

## Does Grain Actually Predispose Our Cats to Gain Weight?

A Knowledge Summary by

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### PICO question

In adult cats, does feeding grain free maintenance diet reduce the risk of obesity compared to feeding a maintenance diet containing grains?

### Clinical bottom line

There is no evidence showing feeding grain free maintenance diet reduces the risk of obesity compared to feeding a maintenance diet containing grains.

## The evidence

No published research evidence currently exists regarding the role of grain free diets in prevention of feline obesity.

During the literature search some primary research papers and non-systematic reviews were identified, where the role of carbohydrates in feline obesity was evaluated. Since grain is mainly used as a source of carbohydrates in pet food, this information has been taken into consideration for the appraisal, application and reflection. In some of them, specific types of grain are considered. However these studies do not specifically compare grain containing diets with grain free diets in order to evaluate the potential role of grain as a risk factor of obesity.

The majority of the papers did not mention any conflict of interest. However, research funds seem to be provided by pet food manufacturers in a great number of them.

## Appraisal, application and reflection

Carbohydrates in the form of cereal grains or alternative sources make up from 20% to 50% of most extruded diets. Starch is what the largest portion of a whole grain is comprised of, and it is necessary to give structural integrity to the kibble. Despite being widely used in the pet food industry, cereal grains are poorly studied (1).

The carnivore nature of cats has led to speculations that high carbohydrate diets as dry food, could be detrimental for their health and lead to feline obesity. Obesity is a concern because it predisposes cats to insulin resistance, diabetes mellitus, lower urinary tract disease, osteoarthritis and skin problems.

The PICO question is based on the assumption that grain could be evaluated as an independent risk factor of feline obesity. However, risk factors for feline obesity seem to be multiple and interrelated.

On the other hand, different grains are sources of different types and amounts of carbohydrate (e.g. resistant starch, digestible starch, free glucose). Different sources of carbohydrate may differently influence weight gain (2).

In a recent study (3), the mean manufacturer reported carbohydrate content in the feline grain free diets was

25% lower than the reported carbohydrate content of the grain containing diets. However, there was considerable overlap between the groups and the individual diets' carbohydrate/nitrogen free extract content varied widely.

Assessing the evidence behind the influence of macronutrients on prevention of obesity is beyond the scope of this knowledge summary. However, given the frequent use of grain starch in extruded diets and the high percentage of starch contained in grain, reviews and studies retrieved on this search that focus on the effect of carbohydrates in weight gain, have been read and taken into consideration to write this appraisal.

Some experts (4, 5, 6) state that, according to the research done on carbohydrates in feline diets, grain does not seem to contribute to feline obesity, compared to diets with an increased fat or protein content. But as this statement is based on experts' opinions, its grade of evidence is low (EBVM grade IV) (7). It seems to be the total energetic intake which affects the outcome.

From ten control trials retrieved during the search, that compare high carbohydrate with high fat or/and high protein diets, three show an increase in weight gain when cats are fed high carbohydrate diets, whilst seven show a greater weight gain in cats fed a high protein or high fat diet. However, only one of these ten papers includes wet food samples and most of them focus on management of overweight cats, rather than on risk of obesity. Conclusions about the influence of macronutrients in feline weight gain cannot be made based on this selection of papers since the literature search and the selection process were both focused on grain.

Given the high number of papers retrieved, many titles were excluded. As the latter usually do not show whether grain is considered in the text, exclusion and inclusion criteria were difficult to establish at this stage. Initially all titles related to feline diets were included. Then, those that did not suggest any association with weight gain or carbohydrates were excluded.

This initial exclusion criteria could have negatively affected the search results, as it may have allowed missing relevant content of some studies. However, by including "carbohydrates" amongst the search terms, we have avoided ignoring plenty of information that would have been omitted otherwise. Initially a more specific grain related search strategy was attempted but it was considered non-representative of the current scientific evidence regarding this PICO question.

The majority of the papers did not mention any conflict of interest. However, research funds seem to be provided by pet food manufacturers in a great majority of the papers. This possible bias may influence owners and veterinarian's perception of the evidence available. The current general concern amongst owners and veterinarian's about feline obesity would justify more independent research about the role of grain in weight gain.

## Methodology Section

Search Strategy	
Databases searched and dates covered:	CAB Abstracts on the OVID interface 1973 to 2018 Week 15 PubMed 1947–2018 Week 15 VetMed Resource 1919–2018 Week 15
Search terms:	<p>CAB Abstracts</p> <ol style="list-style-type: none"> <li>1. cat or cats or feline or felines or queen or queens or felis or felidae or exp cats/ or exp Felis/ or exp Felidae/</li> <li>2. pet or pets or exp pets/</li> <li>3. carbs or carbohydrates or grain* or cereal* or wheat or corn or rice or exp grain/</li> <li>4. diet or diets or food or feed or exp diet/</li> <li>5. (1 or 2) and 3 and 4</li> </ol> <p>PubMed</p> <ol style="list-style-type: none"> <li>1. 1 cats or feline or felines or pet or pets</li> <li>2. diet or dietary or food or feed</li> <li>3. carbs or carbohydrates or grain-containing or grain or cereal or wheat or corn or rice</li> </ol> <p>VetMed Resource</p> <ol style="list-style-type: none"> <li>1. 1 cat or cats or pet or pets</li> <li>2. diets or diet or dietary food or feed or foods</li> <li>3. carbs or carbohydrates or grain-containing or grain or cereal or wheat or corn or rice</li> </ol>
Dates searches performed:	26 April 2018

Exclusion / Inclusion Criteria	
Exclusion:	Grain but no association with obesity Carbohydrates considered, but not grain Non-peer reviewed material
Inclusion:	Grain/carbohydrates in feline diets Feline obesity, food intake, energy source, macronutrients Primary research papers Systematic reviews (SR)

Search Outcome								
Database	Number of results	Excluded – Duplicates	Excluded – title not related to PICO	Excluded – content not related to PICO	Excluded – not primary research or systematic reviews	Excluded – unspecific source of carbohydrates	Excluded – a number of types of grain used as source of carbohydrates considered but not compared to grain free diets	Total relevant papers
PubMed	732	0	713	8	3	3	5	0
VetMed Resource	522	63	417	26	12	2	2	0
CAB Abstracts	991	410	400	176	5	0	0	0
Total relevant papers when duplicates removed								0

## CONFLICT OF INTEREST

The author declares no conflict of interest.

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