

Provides energy for:

- **Muscular contraction (glycogen stored in muscles and liver).**
- **Glandular secretions.**
- **The brain, lungs and nerves.**
- **Provides heat to maintain body warmth.**
- **Prevents hypoglycaemia and nervous systems of low blood sugar by feeding nerves with glucose. Complex carbs are needed to maintain blood sugar.**
- **'Spares' protein by preventing breakdown for fuel.**
- **Aids in absorption of other nutrients.**
- **Stimulates growth of intestinal bacterial, good and bad. Good bacteria help the synthesis of important vitamins like Biotin.**
- **Provides fibre or 'bulk'. Cellulose tones intestinal muscles and regulates movement of food through intestines**
- **Essential for effective anal gland tone.**
- **Carbs add flavour, colour and texture.**

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ANIMAL HEALTH CENTRE

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WHY DOES MY DOG NEED VEGETABLES?

- Dogs access the contents of the stomach of their prey first for the vegetable matter to prime their own digestive enzymes so they can digest meat and bones.
- Helps protect against some cancers by reducing formation of estrogen-like chemicals in the gut.
- Adds bulk to faeces and increases the water-holding capacity thereby assisting with good elimination.
- Fibre improves the control of blood sugar levels in diabetes through slowing the release of glucose; helps regulate plasma glucose in the diabetic dog.
- Can be an inhibitor of abnormal cell growth in the gut.
- Normalises transit time through the gut.
- Alters nutrient absorption and metabolism.
- Promotes satiety, therefore helps to control obesity.
- Maintains the structural integrity of the gut mucosa.
- May help with lowering cholesterol.
- May decrease susceptibility to lung and gastro-intestinal cancers (especially useful yellow and green vegetables and whole fruit, especially citrus).
- Assists in anal gland health by providing bulk in the faeces.
- Carbs are alkalizing, thereby reducing the risk of a highly acidic diet (meat-only). Many diseases thrive in an acid environment, including arthritis and cancers.

We notice that many dogs put on muscle mass when vegetables are introduced into their diet.

WHAT ARE CARBOHYDRATES (CHO's) ?

Carbohydrates are food produced by plants.

There are THREE main groups:

1. Soluble simple sugars found in fruit, honey, sugar cane
2. Insoluble or complex sugars and starch found in grains and vegetables
3. Fibre

Monosaccarides

Simple sugars - glucose (blood sugar), fruit sugars and part of lactose found in the milk of mammals. All carbs are broken down to glucose in the intestines and liver before being used by the body cells.

Disaccarides

A combo of two sugars - sucrose (in fruit and veges), lactose (milk sugars which encourage growth of healthy intestinal flora) and maltose in germinating cereals and malt.

Polysaccarides

A combo of many sugars - the family of starches, glycogen and cellulose.

Starch

Starch is the form stored in plants. Sources include wheat, rice, corn, peas, beans and potatoes. Starch is made digestible through heat and the enzyme amalyse. Dogs do not have this enzyme in the saliva, so starch digestion does not occur in the mouth as it does with humans.

Glycogen

Glycogen is the form of carbs stored in the liver and muscles of animals. When the blood reaches a level of extra glucose this is made into glycogen which stabilises sugar levels in the blood.

Cellulose – dietary fibre. May be insoluble (woody plants) or soluble (pectins in fruit and veges). Both forms are not digested and not considered necessary in the diet, however fibre is essential for gut health. Lack of fibre in the diet may be partly responsible for the increase of fibre-responsive diseases like diabetes and IBS.

Dietary Fibre

In the wild carnivores eat all parts of the prey, which includes digestible and indigestible fibre, so it is considered a natural part of the diet. Fibre is not classified as a nutrient but does affect the health and function of the gastro-intestinal tract, affecting motility and the ecosystem of the gut. Fibre includes cellulose, pectin, gums and mucilages and is classified according to its solubility in water.

Soluble Fibre

Found in peas, oats, dried beans, lentils, barley, pasta and fruits. It delays gastric emptying and increases the viscosity of the contents of the small intestine. This influences the absorption of some nutrients. Soluble fibre reduces the *glycemic response to carbohydrate foods, increases bile acid excretion and may reduce LDL cholesterol.

Insoluble Fibre

Found in cereals (especially bran) and vegetables. Insoluble fibre, especially cellulose, regulates and normalises stools and **bowel transit time (shortens the transit time in animals that have a slow to normal transit time and prolongs it in animals with a rapid transit time). It is therefore useful for reducing constipation and managing bowel diseases such as diverticular disease, irritable bowel syndrome and gall stones. Diets high in insoluble fibre are inappropriate for dogs with high energy requirements (growth, stress work, late pregnancy), but appropriate for weight control or weight reduction because of the satiety effect (sense of fullness it produces).

Disadvantages of Fibre

Flatulence and borborygmi (rumbling stomach), particularly when large amounts are introduced suddenly into the diet. This is why we recommend only pumpkin with tripe when initially changing to a 'real food' diet.

*** Bowel transit time = this is how long it takes an undigested particle to move through the digestive tract, from mouth to anus, to be excreted in the faeces.*

ENERGY – CARBOHYDRATES v. PROTEIN

Animals have a metabolic requirement for glucose but most animals can synthesise enough glucose to meet their metabolic requirements without dietary carbohydrate PROVIDED the diet contains sufficient glucose precursors (amino acids and glycerol).

Evidence is that dogs have a well-developed ability to produce blood glucose from non-carbohydrate sources (fats and proteins) and store it in the muscles and liver for use. This process is called gluconeogenesis. Protein also uses this process, using amino acids for energy production.

It is important to realise that blood glucose levels are used at both rest and exercise and must remain within a normal range (the brain relies solely on blood glucose). Dogs have demonstrated the ability to produce very fast gluconeogenesis in the presence of decreased post exercise circulating blood plasma. The utilization of fats and proteins in gluconeogenesis use alternative metabolic pathways during low (oxygen) and high (without oxygen) activity and this whole process is so effective some nutritionists risk saying – 'carbohydrates are not that important in the canine diet' and in fact would recommend as low as 5-10% of total dietary intake.

Research appears focused on performance, not on the gut, from where most illness arise!

**** The Glycemic Index***

In basic terms, the GI represents the speed at which a CHO source can be broken down, enter the blood and hereby increase blood glucose levels. The more simple the sugar the greater its potential to be rapidly broken down into blood glucose. Even polysaccharides have to be broken down before becoming blood glucose but the process takes longer and has a lesser impact on the BG levels.