Breast milk will always be the most natural food during the first six months, and every mother who can, should breast-feed her baby for herself.

Henri Nestlé 1869.

ONE HUNDRED YEARS BEFORE THE W.H.O. CODE HENRI NESTLÉ HAD HIS OWN.

Henri Nestlé, in his very first booklet to mothers, clearly stated that there will never be an infant formula that is as good as breast milk. And today, Nestlé are continuing the effort to help persuade mothers to breast-feed.

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IMPORTANT NOTICE: The World Health Organisation (WHO*) has recommended that pregnant women and new mothers be informed of the benefits and superiority of breast-feeding – in particular the fact that it provides the best nutrition and protection from illness for babies. Mothers should be given guidance on the preparation for, and maintenance of, lactation, with special emphasis on the importance of a well-balanced diet both during pregnancy and after delivery. Unnecessary introduction of partial bottle-feeding or other foods and drinks should be discouraged since it will have a negative effect on breast-feeding. Similarly, mothers should be warned of the difficulty of reversing a decision not to breast-feed. Before advising a mother to use an infant formula, she should be advised of the social and financial implications of her decision: for example, if a baby is exclusively bottle-fed, more than one can (450g) per week will be needed, so the family circumstances and costs should be kept in mind. Mothers should be reminded that breast-milk is not only the best, but also the most economical food for babies. If a decision to use an infant formula is taken, it is important to give instruction on correct preparation methods, emphasizing that unboiled water, unboiled bottles or incorrect dilution can all lead to illness. ** See: International Code of Marketing of Breast Milk Substitutes, adopted by the World Health Assembly in Resolution WHA 34.22, May 1981.*

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Feed Your Child Right

Infant Nutrition and Feeding Practices • Tyrosinaemia

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The Singapore Journal of

NUTRITION AND DIETETICS

Vol 2 No 2 December 1992

Editorial

Our current issue focusses on several aspects of infant nutrition. Dr. Yeung's paper reviews the principles behind current infant feeding practices while Prof. Hamburger's talk focusses on the diagnosis and prevention of food allergy in infants. Diana Peers has done an excellent case study of an infant with tyrosinaemia. To cap it all, we have a review of our very own first local book, "Feed Your Child Right" by members, Lynn Alexander and Yeong Boon Yee which won the recent National Development Council's Book Award for 1992 under the non-fiction category.

This year has definitely been a very vibrant and successful one for our profession and 1993 looks set to be more exciting.

And finally to close the year, let me, on behalf of the Editorial Committee, wish all our readers **"Season's Greetings and Best Wishes for the New Year!"**

CONTENTS

Rationale For Suggested Infant Feeding Practices

David L Yeung, Ph.D., Director, Corporate Nutrition, H.J. Heinz Company

Many factors influence the growth, development and health of infants. These include genetics, the environment, health care and nutrition. This paper concerns nutrition and discusses the rationale behind current international guidelines for infant feeding. However, these guidelines may not be entirely appropriate for all cultures and situations.

Dietary guidelines are intended to provide individuals within a target population with a clear, simple and uniform message that promotes sensible food choices to achieve optimal nutrition and health. As such, the recommendations must be (a) consistent with reliable scientific information, or at least, the considered judgment of nutritionists; (b) practical, in the sense that they can applied in the everyday situation, and (c) suitable to the majority of the target population. Furthermore, the recommendations should be sufficiently flexible to recognize the individuality of the consumer in terms of his/her nutritional needs and food preferences.

The aim of infant feeding guidelines is to provide nutrition educators with a concise message to assist new parents in providing their infants with optimal nutrition for growth and development and in avoiding some of the common nutritional problems. The guidelines recognize that the kinds and quantities of foods needed by infants change rapidly during the first year of life. They also recognize that infants are, comparatively speaking, physiologically immature and thus a stepwise introduction of food is emphasized.

Birth to 6 months

Breast-feeding

The recommendation is for the infant to be breast-fed as soon as possible when the baby is born, and for as long as possible, preferably not less than 6 months (1). Breastmilk is the best milk for the human infant. Nutritionally breastmilk contains all the essential nutrients in optimal levels; the exception is vitamin D. Breastmilk also contains immune substances that impart passive immunity to the infant. In addition, recent research shows that breast-feeding has long-term health benefits.

Under normal conditions, breastmilk contains sufficient energy, protein, fat, carbohydrate, vitamins (excepting vitamin D), minerals and water to support optimal growth in the first 6 months of life. However, the diet of the mother can influence the levels of certain nutrients. Hence, to ensure that breastmilk provides adequate nutrition for the growing infant the mother requires a balanced diet that contains all the essential nutrients. This can be done by raising the energy intake by 450 calories per day over and above the intake for the mother before pregnancy from a variety of foods.

The nutrients in breastmilk are highly bioavailable. For example, human milk has relatively low levels of iron. However, the presence of lactoferrin in breastmilk ensures high bioavailability of the iron. Between 50 to 80% of the iron in breastmilk are absorbed, and exclusively breast-fed infants have adequate iron status up to 4 to 6 months of life (2).

The level of vitamin D in human milk is low. However, research shows that regular exposure of the infant's face and forearms to the sun raises the plasma vitamin D levels towards normal (3). Hence, to reduce the risk of rickets, exclusively breast-fed infants should be regularly exposed to sunlight even in the winter months or be given a vitamin D supplement.

Human milk protein is mainly alpha-lactalbumin which forms a soft curd in the stomach and is easily digestible. Although animal milks contain more protein than human milk they also contain more casein lwhich forms a hard curd that is less readily digestible in young infants. Alpha-actalbumin is also one of the proteins necessary for synthesis of lactose, the breastmilk sugar.

Besides the nutritive properties, human milk protein together with other breastmilk factors play an important role in fighting infections in the newborn (4). For example, the immunoglobulins, secreted in human milk help to protect the infant from infections. White blood cells present in mother's milk play a similar role. The lactobacillus growth factor promotes colonization of the infant's gut with the bacteria lactobacillus which maintains an environment in the intestine that discourages growth of pathogenic organisms that cause gastroenteritis and other infections. Lactoferrin, the iron transport protein also has bacteriostatic properties. Research has provided evidence to show that breast-fed infants have fewer episodes of infections and hospital visits than bottle-fed infants. This is particularly true in developing countries.

Psychologically, breast-feeding is satisfying to both the mother and child. It enhances maternal-child interrelationship and the closeness of this coupling exposes the baby to a wide range of bodily stimuli that enrich maternal-child interaction.

Recent research has revealed some very interesting long-term health benefits of breast-feeding to the child. Premature babies who receive breastmilk, not necessarily from the breast, have been reported to have a substantial advantage in IQ at 7-1/2 to 8 years over those infants who did not receive any breastmilk (5). This advantage was 8.3 points or over half a standard deviation. Furthermore, the more breastmilk the child receives during infancy the higher was the difference in IQ, particularly in verbal expression. It has been suggested that this could be related to the presence of the omega-3 fatty acids in breastmilk but absent in cow's milk or formula.

Infants who are breast-fed are also found to have lower risk for insulin dependent diabetes militus, lymphoma and cardiovascular diseases in later life (6,7,8). The longer the duration of breast-feeding the lower the risk of these chronic diseases.

The reasons for the long-term health benefits of breast-feeding are unclear. Only through research will the explanations be forthcoming. Nevertheless, these findings, albeit preliminary, make it all the more important for all new mothers to breast-feed their infants.

Mothers are encouraged to start nursing as soon as possible after the delivery of their baby and not to delay this process for 24 to 72 hours as practised in some cultures. Early initiation of breast-feeding will facilitate milk production and secretion. To facilitate early initiation of breast-feeding and feeding on demand, rooming-in during the hospital stay is advocated. Colostrum contains high levels of the immune substances mentioned above. Consequently, early breast-feeding will confer passive immune protection to the newborn.

Mothers are also encouraged to breast-feed for as long as possible and not less than 6 months so that maximum nutritional and immune benefits can be enjoyed by the infants.

Ideally all newborn infants should be breast-fed. However, if breast-feeding is not possible the best alternative is a commercial infant formula that is fortified with all the nutrients in appropriate amounts that are essential for health and growth of the infant.

Supplementary Foods

Breastmilk alone provides sufficient nutrients to satisfy the needs of most infants up to about 6 months of age. However, there are many infants who will require a food supplement by 4 to 6 months of age. According to the Consultative Group on Maternal and Young Child Nutrition, a U.N. Subcommittee on Nutrition, "In general, complementary foods should not be introduced to exclusively breast-fed infants before 4 months, nor delayed beyond the age of 6 months. When growth falters, however, appropriate remedial steps should be taken regardless of age" (9).

Growth of exclusively breast-fed infants in the first 3 months of life is comparable to international reference values. Thereafter, the growth rate of many of these infants tends to falter. Lack of sufficient breastmilk is one of the factors attributed to this phenomenon and feeding a food supplement

at this time is generally recommended. Indeed research conducted in different parts of the world shows that introduction of nutritious solid foods by 4 to 6 months as supplements to breast-feeding does improve growth of the infants.

Introduction to solid foods before 3 to 4 months should be avoided since they contribute nutritionally very little to the infant who is on either breastmilk or infant formula and may interfere with breast-feeding. When the infant reaches 3 to 4 months he or she is able to sit with support and has good neuromuscular control of the head and neck (10). At this stage of development, the infant is able to indicate a desire for food by opening his mouth and leaning forward, and to indicate disinterest or satiety by leaning back and turning his head away. Furthermore, the extrusion reflex is lost making acceptance and swallowing of solid foods easier.

In practice, the time of introduction of solid foods should be determined by the need of the growing infant as recommended by the U.N. Consultative Group on Maternal and Infant Nutrition, and not by chronological age. Furthermore, it should not be done under the pressure of friends, neighbours or relatives with infants of similar age who are already eating solid foods. Each infant is a unique individual and his hunger needs vary with his rate of growth, physical development and activity. Large, active or energetic infants may need a food supplement earlier than small or more passive infants.

The best way to judge the adequacy of food and energy consumption is by regularly measuring the length and weight of the infant and comparing them to an established growth chart. Significant downward deviation of weight over length signifies inadequate nutrition and a food supplement should be introduced.

The introduction of solid foods should not be taken as a signal to terminate breast-feeding. If the mother can and chooses to, breast-feeding should be encouraged for as long as possible.

Solid foods should be introduced gradually, a little at a time. The amount of the supplement should be increased as need increases. In this way the risks of overfeeding and reducing breastmilk consumption are minimized.

Gradual and stepwise introduction of food supplements, preferably starting with single ingredient foods, facilitates the detection of food intolerance. During early infancy, macromolecules can "leak" into the circulatory system, thereby causing an allergic reaction. Single ingredient solid foods should be added to the infant's diet first with several days between the introduction of each new food (10). Once tolerance of single food is established, mixed foods may be introduced. If a food allergy is suspected the food should be eliminated from the diet and the physician's advice should be sought. Food allergies during infancy are usually transient. That is, the individual is likely to be able to tolerate the food at an older age.

The ingredients that are the most common causes of food intolerance among young infants are cow's milk, gluten, egg white and shellfish. Thus, food containing these ingredients should be avoided. For example, in many countries single grains such as rice, barley, and oat may be introduced as first solids as they contain little gluten, if any, and are therefore of low allergenicity. Once they are found to be well tolerated by the infant, mixed cereals may be introduced.

Cereals are often the first solids to be introduced because they are staples and therefore generally available. They are easy to prepare and feed. In many countries the infant cereals are fortified with nutrients that are otherwise missing in diets of infants.

Other foods may be added to complement the milk diet. Vegetables are suggested to be introduced before fruit. Infants tend to prefer fruits over vegetables because fruits are generally sweeter (1). By introducing vegetables before fruits the infant may accept vegetables more readily. Both yellow and green vegetables are good sources of vitamin C and vitamin A.

Meat and fish may be introduced when protein requirement is higher. Besides being an excellent source of protein, meat is also a good source of the B-vitamins. Organ meats are excellent sources of vitamin A and iron. Egg yolk but not egg white or whole eggs may also be added. Egg white should be avoided because it is highly allergenic.

Before 6 months, foods should be soft and strained or finely mashed because of the lack of teeth at this stage of development. Furthermore, soft strained foods also reduce the risk of choking.

Six to 12 months

By 6 to 8 months, infants should be started on chewable foods (12). At this time, the infant is acquiring opposing teeth and can make meaningful chewable movements. Providing chewable foods will help the infant to learn to chew and to exercise the gum and jaw. Broad clinical experience suggests that delay in the introduction of lumpy foods beyond 8 months may result in later feeding difficulties.

Protein, riboflavin, iron and calcium are commonly deficient among infants. Protein deficiency adversely affects growth and development and the immuno-defense mechanism. Lack of riboflavin hinders energy metabolism, and therefore growth and development. Iron is required for the synthesis of red blood cells and in oxygen transport and metabolism. Without adequate iron, body metabolism may be adversely affected. Furthermore, the child becomes anemic and lethargic. He or she may fail to grow properly. Iron deficiency anemia can also adversely affect mental and behavioural developments not only during infancy but in later childhood even though the iron deficiency anemia has been rectified (13). Calcium is required for the formation and maintenance of strong bones. Calcium deficiency in early years prevents optimal growth and promotes bone malformation.

It is wise to include a variety of foods from each of the basic food groups: (i) milk and milk products, (ii) cereal and cereal products, (iii) meat, poultry, fish and egg, (iv) vegetables, (v) fruit. This will ensure a balanced intake of the essential nutrients and minimize the risk of any nutrient deficiency. Besides, variety in the diet provides greater experience in flavour, taste and texture to the infants. It also reduces monotony in the diet and fosters good eating habits.

Seasonings such as spices and flavour enhancers are not needed in baby foods. Infants cannot tolerate strong spices. Flavour enhancers such as monosodium glutamate, on the one hand, increase the renal solute load thereby taxing the immature kidney and, on the other hand, distort the taste perception of the food. Infants have acute taste buds. They enjoy foods that are considered bland by adults. Thus in order for each infant to enjoy the natural flavour of foods, to establish good life-long eating habits and to reduce the risk of gastrointestinal problems, foods served to infants should not be as highly seasoned as in adult foods.

Twelve to 24 months

By one year of age the young individual is capable of eating more textured foods and enjoying many of the foods that the rest of the family eats. However, it is still a good idea not to feed him or her foods that are highly seasoned, or spiced.

If family foods are consumed, they are generally of higher energy density than foods commonly eaten by infants. Infants and pre-schoolers eat according to their energy needs. If the foods are of high energy density, a greater volume of food may not be needed. Their food needs and appetite may fluctuate from day to day. Many parents are unaware of these phenomena and insist that their infants continue to eat greater amounts of foods. This can promote undesirable eating habits and also create an aversion to specific foods.

It is prudent to provide the growing infant with judicious portions of foods. One should not insist that the infant finish all the food provided in a bottle or bowl. If the child requires more food, an additional serving may be provided, but, if the child does not wish for more, due consideration should be given.

Parents must be cautioned against giving small hard pieces of food which can cause choking and asphyxiation. Foods that have been implicated include nuts, pieces of raw vegetables such as peas, beans and stringy vegetables, sausages, pieces of hard fruits and small candies.

Summary

Providing proper nourishment to the infant requires caring and common sense. No two infants are alike. The time in which a food supplement is introduced and the amount of food provided must be dictated by the developmental needs of the infant.

The ultimate aim in infant feeding is to provide a nutritionally adequate diet for optimal health and growth and development of the infant. To this end, variety and moderation in food choices are key principles.

Food should not be used as a means of reward or punishment. This can result in establishing poor eating patterns and attitudes. Each feeding period should be a peaceful and unhurried event for both parents and infant. The environment should be warm and relaxed. Infants are sensitive individuals. The emotion of the feeder can be easily transmitted to the infant. Positive and negative signals, be they verbal or physical expressions, about foods can affect the food likes and dislikes of infants.

Infant feeding can be a warm and enjoyable experience for both parents and child. It is one aspect of parent-child bonding. Every positive experience the parents and infant associate with feeding enhances their closeness, well-being and security.

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Diagnosis And Prevention Of Food Allergy In Infants

Professor N Hamburger, Professor of Paediatrics, Paediatric Immunology & Allergy Division, University of California, San Diego, USA

Summarized by Lisa Cadman, BSc. Hons., SRD, Dietitian, National University Hospital, Singapore

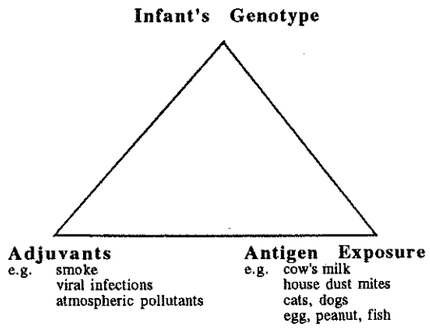
Introduction

Atopy, or allergy, is a state of hypersensitivity to certain antigens, and can cause asthma, eczema, hayfever and food allergy.

The immune response is initiated when an antigen comes into contact with a lymph or plasma cell. A specific protein IgE then "sensitises" the mast cell. During the next contact with the same antigen, the mast cell "recognises" the antigen, which then leads to physiological effects induced by the release of eosinophils, which in some cases can result in anaphylaxis.

Allergic reactions are extremely common, affecting 35.3 million people in the world. Hayfever, asthma and other allergies affect 14.6, 8.9 and 11.8 million people, respectively.

The factors that influence atopic allergy reactions include the infant's genotype (or hereditary potential), antigen exposure, and other adjuvants, or environmental factors.



There are certain risk factors for the development of allergy, or atopy, in infancy. These include hereditary or immunological responses (Table 1), specific environmental stimulation (Table 2), and non-specific environmental stimulation (Table 3).

Table 1: Heredity/Immunological Responses

1	Familial history (biparental>uniparental>none)
2	Increased cord IgE levels
3	Increased serum IgE levels in infancy and childhood
4	Specific IgE antibodies (skin, serum)
5	Decreased T-cell numbers
6	Increased eosinophilia cells
7	Increased nasal eosinophilia/basophilia cells

Table 2: Specific Environmental Stimulation

1	Feeding practices	- brief periods of breastfeeding - food allergens in breast milk e.g. peanuts, peanut butter, excess cow's milk, seafood, fish - early introduction of solid foods - the time of weaning
2	Magnitude of allergen exposure	
3	Early exposure to allergens	- e.g. specific foods, house mites, pets, month of birth (temperate climates)

Table 3: Non-specific Environmental Stimulation

1	Intrauterine exposure to tobacco smoke
2	Infections (viral, bacterial)
3	Passive tobacco smoke, pollutants

Atopy and Feeding Practices

Feeding practices can specifically affect the risk for atopy in infancy. Short periods of breast feeding, early introduction of solid foods, and an inappropriate time for weaning have been associated with high rates of atopy.

Specific exposure to potential food allergens which may be expressed in the breast milk, including peanuts, peanut butter, large volumes of cow's milk (> 1.0 litre per day), seafood and fish, may increase the likelihood of atopy. Continued exposure to large amounts of the allergen, or early exposure to antigens, e.g. food, house mites, pets, can increase the risk of atopy.

Heredity and Atopy

Heredity played an important role in determining the risk for an allergic response in the infant. If both parents had a history of atopy, the risk of allergy increased to 50 - 80%, compared to a risk of 5 - 15% if no parental or sibling atopy history was seen (Table 4).

Table 4: Risk of Infantile Atopy based on Heredity

Risk of Atopy	Risk of Allergy (%)
Biparental	50 - 80
Biparental or uniparental + sibling	40 - 60
Uniparental or sibling	20 - 40
No parent or sibling	5 - 15

Strategies to Reduce the Incidence of Atopy

Professor Hamburger suggested that very high-risk families should make certain changes to prevent allergic disease, based on his clinical experience and research.

Pre-natal exclusion of potential allergens from the maternal diet including egg, milk and peanut, with supplements of elemental calcium, may help in very high-risk families.

Breast feeding was strongly promoted until 4 - 6 months of age. Supplements of caesin hydrolysate, e.g. Nutramigen (Mead Johnson) or Nan HA (Nestle) may need to be offered to the very atopic infant.

The introduction of solid food should be delayed until six months of age, offering the least allergenic foods first, e.g. apple puree.

Only after one year of age should potential allergens be introduced at biweekly or monthly intervals in the order: milk, wheat, soy, corn, and citrus. Professor Hamburger suggested that egg, peanut and fish should be delayed even longer.

Other strategies to reduce the incidence of atopy include ensuring the removal of potential inhalants, e.g. house mites, moulds, air conditioners, purifiers and pets. Atopic infants should be kept away from all smoke and crowded places where infections may be transferred.

Breast Milk or Formula in the Treatment of Atopy?

Breast feeding, or the use of caesin hydrolysates, e.g. Nan HA, Nutramigen, in those unable to breast feed, was highly recommended, together with antigen avoidance strategies in the treatment of the atopic infant.

Soy formula was found to have no protective effect in the development of allergy. Often an allergic response develops later.

In the general population, 1% of all infants were found to have allergic responses to ordinary formula milk, e.g. Enfamil, Similac, SMA; 0.04% reacted to whey hydrolysates, while only 0.01% reacted to caesin hydrolysates, e.g. Nutramigen, Nan HA.

Summary

The benefits of encouraging breast milk in the prevention of atopy include:

- promoting ideal growth and development
- reducing the incidence of morbidity and mortality from infections
- improving the "gut closure" or gut maturation, i.e. preventing the passage of undigested protein across the gut wall
- preventing or delaying the onset of allergic disease
- promoting psychological bonding for the infant and mother
- enhancing lung growth. Breast-fed infants reportedly have a greater bronchial diameter compared to bottle-fed infants
- economical for both the infant and society
- possible benefits in terms of intelligence in later life

Discussion

Some interesting questions from the floor promoted a lively debate where Professor Hamburger reinforced the strategy for treatment and prevention of atopy.

Interesting comments included:

His recommendation is for the healthy infant to breast feed until at least 4 months of age, and possibly to 6 months. Atopic infants should ideally breast feed until 6 months, and possibly 8 months of age. In the treatment of cow's milk allergy, soy hydrolysates should be tried first before soy formula.

Healthy infants should begin weaning at 3 - 4 months of age. Allergic infants should delay weaning until 4 - 6 months of age, and start with less allergenic food such as apple puree. All rice grains should be avoided initially, with obvious implications for the local diet in Singapore.

On the subject of milk intake possibly enhancing excess production of mucous during illness, Professor Hamburger suggested that due to the large volume of water needed to hydrate milk, it becomes difficult for infants to meet increased fluid requirements during illness from milk alone. Supplementing with other fluids, e.g. water, fruit juice, etc. in addition to milk may be necessary. A change in the milk formula to reduce the mucous production is not necessarily indicated.

Professor Hamburger clarified that colic is not an allergic disease but suggested that a hydrolysed formula may be useful in treating this disorder.

MEETINGS

FEBRUARY 14-17 1993
17th Clinical Congress of the American Society for Parenteral and Enteral Nutrition
Venue
San Diego Convention Center, San Diego, CA, USA

MARCH 8-12 1993
XV International Vitamin A Consultative Group Meeting
Venue
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SEPT 26 - OCT 1 1993
International Congress of Nutrition "Nutrition in a Sustainable Environment"
Venue
Adelaide, Australia
Fee
A$ 500.00 (before Mar 1993)

Dietary Management Of Tyrosinaemia

A case study by Diana Peers, Bsc. Hons., SRD, Dietitian, National University Hospital, Singapore

Background

Hereditary tyrosinaemia, also known as tyrosinosis or tyrosinaemia Type I, is a rare metabolic disorder resulting in liver impairment and renal tubular dysfunction.

The disorder occurs due to the deficiency of fumaryl acetoacetate lyase, and is diagnosed by measurement of the metabolic break-down product succinylacetone.

In the chronic form infants often present with failure to thrive, gastro-intestinal (GI) upsets, cirrhosis of the liver, and renal tubular dysfunction. Rickets can occur, secondary to deranged Vitamin D metabolism, and the Fanconi Syndrome (a failure to reabsorb phosphate, amino-acids and sugar from the proximal renal tubules). Hepatocellular carcinoma is a late complication.

Liver disease can start pre-natally and be advanced at birth. It is associated with an increase in the plasma levels of tyrosine, methionine and phenylalanine. However, liver disease progresses despite dietary intervention and the prognosis is limited to the first decade of life, though rarely beyond the first year.

Diet Therapy

The aim of dietary management is to prevent increases in plasma tyrosine levels which would contribute to further liver dysfunction.

A low tyrosine, phenylalanine and methionine intake is recommended to help improve the amino-acid profile.

Infants with hereditary tyrosinaemia are sensitive to even small changes in plasma tyrosine levels, and the dietary intake should, therefore, be limited to below minimum requirements. However, a reduction in the tyrosine intake level is unlikely to alter the progression of the disease. It is possible that the degradation of tyrosine continues in the liver with the production of toxic metabolites, e.g. succinyl acetoacetate.

Phenylalanine can be converted into tyrosine, but not vice-versa. As phenylalanine is an essential amino-acid it should ideally be restricted to minimal requirement levels to prevent clinical or biochemical deficiency states. Frequent biochemical monitoring can be used to assess the actual phenylalanine levels.

Methionine is an essential amino-acid, metabolised in the liver, particularly in transmethlyation reactions, and levels are elevated in tyrosinaemia. A restriction to a minimum level preventing methionine overload is indicated.

Protein or nitrogen intake should not be higher than normal requirements, and should be altered according to the clinical condition, including liver function, with care to avoid rapid changes in protein intake. In infection or catabolic states, a high energy, reduced protein diet is indicated.

Supplementary amino-acids to correct the plasma amino-acid profile may be necessary. For example, a higher intake of branched chain amino-acids (BCAA) including cysteine and arginine may be needed due to the liver disease.

Impaired liver metabolism of the fat soluble vitamins necessitates supplementation in tyrosinaemia. Vitamin D should be supplied to correct phosphataemic rickets; Vitamin K to correct hypoprothrombinaemia; Vitamin A and E are also desirable.

Ideal Feeds in Tyrosinaemia

Albumaid, produced by Scientific Hospital Supplies (SHS) in the UK, is a low phenylalanine, tyrosine and methionine feed.

Product 3200 AB, manufactured by Mead Johnson, in the USA, is a milk formula low in tyrosine and phenylalanine.

Case Study

Baby X, a three-week-old Chinese female, was delivered at 37 weeks gestation, weighing 3.1 kg. On admission, she presented with early onset hepatic failure, GI bleeding, loss of weight, poor feeding and fever for one day. Baby X had no siblings. Her mother was 25 years old and her father, 28 years old; the marriage was not consanguinous.

Diagnoses were septicaemia, metabolic acidosis and tyrosinaemia Type I. The diagnosis of tyrosinaemia was confirmed by markedly elevated serum tyrosine levels and urinary metabolites.

Feeding History

Prior to referral, Baby X had been maintained on glucose oral feeds, rehydration therapy and Total Parenteral Nutrition (TPN), aiming to correct electrolyte imbalances. Oral feeds were poorly tolerated due to the GI bleeding and abdominal distention, indicated by increasing girth measurements.

Case Dietary Management

The aim of dietary therapy was to prevent increases in plasma tyrosine levels, while meeting the child's nutritional requirements in terms of energy, essential amino-acids, vitamins and minerals.

Based on the actual body weight of 2.9 kg, the estimated nutritional requirements for Baby X were:

Fluid:	150 - 200 mls/kg/day
Energy:	150 kcals/kg/day (normal intake 125-150 kcals/kg/day)
Protein:	1 g protein/kg/day (normal intake 2-3 g protein/kg/day)

As ideal specialised low tyrosine feeds were not immediately available in Singapore, Pregestimil (Mead Johnson) feeds were started. Pregestimil is a nutritionally complete hydrolysed protein formula, which is usually well tolerated as the fat source is partially substituted with medium chain triglycerides (MCT) i.e. 40% MCT, 60% corn oil. The concentration of Pregestimil feeds was increased gradually until an intake providing 1 g protein/kg/day was reached. This was equivalent to a restricted intake of 24 mg tyrosine/kg/day (normal level 60-80 mg tyrosine/kg/day). The energy density of the feed was compensated for by the addition of Caloreen, a glucose polymer. Slow increases in energy density helped to promote tolerance.

Arrangements to air-freight the low tyrosine and phenylalanine feed, product 3200 AB, from the USA were made. The transfer time was estimated at three to four weeks.

However, problems developed in the interim period. With a Haemoglobin (Hb) level of 7.9 g/l, anaemia developed, probably secondary to poor feeding.

A total volume of 130 mls/kg/day, was sucked; the energy intake was only 60 kcals/kg/day, provided from 2 hourly bottle feeds.

The feed volume was increased slowly to 150 mls/kg/day, by decreasing the frequency of feeding to 3 hourly bottle feeds with the aim of promoting greater tolerance and thirst. The ideal energy intake was still not being achieved, however, despite an addition of 8% Caloreen (weight:volume) providing an anticipated 77 kcals/kg/day.

Feed 3200 AB arrived early after 8 days. Quarter strength feeds (0.16 kcals/ml) were started initially, with the aim of increasing the concentration slowly to full strength (0.67 kcals/ml) over four days.

Initially the feeds were tolerated well. Full strength feeds provided 333 kcals (98 kcals/kg/day), 11 g protein (3.25 g protein/kg/day) where the actual weight was 3.38 kg at 1 month 4 days old. The total volume sucked was increased to about 600 mls (190 mls/kg/day) full strength product 3200 AB. Baby X appeared fairly stable for about 14 days.

Further GI bleeding due to a duodenal ulcer, and the discovery of a tumour mass in the left lobe of the liver, resulted in further investigations, periods of no feeding, and poor tolerance to feeds. When

Table 1. Intake and requirements for feed

Intake			*Requirements*
480 mls 3200 AB	=	127 mls/kg/day	150 mls/kg/day
241 kcals	=	64 kcals/kg/day	120 kcals/kg/day
8 g protein	=	2.1 g protein/kg/day	min 2.5 g protein/kg/day

feeding restarted 8 days later, half-strength feeds were introduced, and the concentration slowly increased.

On discharge, Baby X appeared limited by her own ability to suck large volumes of feed 3200 AB, even at three-quarter strength. Her total intake still failed to meet her nutritional requirements, i.e. weight = 3.77 kg (Table 1).

Future Management

Although dietary management was started, the liver function tests continued to deteriorate initially.

Conservative medical management is now indicated in view of the infant's long-term poor prognosis. Feeds are being offered as tolerated. Low tyrosine (low protein) weaning foods are being introduced gradually, e.g. infant rice cereal, apple puree.

Summary

Despite the fairly rapid availability of a specialised low tyrosine/phenylalanine product, the ability of the patient to thrive nutritionally was limited by her poor oral intake, repeated investigations, the discomfort of abdominal distention, and GI bleeds necessitating periods of nil by mouth.

In an ideal situation tube-feeding may help to increase the patient's nutritional intake, by increasing the frequency of the feeds offered, and decreasing the volume fed at each feed. However, in the case of Baby X, medical implications would still inhibit her intake.

In view of the infant's poor prognosis, support was offered encouraging feeds as tolerated, together with low tyrosine supplemental feeds.

This case remains under follow-up by the Paediatric Gastroenterologist and Dietitian.

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Acknowledgment

Grateful thanks to A/Prof Quak Seng Hock, Consultant Paediatric Gastroenterologist, NUH, for his help in the preparation of this case study.

The Evolution Of The Short Cuts Campaign 1984 - 1991

Margaret Hays, Consultant Nutritionist in Private Practice

In the early 1980's, eating meat became associated with poor nutrition and consequently became "out of vogue". Health professionals were misinformed, with many advising patients against even moderate red meat intake.

This is a review of an advertising and promotional campaign, conducted by the Australian Meat & Livestock Corporation, which rekindled the trend towards meat by positioning it as an important part of a contemporary lifestyle.

The situation in 1984:

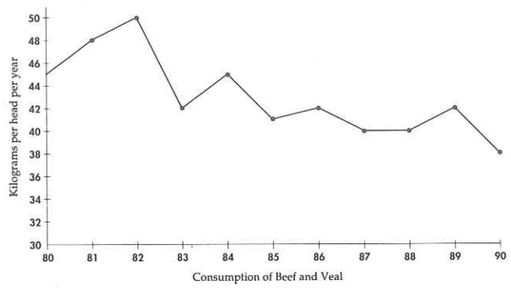
i) Industry Situation (1, 2)
In 1984, meat consumption was in serious decline, mainly in beef and veal. In 1977, Australians were consuming 70 kg of beef and veal per head. By 1984/85, this had dropped to 42 kg per head - a decline of 40%. This decline in meat consumption was partially matched by an increase in the consumption of poultry. In 1976-77, poultry consumption was 15.7 kg per head, by 1983-84 this had risen to 20.0 kg per head.

ii) Retail Environment
Butcher shops were the fastest declining area of the retail trade. They were viewed by consumers as "High Street Morgues" - rows of uninspiring red meat primal cuts and price tags. Merchandising as a concept was non-existent. Butchers were providing **meats** when consumers wanted **meals**. Eighty percent of consumers walking into butcher shops had not decided what to buy. However, butcher shops had no meal ideas. Butchers were craft oriented, not consumer oriented.

iii) Consumer Image of Meat
Meat was seen to be old fashioned, boring, uninspirational and uninteresting. Consumers wanted easily available alternatives to the 1950's - "meat and three veg" meal. Meat, as it was presented, offered limited variety or appeal, and had few "contemporary, modern meal" associations. Meat was an emotional enemy, not thought of as part of a modern balanced diet. It was "big, heavy, fatty and masculine".

iv) Health/Nutrition Situation
Red meat had become classified as a nutrition "baddy" and was synonymous with ill health. Its perceived high fat content raised the spectre of cholesterol and weight gain. Red meat was totally disadvantaged by white meat.

Figure 1: Apparent per capita consumption, beef and veal, 1980 - 1990



Changing Food Preferences

During 1984, major national market research studies were conducted to determine the lifestyle and attitudinal changes that had caused the drop in consumption.

Lifestyle factors identified as resulting in a decline in demand for red meat (Figure 2) were:

Perception of inconsistency in both price and quality. Common concerns and complaints were quality variation from week-to-week or retailer-to-retailer, and

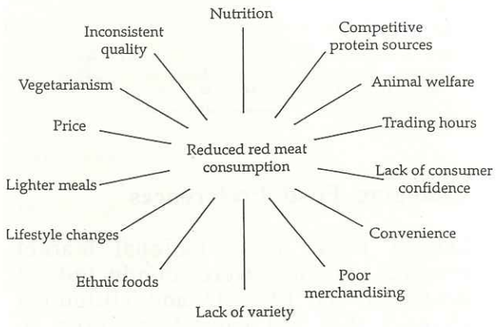
inexplicable sharp rises and falls in price. Although some consumers did return to previous buying levels once prices lowered, many did not. Each time this occurred, a proportion of red meat sales was lost.

Trading hours. The inability to purchase red meat during normal retail trading hours in most states was cited as a major disadvantage, particularly by working women, whereas competitive protein foods such as chicken and fish could always be readily purchased.

Lifestyle changes and an increased interest in "**ethnic-type**" foods where the volume of red meat used was much lower. Animal welfare issues also made inroads in reducing red meat consumption.

The advent of **busier lifestyles**, particularly in the wake of the working woman phenomenon. This placed more emphasis on the need for quick and convenience foods, particularly those which reduced effort but retained a "home-cooked" appearance. In general, traditional meat cuts were viewed by consumers as being unable to meet their needs for variety and convenience.

Figure 2: Lifestyle factors contributing to the reduced consumption of red meat



Lack of consumer knowledge in selection, storage and cooking of red meat, particularly in the freezer-to-microwave technique. Poor performance was blamed on the product rather than its handling, and resulted in consumers choosing to purchase other protein foods.

Lighter meals. Red meat was seen particularly by women, as too heavy and indigestible in contrast to the many light alternatives available.

Lack of variety. The product was seen as lacking in variety, with very little novelty; in short, dull and boring.

Competitive protein sources. Chicken, fish, vegetarian meals and the Pritikin diet had all infiltrated the Australian diet.

Poor merchandising. By comparison with most other food categories there was nothing new happening in the area of retail presentation.

Nutrition. Concern was expressed about nutritional aspects such as excessive fat, cholesterol, kilojoules and the vague feeling that "too much red meat is not good for you".

All these factors added up to a fundamental lack of consumer confidence in the product.

A number of marketing strategies were undertaken to counteract these problems, particularly in the area of advertising and merchandising, but effective response to the nutrition controversy was hampered by a lack of up-to-date data on the fat and cholesterol content of meat.

The industry was aware that much unwarranted criticism of the fat and cholesterol content of beef and lamb came from a lack of knowledge of Australian meat composition and its production, such as:

- that meat composition (in terms of fat and cholesterol) could vary from country to country;
- that Australia's meat production techniques (essentially pasture-rearing) generally favoured the production of lean, non-marbled meat;
- that grain-feeding or lot-feeding is not used in the same manner in Australia as in the USA, and as a result marbling is practically non-existent in Australian domestic beef compared to US beef;
- that improvements had been made by the industry, such as the introduction in the 1960's and 1970's of European breeds, which favoured carcasses of a lower total fat cover.

The Search For Meat Composition Data

The food composition tables for Australia (3), existing in 1985, did not reflect the meat Australians were consuming in the 1980's but were based on British, American and/or 40-year-old Australian data. The out-of-date and non-applicable data contributed to the strong perception that red meat consumption meant a high fat intake and therefore a high health risk, whereas white meat (fish or chicken) was nutritionally more desirable.

Despite the concern regarding the nutrient composition of red meat and its effects on the nutrient intake of Australians, no new data became available until the mid 1980's. The new data (4) showed that the intramuscular fat content of lean beef and lamb was lower than published in the existing food tables (3). The work of Sinclair and O'Dea (1987) (4) was also the first to show that lean beef contained major amounts of oleic acid, a monounsaturated fatty acid and significant amounts of the polyunsaturated fatty acids linoleic, linolenic and arachadonic.

The work of Sinclair & O'Dea (1987)(4) was supplemented by research conducted at CSIRO by Thornton et al. (1987) (5) who examined the fat content of popular cuts of meat, as well as fresh and frozen chickens, whole and as chicken pieces. These results showed that some portions of chicken were higher in fat than beef or lamb, even after the removal of chicken skin. It was clear that only skinless chicken breast at 3% fat (raw) was lower in fat than the four beef cuts examined (5).

These initial results from separate research groups considerably aided in promoting the nutritional benefits of beef and lamb in a more specific manner.

The publication of the composition of Australian meats and poultry (Greenfield 1987) (6) and the newly revised and released Composition of Foods, Australia (7) form the basis for the promotion of the nutritional benefits of beef and lamb.

Analysis Of Consumers

Qualitative research conducted in 1984 among various consumer types identified:

- **which facts**
- **with which consumer groups**
- **in what order of priority or intensity**

contributed to consumption decline.

Consumer analysis revealed that:

Children under 10:	potential lost generation of meat eaters
10-14 year old boys:	heavy meat eaters
15-24 year old females:	very light meat eaters
20-24 year old males:	young singles-multi taste experiencers
25-39 year old females:	identified as the "new women" and potentially losing this generation as meat consumers
40-60 year old budget conscious housewives:	declining consumption of red meat due to cost
45-60 year old males:	traditionally heavy meat eaters

The various consumer groups that were identified had very little in common and if they were to be spoken to through advertising, the message would have been lost.

This led to the identification of the target consumer, **the young working mother**, with the secondary target groups being: **the young single woman, the budget conscious housewife, and the traditional housewife.**

By targeting the working woman, none of the secondary targets would be alienated. However, with any of the other groups at the centre, identification and association with the advertising message would be lost on the working woman.

The most critical task for advertising was to re-establish beef and lamb in the minds of **young working mothers** (the new generation of women). If the status of beef and lamb declined further, the big risk in the long term was the potential loss of young working mothers' children as meat eaters.

Target Consumer Key Facts

In 1985, it was estimated that the stay-at-home woman put in an average week of 77 hours.

The working mother obviously had to put in many more; however, the key problem with this woman was not just the additional hours, but the many tasks that needed to be performed within specific time frames (i.e., the two-hour morning and two-hour early evening periods).

Accompanying the massive physical movement into the workforce was a massive attitudinal change.

The implications of this change were immense, with women opting for, in many ways, the hardest possible performance, problem and anxiety routes in order to "broaden" their lives.

The dilemma was they still had to live everyone else's life (in the family) in order to live their own life.

There was an enormous gap from traditional housewife to modern individual mother and woman.

From the working mother, preparation of the evening meal was an unenviable task. Force of circumstance had led her to regard it negatively. She was invariably tired, could expect little help from her husband or children, and was expected to provide for her family meals that were varied, interesting, appealing, and nutritious.

There were indications that the early movement of embracing martyrdom was waning; women were now much more receptive to solutions to the problem.

These women were now acting in ways which were quite incompatible with their longheld attitudes; attitudes which were more compatible with their mothers' lifestyles than their own - that it was indeed a woman's role to be chef, cook, chauffeur and bottlewasher. That the home always had to be neat and tidy.

Traditional mothers had a provider orientation, modern mothers had an organiser orientation. One of the new key attitudes to emerge which helped the modern working mother bridge the anxiety/guilt gap between the old values and the new behaviour was "it's okay to cheat in order to cope!"

The Role Of Advertising

The objectives of the advertising campaign were to halt the decline in red meat consumption. The negative product image of red meat had to be an image created for red meat as being appealing, contemporary, convenient, versatile and balanced. Red meat had to be firmly established with the new generation of women and their families, and it needed to be part of a modern, varied and interesting diet so that the nutritional status of Australians could be improved.

Red meat had to be marketed as a **branded** consumer product. In 1985, red meat had:

- no personality
- no presentation
- no branding
- no loyalty

"SHORT CUTS" was then invented and positioned as a new brand of meat. The positioning point was:

- new meat versus old meat
- easy meat versus chore meat
- quick meat versus time consuming meat
- interesting meals versus boring meal
- lean and light versus big, heavy and fatty
- new world versus old world
- new woman versus old woman

The butcher shop was targeted as the critical "media environment" in its own right along with traditional media advertising.

It was apparent that communication aimed only at presenting the new style of meat at retail would not be enough.

The creative objective was to position meat as a friend, and an ally, which understood her situation and problems, and helped busy working women to cope, be better organized and help solve that daily meal dilemma.

Short Cuts was not presented as meat - it was presented as time problem solver, decision problem solver, easy problem solver, and a variety problem solver.

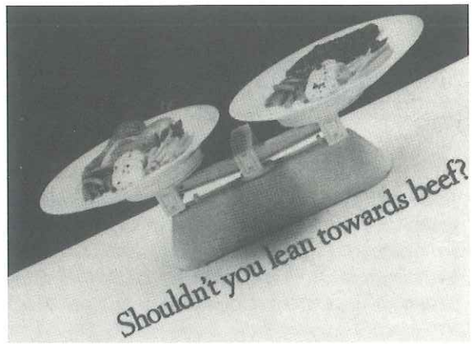
Nutrition Advertising Using Meat Composition Data

The concept of "lean meat" is a central marketing tool in the promotion of beef and lamb. "Lean meat" is readily identified by consumers as "new meat" and thus meets their needs for convenience, variety and lighter, more nutritious meals.

The Short Cuts advertising and merchandising campaign established "lean meat" as a hero for the busy working woman looking for a solution to the daily meal dilemma. In this mainstream advertising, a great deal of time, effort and money was spent in establishing in consumers' minds that beef and lamb, trimmed of fat, were nutritious and convenient, fulfilling a contemporary need for modern women.

The release of The Nutrient Composition of Australian Meats and Poultry (6) heralded the start of a new and aggressive campaign to re-position lean beef as a low-fat food with a deserved place in the Australian diet. Three strong "Nutrition Message" TV commercials were created in the 12 months following the release of the publication.

Advertising, if it is to be successful must evoke emotion. It is not truly designed to be educational. While the "Scales" commercial was indeed based on facts, the real success of the commercial lay in the emotional response from consumers and health professionals alike. Nutrition education is complex but advertising must encapsulate a single idea in a 30-second message. As a result of the debate which raged after the airing of the "Scales" commercial, consumers now understand that eating chicken with skin is nutritionally no better than eating red meat with the fat.



Nutrition Education Using Meat Composition Data

The "Meat, the Facts" program was created for general practitioners to give them accurate information on the fat and cholesterol content of beef and lamb, while reminding them of the iron, zinc, protein and B-vitamins provided by these foods. Revised meat composition data as well as the release of the reports from the Dietary Surveys (8,9) have been crucial to this activity.

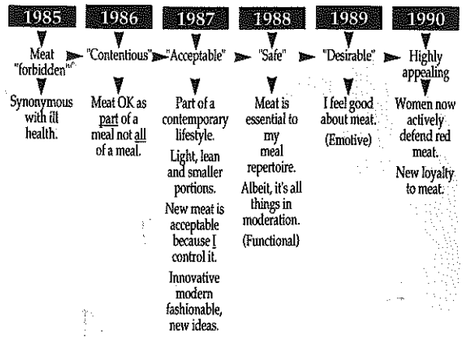
The release of the revised meat composition data enable such material to contain more specific information on beef and lamb, and their contribution to the Australian diet (e.g. Meat, The Facts and Lean and Low Brochures).

As a result of the Short Cuts campaign and the "Meat, The Facts" program, red meat moved from contentious to acceptable, to safe, along the nutrition continuum.

Annual quantitative studies found the number of people holding a strong conviction that "Beef and Lamb are good for you" had more than doubled since 1985, when "Short Cuts" advertising was introduced.

Since 1984, nutrition perception in relation to meat has moved through the full spectrum as shown in Figure 3.

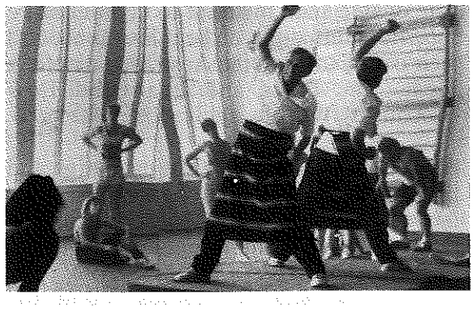
Figure 3: Nutrition Perceptions 1985-1990



Development Of Meat Into Brand Images

By 1988, Short Cuts had become the symbol of modern family eating. The campaign had altered consumer perception to such a degree that it was then necessary to widen and broaden meat's appeal.

The gap between modernists and traditionalists had widened. Now, the aim was to provide meal solution stepping stones that would gradually bridge the gap between "old meat" and "modern meals".



This has been achieved by linking different meat cuts to different feelings and emotions. Beef steak was positioned as a symbol of indulgence, appetite, desirability, adventure and satisfaction, which appealed to the stomach. Meanwhile lamb roasts symbolised care, love and enjoyment and appealed to the heart.

As a result, meat is now perceived by both modernists and traditionalists to satisfy their meal needs. This ensures that meat continues to remain relevant to the broad range of Australian consumers.

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Foods, Nutrition And Sports Performance: Final Consensus Statement

Edited by Clyde Williams , Loughbrough University, Co-chairman of Consensus Conference, IOC Medical Commission and John T. Devlin, University of Vermont, USA

Excerpted from "Foods, Nutrition And Sports Performance", an International Scientific Consensus organized by Mars International, under the patronage of the International Olympic Committee

Diet significantly influences athletic performance. An adequate diet, in terms of quantity and quality, before, during and after training and competition will maximize performance. In the optimum diet for most sports, carbohydrate is likely to contribute about 60 - 70% of total energy intake and protein about 12%, with the remainder coming from fat.

Total energy intake must be raised to meet the increased energy expended during training and maintenance of energy balance can be assessed by monitoring body weight, body composition and food intake. Where there is a need to reduce body weight this should be done gradually, and not immediately before competition.

In athletic events of high intensity and long duration (such as multiple sprint sports and endurance sports) performance is generally limited by carbohydrate availability. High carbohydrate diets (even in excess of two-thirds of total energy) maximize carbohydrate (glycogen) stores and improve performance in such activity. A high carbohydrate diet is also necessary to sustain high-intensity training on a daily basis. After each bout of exercise, the diet should contain sufficient carbohydrate to replenish the glycogen stores and to maximize subsequent performance. The requirement for sugars and starches, in both solid and liquid forms, will vary, depending on the timing and nature of the physical activity.

Increased fluid intake is necessary to avoid dehydration, and may improve performance during prolonged exercise, especially when sweat loss is high. The fluids may contain some carbohydrate, the concentration of which will be dictated by both duration of exercise and climatic conditions. If exercise is of short duration and sweat losses are small, the replacement of salts can be achieved from a normal food intake after exercise.

Protein requirements are higher in individuals involved in physical training programmes than in inactive people. However, most athletes already consume sufficient protein as a consequence of their increased energy intakes.

Fat consumption should be no greater than 30% of total energy intake. Supplementary fat beyond this intake is not recommended for training or competition because the body is able to mobilize its large reserve of this energy store. Except where there is a need to reduce body fat content, it is important to maintain these stores by ingesting sufficient energy between periods of exercise.

Vitamin supplements are not necessary for athletes eating a diet adequate in respect of quality and quantity. Of the minerals and trace elements essential for health, particular attention should be paid to iron and calcium status in those individuals who may be at risk.

There is no good evidence to support the use of other nutritional supplements, including those commonly assumed by athletes to have ergogenic effects.

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Carbo-Loading - An Olympic Experience

Tan Wei Ling, Deputy Director, Food and Nutrition Department, Ministry of Health, Singapore

August the third, I found myself at the entrance of the gigantic Olympic Village in Barcelona, Spain. The temperature was 40ºC and the humidity 60%. I had to look for a hat to shade my face, lest it got scorched!

No, I wasn't competing with the Singapore swimming team, nor was I responsible for the team's diet plan. I was sponsored by the Singapore Nutrition and Dietetics Association to attend the seminar on "Food and Fluid for Elite Performance", organized by Mars International in conjunction with the Games.

Key points of papers presented for discussion at the seminar.

NUTRITION STRATEGIES FOR PHYSICAL PERFORMANCE

- Enough essential nutrients to keep in good health, with dietary energy coming from
  - carbohydrate 60%
  - protein 15%
  - fat 25%
- Enough energy to meet training needs, by increasing energy intake by 20%
- Enough glycogen (energy) store in the muscles (capacity increased 2-3 times during training) to last through event or events, by adjusting the energy of the precompetition diet to come from
  - carbohydrate 70 - 80% (carbo-loading)
  - protein 10 - 12%
  - fat 10 - 14%
- Timely release of energy for event or events and delay of fatigue, with pre-event meal (2-3 hours before competition) consisting of
  - 500 - 1000 kilocalories
  - high complex carbohydrates
  - low fat
  - low simple sugars
  - moderate fibre
  - 500 - 1000 ml fluid, followed by 1/2 glass water every 10 - 15 minutes till time of event
- Quick recovery after each event in preparation for next event by
  - rebuilding energy reserves with liquid carbohydrates at rate of 1 g/kg body weight every 2 hours up to 6 hours
  - replacing fluid/electrolyte loss with dilute mineral water at rate of 1 litre for every kg of weight loss

Should you be preparing to compete in the next Olympics, I am available for consultation. But I don't guarantee any "golds".

An Interview With Professor Mimi Yu On Research Into Dietary Factors Related To Cancer

By Kath Walsh, Principal Lecturer, English Language Centre, Ngee Ann Polytechnic, Singapore

Cancer is on the increase in the developed countries of Asia. Studying the incidence of cancer in Singapore, especially naso-pharyngeal cancer, is Dr. Mimi Yu, Ph.D., Professor of Preventive Medicine at the School of Medicine, University of Southern California. Dr. Yu, an epidemiologist and statistician, spoke with SNDA about diet and cancer. Dr. Yu is currently investigating diet and cancer through a large scale cohort study of Singaporean Chinese, during her six-month stay with the Department of Community, Occupational and Family Medicine, the National University of Singapore.

Walsh: Why did you decide to take a six-month sabbatical in Singapore?

Yu: Because I wanted to collaborate with Dr. Lee Hin Peng, Chairman and Assoc. Professor of the Department of Community, Occupational and Family Medicine, and his colleagues at NUH. This collaboration involves conducting a cohort study to validate the link, implicated in my previous research, between early diet and nosopharyngeal cancer in the Southern Chinese.

Walsh: What dietary and environmental factors did you identify in your research on the Chinese population?

Yu: Our past studies, in humans as well as animals, strongly implicated salted fish and other similar preserved foods consumed during early childhood to be a major risk factor for nasopharyngeal cancer (NPC) in the Chinese from the southern provinces.

Walsh: Why do you need to validate your findings on salted fish consumption and NPC development in Singapore?

Yu: Our previous research of NPC on humans were all case-control studies, i.e. data collected through interviews with NPC patients and healthy controls was compared in terms of past exposures, including diet and environmental factors. However, cancer takes a long time to develop.

Therefore, questions are on events starting 30-40 years ago and there is always a possibility that the quality of the responses or the recall of distant past events among the cancer patients is not comparable to the control group. In a cohort study, a large group of healthy individuals are recruited and exposure information collected prior to disease development. This means the information from all study subjects is comparable. These subjects are actively followed forward in time and a predicted number will develop the disease of interest, in this case, NPC, in a certain period of time. The NPC cases and the rest of the cohorts are then compared in terms of past exposure to establish any associations between environmental exposure and disease development.

Walsh: Could you elaborate on the design of this cohort study?

Yu: We plan to recruit 60,000 Singaporean Chinese, both males and females, 15,000 of each from the Cantonese-dialect group and the Hokkien-dialect group, between 45-74 years of age. All the recruits will be residents of HDB flats. We chose HDB residents for the following reasons: first, they are the least likely to be lost in the follow-up either through migration or moving to a new address within Singapore; and secondly, all the residents are registered with the HDB so they will be easier to trace.

Walsh: Referring to your previous work, have you found any changes in eating patterns among the Asian population or internationally over the past ten years?

Yu: Definitely Singapore, like Japan and Hong Kong, has gained affluence and is adopting western eating habits. The disease patterns are now beginning to resemble those of Western Europe and the USA. The incidence of colorectal cancer and breast cancer is on the increase.

Walsh: What dietary factors have emerged from research on migrant populations?

Yu: Research has shown that the disease pattern of the migrant Japanese in Hawaii has changed to resemble the American pattern. Such findings point to the importance of the environmental influence in cancer development and heart disease.

Walsh: At what age do you think people are most susceptible to developing cancer?

Yu: Cancer rarely strikes before the age of 40, and thereafter the incidence of cancer increases with age.

Walsh: What other cancers are linked to diet?

Yu: These are colorectal cancer, stomach cancer and possibly breast, prostate and lung cancer.

GENERAL DIETARY ADVICE RELATING TO CANCER

1. In terms of NPC, mothers should be reminded to avoid feeding small children fermented and preserved foods in general.
2. Research has repeatedly shown that consuming fruit and vegetables is protective against a number of cancers.
3. Excessive fat especially saturated fats, besides contributing to heart disease, could possibly give rise to colorectal cancer and possibly breast and prostate cancer.
4. There are many benefits from adhering to a more traditional Chinese diet of rice, vegetables and beancurd, using meat, especially fatty meats, in moderation.

CONTINUING EDUCATION COMMITTEE

Fourteen of our SNDA's full members recenty qualified for the Continuing Education Award (CEA), endorsed by the Singapore Professional Centre (SPC), at the end of the first two-year reporting period.

They are:

Tai Yee Fui	Tan Wei Ling
Evelyn Fong	Lynn Alexander
Germaine Heng	Diana Peers
Lisa Cadman	Yeong Boon Yee
Beatrice Pung	Myriam Young
Emily Mok	Letchumi Meyappan
Anna Jacob	Nicole Gilbert

All SNDA full members are encouraged to actively participate in the CEA Scheme run by the CEC. Points may be collected over a two-year continuous reporting period until the requirements are met.

For further information, please contact any member of the CEC:

Yeong Boon Yee (chairperson), Diana Peers, Lesley Walter, Tan Kwok Hoey, Nancy Evans and Letchumi Meyappan.

Book Review

By Lisa Cadman, Dietitian, BSc. Hons, SRD, National University Hospital, Singapore

Title:	***The First Nutrition Guide for Asian Parents Feed Your Child Right***
Authors:	*Lynn Alexander and Yeong Boon Yee*
Publisher:	*Times Books International, 1990*
ISBN No:	*981 204 063 3*
Cost:	*S$19.90*
Recognition:	*Won the National Book Development Council 1992 Book Award: Highly Commended for Non-Fiction Category*

The authors, well known to the Singapore Nutrition and Dietetics Association members, have produced ".....a long awaited book.....it is pretty comprehensive and should serve young mums well throughout their children's growing years" (New Straits Times).

I asked the authors what influenced them to write the book?

Lynn: A friend's wife, who was an editor, contacted me after hearing about my interest in writing. She suggested writing a book about feeding children as there were no books on the subject specially written for Asians living in this part of the world, and also because she was a mother of two young children and felt the practical advice would be really handy.

Boon Yee: I was approached by Lynn to give an Asian perspective to the project she and Times had discussed. The other motivational factors were the lack of books for mothers on this topic by local professionals, and our own interests and experiences which we felt could be shared with mothers in this region.

The book provides nutritional information on many aspects of child nutrition incorporating nutritional advice for pregnancy, and lactation as well as for weaning, through the toddler stage and up to the school-going child. The advice offered is so practical that the authors must have shared some of their personal experiences.

Lynn: Yes! Shortly after Boon Yee and I started on the book, I became pregnant with my first child. Suddenly the research for the book took on a whole new meaning! I found it particularly valuable to experience breastfeeding firsthand - that's probably why you'll notice that we really went to town on our breastfeeding section as I just couldn't leave anything out! Individual chapters are sectioned for early reference and charts and tables are always clearly laid out.

Who decided on the delightful illustrations that head each chapter?

Boon Yee: Lynn and I selected them mostly and they were illustrated by Lynn's neighbour, Ambrose Poh, who is actually a journalist and draws for a hobby.

Throughout the book local "makan" supports the nutrition advice which also includes deeper traditional food beliefs, e.g. yin and yang balance, which are often followed closely during times when good health and nutrition are particularly important, i.e. pregnancy and the child's growing years. Recipes complement the first section of the book; many are practical adaptations from the normal family menu.

Knowing the authors have young children, I asked them if they had enjoyed tasting the delightful kelong treasures, saucey secrets and other recipes.

Boon Yee: You bet! Mush, flops, surprises and successes were all part of my children's lunches and dinners when my kitchen got busy on testing sessions. Lynn and I had a lot of fun but I'm not sure about my kids.

Lynn: I'm glad to say that trying all those recipes has made my kids' taste more universal. They are equally at home with Indian, Chinese or good old British food.

The authors both enjoyed writing the book. Will there be anymore?

Lynn: Not for the time being! But it would be nice to do another one. We have been very encouraged with the attention "Feed Your Child Right" has received.

Boon Yee: It took us more than 3 years! The crazy hours involved will be a deterring factor to consider another one, but the interest is there. Lynn and I both enjoyed the experience and are hopeful of eventually convincing ourselves to have another go!

"Feed Your Child Right" is a definite "must" for mothers in Southeast Asia. It is also a good reference for health professionals who may be involved in teaching the basic aspects of infant feeding. Traditional food beliefs and diet in special circumstances, e.g. vegetarianism, food allergy, lactose intolerance are particularly useful as they are seldom covered in other books of this nature.

So, look out for "Feed Your Child Right" at Times Bookshops and on behalf of the SNDA, congratulations to Lynn and Boon Yee!

Authors Yeong Boon Yee and Lynn Alexander with their pride and joy!

NEW BOOKS

FOOD ALLERGY
ADVERSE REACTIONS TO FOOD AND FOOD ADDITIVES

D.D. Metcalfe, H.A. Sampson and R.A. Simon
ISBN 0 86542 0947
448 pp
Spring 1991
Price £52.50 (approx)

Description

This is a definitive, scientifically based text on adverse reactions to foods and food additives. It is the first book to be soundly based on the scientific principles of the subject. Divided into three main sections, the first part "Adverse Reactions to Food Antigens" is a review of food allergy and covers basic and clinical science. The middle section "Adverse Reactions to Food Additives" includes coverage of specific additive sensitivities and specific clinical reactions to additives. The final part, "Contemporary Topics in Adverse Reactions to Foods", covers topics such as diets and nutrition, psychological considerations, and unproven diagnostic and therapeutic techniques.

Features

- Precise scientific and clinical reference.
- Features reactions to specific food additives, such as sulphites, monosodium glutamate, and tartrazine.
- Includes a chapter devoted to the prevention and natural history of food hypersensitivity.
- Discusses practical management details such as diet as well as the immunological principles.
- Covers food allergy and the effect on all organ systems.
- Includes paediatrics as well as adults.

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INTERNATIONAL JOURNAL OF SPORT NUTRITION

Edited by Melvin H. Williams, Ph.D.
ISSN 1050-1606
Frequency: Quarterly (Current Volume: 2, 1992)
Subsp: Individual - £20.00; Institution - £38.00; Student - £13.50 (Surface)
Individual - £31.50; Institution - £49.50; Student - £25.00 (Air)

Description

The *International Journal of Sport Nutrition (IJSN)* advances the understanding of the nutritional aspects of human physical and athletic performance. Research articles and applications from both experimental and experiential evidence are included on all aspects of sport and exercise nutrition, irrespective of age, gender, athletic ability, level of fitness, or health status of the participants.

IJSN includes research reports, scholarly reviews, case studies, clinical application articles, book and video reviews, and brief abstracts of other published literature.

Articles from Recent Issues

- Exercise Intensity and the Thermic Effect of Food, *Kent W. Goben, Gary A. Sforzo, and Patricia A. Frye.*
- Dietary Intakes and Food Use Groups of Elite Australian Male Athletes, *Louise M. Burke, Ross A. Gollan, and Richard S.D. Read.*
- Seasonal Changes in Female Athletes' Diets, *June Nutter.*
- Nutritional Considerations for Ultraendurance Performance, *Elizabeth A. Applegate.*

ABSTRACTS

THE DIETARY HABITS OF DOCTORS AND TEACHERS. *R. Chambers. Journal of Human Nutrition and Dietetics, 5, 119-123, 1992.*

A questionnaire was completed by 408 general practitioners and 385 secondary school teachers about their own dietary intake with response rates of 48% and 45%, respectively. Over half of each group were of ideal weight and only 3% of the total were obese.

The group of general practitioners, reported that they ate significantly less fats and salt and significantly more fibre and polyunsaturated fats in their diet than the teachers. Teachers were significantly more likely to avoid food additives in their diet, 70% made an effort to avoid them compared to 47% of doctors.

DIABETIC FOODS AND THE DIABETIC DIET. *B.J. Thomas and the Nutrition Subcommittee of the British Diabetic Association's Professional Advisory Committee. Journal of Human Nutrition and Dietetics, 5, 210-213, 1992.*

The role of special "Diabetic" foods in the diabetic diet is considered and the following conclusions are drawn.

(1) Most diabetic foods provide slightly, but not substantially, less energy than comparable non-diabetic products.
(2) Many diabetic foods have a higher fat content than their non-diabetic equivalents. This is contrary to the requirements of the 1984 Food Labelling Regulations.
(3) Many diabetic products have a relatively high content of protein.
(4) In percentage terms, the greatest difference between diabetic and non-diabetic foods remains that of carbohydrate content, particularly carbohydrate other than fructose or sorbitol. On a per portion basis (for instance per teaspoon of jam) the difference is relatively small and likely to be of minimal practical significance.
(5) Diabetic foods cost between 1.5 and 4 times as much as their non-diabetic equivalents.
(6) Some ordinary reduced-sugar/low-calorie products are preferable to diabetic products in terms of fat and energy content and cost.
(7) The promotion and widespread availability of diabetic foods tend to delude patients into believing that these products are advantageous, or even necessary. Their existence also undermines current dietary teaching by implying that diabetics cannot eat normal foods.
(8) Diabetic foods offer no significant physiological or psychological benefits to diabetic patients and can even be counterproductive to good diabetic control. There is no longer a need for special diabetic foods in the modern dietary management of diabetes.

FERRITIN AND FERTILITY. *D.H. Rushton, I.D. Ramsay, J.J.H. Gilkes and M.J. Norris. The Lancet, Vol. 337, 1554, June 22, 1991.*

A study of the nutritional status of women experiencing hair loss led to additional observations of several subjects who became pregnant during treatment. Of 113 women with increased scalp-hair shedding, those with reduced serum ferritin values (<40 ng/mL) were given a daily oral supplement of iron (35 mg) and vitamin C (100 mg); optimum hair growth was achieved with a ferritin level >70 ng/mL. Seven women became pregnant during this treatment; conception occurred within 28 weeks of starting iron and vitamin C supplementation. These findings suggest that conception is prevented in women with depleted iron stores, as assessed by serum ferritin. The failure to conceive may be a natural response against further losses of iron that would be induced by the preferential demands of fetal development.

FASTING AND VEGETARIAN DIET FOR RHEUMATOID ARTHRITIS. *J. Kjeldsen-Kragh, M. Haugen, C.F. Borchgrevink, E. Laerum, M. Eek, P. Mowinkel, K. Hovi and Q. Forre. The Lancet, Vol. 338, 899-902, October 12, 1991.*

Fasting is an effective treatment for this disease, but most patients relapse when food is reintroduced. The effect of fasting followed by 1 year of a vegetarian diet was assessed in a randomized, single-blind, controlled trial. For 4 weeks, 27 patients were on a subtotal fast for 7 to 10 days, followed by an individually adjusted gluten-free vegan diet; then their food was changed gradually to a lacto-vegetarian diet. A control group ate an ordinary diet. After the 4-week period, the diet group showed significant improvement in number of tender joints, Ritchie's articular index, number of swollen joints, pain score, duration of morning stiffness, grip strength, erythrocyte sedimentation rate, C-reactive protein, white blood cell count, and a health assessment questionnaire score. In the control group, only pain score improved significantly. The benefits in the diet group were still present after 1 year.
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WEIGHT VARIABILITY AND HEALTH OUTCOMES. *L. Lissner, P.M. Odell, R.B. D'Agostino, J. Stokes III, B.E. Kreger, A.J. Belanger and K.D. Brownell. The New England Journal of Medicine, Vol. 324, 1839-1844, June 27, 1991.*

Fluctuations in body weight may have negative health consequences independent of obesity and the trend of body weight over time. This observation is drawn from data collected for the Framingham Heart Study 32-year follow-up. An analysis was made of total mortality and mortality from coronary heart disease (CHD) and cancer in relation to intraindividual variation in body weight, including only end points that occurred after the 10th biennial examination. Subjects with high variable body weights had increased rates of mortality, mortality from coronary heart disease, and morbidity due to CHD. Using a multivariate analysis that controlled for obesity, trends in weight over time, and five indicators of cardiovascular risk, researchers found that the positive associations between fluctuations in body weight and end points related to mortality and CHD could not be attributed to these potential confounding factors. If dieting, which cannot be ruled out as an explanation of these findings, emerges as a major factor in body-weight fluctuation, it may be important to review the public health implications of current weight-loss practices. Two aspects of this study's results bear consideration: (a) weight fluctuation was most strongly associated with adverse health outcomes in the youngest cohort (aged 30 to 44 years), the age group in which dieting is likely to be most common; (b) because the relatve risks associated with variation in weight were similar to those attributed to obesity, the risks caused by excess weight may not outweigh the risks caused by weight fluctuation. Overweight persons need to learn skills for maintaining weight loss; prevention of relapse should become a central focus of weight-loss programs.

ACTIVITY LEVEL AND INCIDENCE OF DIABETES. *S.P. Helmrich, D.R. Ragland, R.W. Leung And R.S. Paffenbarger, Jr. The New England Journal Of Medicine, Vol. 325, 147-152, July 18, 1991.*

Increased physical activity is effective in preventing non-insulin-dependent diabetes mellitus (NIDDM); the protective benefit is especially pronounced in persons at greatest risk for the disease (those with a high body mass index, a history of hypertension, or a parental history of diabetes). These conclusions come from a survey of the physical activities of 5,990 male alumni of the University of Pennsylvania. NIDDM developed in 202 men during the 98,524 man-years of follow-up from 1962 to 1976. Leisure-time physical activity, which was expressed in kilocalories expended per week by physical activities such as walking, stair climbing, and sports, was inversely related to the development of NIDDM. The rate of NIDDM incidence declined as energy expenditure increased from less than 500 kcal to 3,500 kcal. For each 500 kcal increment in energy expenditure, there was a 6% reduction in the age-adjusted risk of NIDDM.

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