Scientific Advisory Committee on Nutrition

Subgroup on Maternal and Child Nutrition (SMCN)

Paper for discussion: Soya based infant formula

Agenda item: 5

Please see attached paper for discussion which includes:

Annex 1 - Response to The Committee on Toxicity on the draft report Phytoestrogens and Health

Annex 2 – Paediatric Group Position Statement on the use of Soya protein for Infants

Annex 3 – Letter from IDFA: SACN's Advice to the COT on Soya infant Formula

Reference Papers:

Berry GT, Nissim I, Lin Z, Mazur AT, Gibson JB, Segal S. Endogenous synthesis of galactose in normal men and patients with hereditary galactosaemia. Lancet 1995;346 1073-1074.

Gitzelmann R, Auricchio S. the handling of soy alpha-galactosides by a normal and a galactosaemia child. Pediatrics 36,2311965.

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Koch R, Acosta P, Ragsdale N, Donnell G N. Nutrition in the Treatment of Galactosemia. Journal of the American Dietetic Association 1963;43:216-222.

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Scientific **A**dvisory **C**ommittee on **N**utrition

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Soya based infant formula

Issue

1. Clarification of the need for soy-based infant formulas.

Background

2. The Committee on Toxicity (COT) raised the possibility of risk to infants from the high phytoestrogen content of the infant formula (Committee on Toxicity 2003). COT consider the science in this area to be complex and acknowledge that the available evidence on phytoestrogens in soya-based formulas and possible risks to reproductive health in infants is not definitive. Although adverse effects on the development of reproductive organs and fertility have been reported in animals after administration of large doses of phytoestrogens, from limited number of studies there is no evidence of similar effects in humans.
3. COT made the following conclusion :

The Working group considered that the findings from these studies do not provide definitive evidence that phytoestrogens present in soy-based infant formulae can adversely affect the health of infants. However, the findings, together with those from studies on the mechanism of action and biological activity of phytoestrogens reviewed in this report, provide evidence of potential risks. For this reason , the Working Group expressed concern about the use of soy-based infant formulae. The Working Group notes that the Scientific Advisory Committee on Nutrition (SACN) expressed similar concern when considering evidence presented in this report. SACN also considered there to be no substantive medical need for, nor health benefit arising from, the use of soy-based infant formulae. However, it was noted that soy-based infant formulae were the only vegan infant formula option available if babies were not exclusively breast-fed. In light of the concerns expressed, the Working Group <u>recommends</u> that the Department of Health review current advice on the use of soy-based infant formulae.

4. The above conclusion took account of SACN's view that at present there is no clinical condition that uniquely requires the use of soya-based infant formula as other suitable alternatives such as specialised hydrolysate formulas are available (Annex 1).

Current advice

5. In 1999, following the Food Advisory Committee's recommendation to reduce the levels of phytoestrogens in soy-based infant formulae as a precautionary measure, the COMA Panel on Child and Maternal Nutrition (PCMN) agreed that *"the use of soy-based infant formula should be discouraged through professional and parental education as more suitable alternatives, particularly those based on cow's milk protein hydrolysates, are available"*

Use of soy-based infant formula in the UK

6. 1% of non-breast fed infants aged 4-10 weeks receive soy-based formula and this rises to 2% in infants aged 10-14 weeks (DH, Infant Feeding Survey 2000). Soy-based infant formula is the only choice available for feeding infants non-animal origin formula and is currently the only vegan option.

7. There has been a steady decline in the total number of prescriptions issued for soya-based formulae since 1994. In 2002, 173,500 prescriptions were issued but information on the indications for which these were given is not available. Also, data providing a breakdown of which types of formulae are being given to infants at risk of developing cow's milk allergy are not available. However, a significant number of mothers who wish to avoid cow's milk in order to prevent allergies are known to purchase soy-based infant formulae.

Discussion

8. Soy-based infant formulae can be prescribed and are listed by the Advisory Committee on Borderline Substances (ACBS) for:

- proven cow's milk sensitivity,
- proven lactose intolerance in pre-school children,
- galactokinase deficiency and galactosaemia.

9. A joint statement by the European Society for Allergology and Clinical Immunology (ESPACI) Committee on Hypoallergenic Formulas and the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutriton (Høst *et al* 1999) particularly cautioned against the use of soy-based infant formula to treat or prevent cow's milk allergy as some prospective studies have shown that soy-based formulas are as allergenic as conventional cow's milk based formulas. On this basis they should not be recommended for the prevention of food allergy. Further studies may be required to clarify the allergenicity of soy-based formula in infants who are at risk of developing allergies. Notably the committee concluded that :

- *Infants with cow's milk protein allergy who are not breast fed should receive a dietary product with highly reduced allergenicity based on "extensively" hydrolysed protein or, in selected cases, a product based on an amino acid mixture.*
- *In bottle-fed infants with a documented hereditary atopy risk (affected parent or sibling), the exclusive feeding of a formula with a confirmed reduced allergenicity is recommended because it can reduce the incidence of adverse reactions to food, especially to cow's milk protein.*
- *Exclusive breastfeeding during the first 4-6 months of life might greatly reduce the incidence of allergic manifestations and is strongly recommended.*

10. The EC Scientific Advisory Committee (SCF) (2003), in its report on the Revision of Essential Requirements of Infant Formulae and Follow-on Formulae stated :

Both cow's milk protein and soya protein isolate may be regarded as nutritionally adequate in infant formula. However, in view of some remaining uncertainties on the short- and long-term effects of a high isoflavone intake in infancy and on the potential to influence allergic and autoimmune disease, the Committee is of the opinion that soy-based formula should be reserved for specific situations only and that cow's milk-based formula should be the standard choice.

11. In the UK, although soy-based infant formulae can be prescribed for conditions such as lactose intolerance, and cow's milk sensitivity, there are more suitable

alternatives available in the form of hydrolysate infant formulae. Soy-based infant formulas are an important alternative choice to vegan mothers who wish to avoid animal products.

ACBS listed milk substitutes suitable infants with galatosaemia (Source - Special foods for Children, RCPCH 2002 and information from manufacturers)

Infant Formula	*Protein source*	*Lactose*
Galactomin 17	Sodium and calcium caseinate	<10mg/100ml
Enfamil Lactofree	Milk protein isolate	<10mg/100ml
SMA LF	60% whey and 40% casein	Typically <10mg/100ml
Prosobee Wysoy Farley's Soya Formula InfaSoy Isomil	Soya protein isolate	Lactose free

12. Most soy-based infant formulae do not contain any lactose and therefore tend to be the formula of choice for the management of galactosaemia. However, soya products can contain other potential sources of galactose such as raffinose and stachyose (Koch *et al* 1963). Following a supplement of stachyose or prolonged supplementation with raffinose in galactosaemic children did not alter non-fasting erythrocyte galactose-1-phospahte levels (Gitzelmann and Auricchio 1965). The extent to which galactose is liberated in the gut is still unclear but there remains a possibility that some could be absorbed (Wiesman *et al*, 1995). The SCF (2003) recently proposed that products that contain less than 10mg of lactose/100ml could qualify for the permitted claim "free of lactose", *based on a empirical guidance values for a galactose (both free and â-glycosidic) intake of 50-200mg/day for infants with classical galactosaemia.*

13. It has been known for some time that despite strict restriction of dietary galactose, urinary galactitol excretion remains significantly elevated in patients with galacosaemia. Endogenous production of galactose was estimated to approximate 1g/day in adult turnover studies (Berry et al 1995). This may be a conservative estimate as tracer recycling could have occurred. If extrapolated to infants this equates to endogenous production approximating 50-100mg/day in an infant weighing 4 kg. Thus the amount of dietary galactose consumed from a protein hydrolysate formula may be less clinically significant than widely assumed. Data on urinary galactitol excretion or blood galactose 1-phosphate concentration in infants fed either soy or protein hydrolysate formula do not appear to have been published but generally the upper limit of acceptable range is 150µmol/l RBC (Walter *et al*,1999).

14. Another concern that has been expressed is the acceptability of hydrolysate formulas because of their low palatability. Some health professionals see this as a particular problem in infants who are already on a mixed diet. Although the evidence to support these concerns appears anecdotal, any accompanying reduction of intake could have implications for an infant's growth and development. Unfortunately there do not appear to be data in this context from comparative long-term studies.

15. SACN's view and COT's recommendation for DH to review its advice on the use of soy-based formula raised comment amongst some health professionals and manufacturers who have questioned SACN's view that there is no unique medical condition that requires the use of soy-based formula. A position statement by the British Dietetic Association (BDA) and the letter from the Infant and Dietetic Association are annexed (Annexes 2 and 3) for information.

16. Conclusion

- Specialised infant hydrolysate formulas that are lactose free are available and ACBS listed for infants with proven cow's milk allergy, proven lactose intolerance, galactosaemia and galactokinase deficiency.
- Soy-based infant formulas constitute an important alternative for vegan mothers who make an informed choice not to breastfeed and who wish to avoid animal products.
- Both soy-based and hydrolysate formulas contain some galactose. In galactosaemia the maximum acceptable dietary galactose intake, relative to endogenous production has not been clearly established and published studies of comparative clinical efficacy have not been identified.

Members are asked to consider whether:

- **hydrolysate formulas should be considered preferable to soy formulas in the management of proven cow's milk protein allergy, lactose intolerance and galactosaemia**
- **soy-based formulas should be used to treat or prevent cow's milk allergy**
- **soy-based formulas should be used if hydrolysate formulas are not acceptable to the infant**

References

Berry GT, Nissim I, Lin Z, Mazur AT, Gibson JB, Segal S. Endogenous synthesis of galactose in normal men and patients with hereditary galactosaemia. Lancet 1995;346 1073-1074.

Committee on the Toxicity of Chemicals in Food, Consumer Products and the Environment (2003), Phytoestrogens and Health.

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