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ABSTRACT

Authorities offer conflicting viewpoints on whether animal foods are essential to the health of young children or whether they can ingest the nutrients they need from plant sources. The United States Department of Agriculture (USDA) contends that because of the small capacity of young children's stomachs, they are not likely to consume all of the calories they would need to get enough protein, iron, and calcium from plant foods. The USDA also maintains that cow's milk is essential to a healthy diet. However, recent studies have implicated meat, eggs, and dairy products in atherosclerosis, coronary heart disease, and cancer. Milk and dairy products have been linked to severe respiratory problems, diabetes mellitus, and intestinal blood loss. Regardless, most schools and day care centers still teach and abide by the four food groups, which emphasize meat and dairy foods. Whole grains, vegetables, legumes, and fruit can provide children with the protein, fiber, calcium, iron, and vitamin B12 that they need. However, for children to get enough nutrients from a vegetarian diet, they must limit their intake of empty calorie foods such as potato chips, sodas, and candy. Interviews with 58 preschool children, however, indicated that their lists of favorite foods showed a preference for carbohydrates, fruits, and vegetables. (AC)

Animal Foods Vs. Plant Foods:

Risks and Benefits for Young Children

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Consumption of animal foods has become an integral part of U.S. culture, and these foods are perceived by many to be necessary components of maintaining good health. But recent scientific studies have implicated these foods as a cause for many of the most debilitating and deadly diseases affecting people in the U.S. Despite this evidence, most day care and preschool programs in this country are serving meals and snacks that are high in fats and sugar and low in fiber. Are we modeling and encouraging life-long dietary patterns for young children that will lead to kidney problems, diabetes, cancer, coronary heart disease and a myriad of other major and minor health problems?

Sadly, economics is the main concern of most meal programs in early childhood centers; cooking activities in these places often place emphasis on participation, having fun and preparing tasty meals and snacks but do not give children time or a rationale to explore healthier foods. The preparation of nutritious, plant-based foods can be appealing to young children while encouraging them to try these healthier (albeit often unfamiliar) meals and snacks. This paper will explore both long and short term benefits and disadvantages for preschool age children in the when they consume animal foods versus a diet emphasizing plant foods.

HEALTH RISKS OF ANIMAL FOODS

Animal derived foods such as meat, eggs and dairy products are very high in fat and cholesterol, while food from plant sources contain no cholesterol and tend to be much lower in fat. The typical North American diet that is reflected by most preschool and day care meal programs provides animal foods to the children that are high in saturated fats and cholesterol and low in complex carbohydrates and fiber. This raises the total blood serum cholesterol level and atherosclerosis begins: plaques begin to line the artery walls, clogging them and lessening the blood to to the heart, brain and other vital organs (Barnard, 1990).

Coronary heart disease is the leading cause of death in the U.S., and populations that consume diets rich in plant food have much lower rates of this disease. There is a lot of evidence that high cholesterol levels in childhood leads to coronary heart disease, arteriosclerosis and strokes later in life (Knuiman & West, 1985). In other words, these diseases have less to do with hereditary factors and more to do with eating patterns children acquire form their parents, schools and centers.

There is a link between high fat intake and the incidence of cancer, particularly of the breast, prostate and colon (National Academy of Sciences, 1989). However, vegetables such as Brussels sprouts, cabbage, cauliflower and broccoli contain a naturally occurring chemicals called indole and aromatic isothiocyanates that help to prevent cancer; flavones, found in fruits and vegetables, have a similar effect, and protease inhibitors found in seeds, soy beans and lima beans are also anticarcinogens (National Academy of Sciences, 1982). These foods are known to prevent cancers of the lung, colon, bladder, rectum, mouth, stomach, cervix and

esophagus (World Health Organization, 1990).

Pesticides and other chemicals ingested by rummaging animals are stored and concentrated in their fat, presenting another danger to children who eat fatty animal foods (Mason and Singer, 1990). And when children eat these foods, obesity becomes a problem for many of them: the percentage of children ages six to 11 who are overweight in the U.S. increased 54% in a recent 17 year period (Robbins, 1992).

In response to the growing awareness of the dangers of diet high in saturated fats, many people are switching to lean meats and low-fat dairy. But how much lower in fat are these foods? Compare dinners of rice, broccoli and either four ounces of black beans, four ounces of chicken breast without the skin and four ounces of lean beef. The bean dinner has 3.3 grams of fat, the chicken 34.3 grams and the beef 51.1 grams. Even chicken, generally perceived as a low-fat meat, is only low-fat when compared to other animal foods (Barnard, 1990). A six ounce serving of two percent milk has 3.75 grams of fat (from package information); this is more than the entire bean dinner! Schools and early childhood care centers usually serve whole milk and high-fat meats. In 1991, 90% of the surplus agricultural products the USDA donated to school and center meal programs were eggs, high-fat cheeses, butter, ground pork, ground beef and whole milk; these are the foods that are highest in saturated fats and cholesterol (Robbins, 1992).

Most of the people living in this world are lactose intolerant; that is, they do not have the lactase enzyme in their systems needed to turn lactose, a milk sugar, into galactose, a substance humans can digest. There are much higher rates of lactose intolerance among non-white peoples, as milk is not a traditional food among African and Asian populations (Oski. 1977). Symptoms of lactose intolerance are indigestion, intestinal gas, cramps and chronic diarrhea. The National Dairy Council (1987) recommends that people with lactose intolerance eat cheeses, yogurt and ice cream, drink lactose reduced milk or add an enzyme product to milk they drink. They do not recommend cutting dairy out of the diet because it provides protein and calcium; alternative sources of these nutrients will be explored later in this paper.

Many adults and children have allergies to milk proteins, the most common cause of food allergies. Symptoms include include canker sores, digestive problems, skin conditions and respiratory reactions (Barnard, 1990). Many people are not aware that these conditions are caused by a milk allergy until they or their children stop ingesting products and notice stuffy noses, post-nasal drip, and rashes disappear.

The consumption of milk and dairy products has been linked to even more severe respiratory problems such as asthma. In one study, 22 non-seasonal asthmatics in Israel who were lactase deficient eliminated all dairy foods from their diets for six months. Many of these peoples had a family history of asthma. Improvement was apparent within two to three weeks, and after several months 15 of the patients had no hospital admissions and were able to cut down or eliminate their

medications. Five asthmatics who returned to a dairy diet after the completion of the study had severe attacks within a week (Ratner et al, 1983).

Cow's milk has been implicated in the onset of diabetes mellitus in adults and children. The milk proteins can trigger the release of certain antibodies which adversely affect the islets of the langerhans, which are in the pancreas and secrete insulin if if there is too much glucose in the blood stream. A recent study of 142 diabetic Finnish children (ages four-to 13-years-old) who consumed dairy foods found that all of them had much higher levels of these antibodies when compared to non-diabetic peers (Karjalainen, 1992).

All dairy products contain very little iron, and milk consumption can lead to blood loss in the stool through intestinal bleeding, loss of iron and even anemia in young children. The American Academy of Pediatrics reports that infants under one year fed cow's milk had a 30% increase in intestinal blood loss (the Academy strongly recommends breast milk and soy based formulas for infants up to one year) (American Academy of Pediatrics, 1992). There are further problems with feeding infants cow's milk, as the younger a child starts drinking milk the more likely it is that he/she will develop allergies (Oski, 1977, p. 21).

A correlation has been discovered between women who consume saturated fats and the incidence of and death from ovarian cancer (National Academy of Sciences, 1982). One study directly implicates dairy as the cause: when a woman's consumption of it exceeds her body's capacity to absorb the galactose it creates, the excess galactose can adversely affect her ovaries (Cramer et al, 1989). Since the problem stems from the milk sugar rather than the fat, eating low-fat dairy is not a solution.

Most animal products are produced in this country under extremely unsanitary conditions that pose a potential threat to children's health. Animal foods that are undercooked can transmit parasites like salmonella and E. coli. Most all eggs and poultry are produced in high confinement "factory farms": hens spend their lives in small wire cages, and thousands of cages containing four to six of them are stacked three high in a typical egg or poultry plant. Since the eggs and meat are produced in such unsanitary conditions, they are given small, sub-therapeutic doses of antibiotics mixed in their feed daily to prevent disease (which also serves to fatten them). Various drugs are fed to these animals to deal with the stress of such an existence, as well as a variety of chemicals to enhance their flavor and appearance (Mason and Singer, 1990). All these substances are transmitted to humans who consume poultry and eggs.

There is a increasing trend to confine dairy and beef cows on small feedlots or in highly restrictive pens, and most of the milk, pork and beef destined for consumers come from cows and pigs that are given antibiotics, hormones and other growth promoting chemicals. Ninety percent of new animal drugs have not been tested by

the FDA, prompting an investigation by a congressional subcommittee that found some of these drugs to have "potentially significant adverse effects on animals and humans" (Mason and Singer, 1990). The onset of puberty is occurring earlier earlier and earlier in western countries that eat a lot of animal foods, and this could be due to the hormone-laden meat, eggs and dairy the children are ingesting (Barnard, 1990).

ANIMAL SOURCES OF NUTRIENTS VS. PLANT SOURCES

Do young children need to eat animal foods to get the nutrients they need to grow normally and stay healthy? We can get an answer to this question by focusing on five nutrients that are essential to human health, comparing their availability from plant and animal sources and looking at various sources to determine how much of these nutrients children need.

PROTEIN

How much protein is enough for young children? According to the National Academy of Sciences (1980), a young child weighing 20 kilograms (44 pounds) needs 30 grams a day of protein. But according to the World Health Organization (1990) a three- to five year-old child weighing the same amount needs 22 grams of protein a day, 27% less than the Academy's recommendation. Other sources say even the WHO recommendations are too high, and that too much emphasis is placed on protein. In The Power of Your Plate, Dr. Neal Barnard writes:

> "The best advice about protein is to forget it. Most plants contain at least ten percent protein. So even without meats, your foods will contain plenty of protein, and you need not go out of your way to get more of it." (Barnard, 1990)

Protein from animal sources was once thought to be superior to protein from plant sources. In the original edition of Diet For a Small Planet, Author Frances Moore Lappe (1971) compared plant protein sources to egg protein. This is because egg and other animal sources of protein contain all nine of the amino acids that cannot be synthesized in the human digestive tract and must be provided through the diet. However, after seeing the medical evidence of the dangers of eating too much protein, Lappe recanted in a later edition of her book: "I gave the impression that in order to get enough protein without meat, considerable care was needed in choosing foods (to get all the essential amino acids). Actually, it is much easier than I thought." (Lappe, 1981)

The data on the availability and usability of protein from animal sources comes from experiments on rats, animals that have a much higher need for protein than humans relative to their size (National Academy of Sciences, 1980). And according to the WHO, "If the energy (caloric) needs of the child or adult are met by (vegetarian diets)-- then so are the amino acid needs" (1990).

As discussed earlier, a link between the consumption of animal foods and the onset of cancer, heat disease, diabetes and other ailments has been established; these foods contain a high amount of saturated fats as well as protein. This can have a doubly negative effect for some: there is evidence that excess protein in itself may contribute to the onset of cancers of the breast, colon, rectum uterus and prostrate. According to the National Academy of Sciences, "...evidence from both epidemiological and laboratory studies suggests that high protein intake may be associated with an increased risk of cancers at certain sites." (National Academy of Sciences, 1982)

Excess protein is also related to kidney damage: since unused protein cannot be stored by the body as fat, its breakdown products must be filtered by kidneys. This overworks the organ and speeds up destruction of kidney tissue even in people who are healthy otherwise. Many people who have already suffered some loss of kidney function have been advised by their doctors to limit their protein intake (Barnard, 1990). Several studies have made a strong connection between the ingestion of too much protein, calcium loss in the urine and osteoporosis; this will be explored more fully later in this paper.

FIBER

Fiber is the indigestible parts of food that the body passes in the stool; whole grains, fruits and vegetables are rich in dietary fiber, while animal foods contain virtually no fiber at all. Over the last several decades, North Americans have been steadily decreasing their per capita consumption of fiber. Several conditions of the lower intestinal track have been linked to diets high in saturated fats and low in fiber including hemorrhoids, constipation, gallstones and diverticulitis (inflammation of the colon) (WHO, 1990).

There is also evidence that fiber containing foods, particularly water-soluble fiber as contained in oatmeal and beans, can actually lower cholesterol levels. One theory is that fiber signals the liver to produce less cholesterol; it my also bind with cholesterol in the intestines, preventing its re-absorption into the body (Barnard, 1990). In any case, whole grains contain no saturated fats or cholesterol, so increasing the intake of these foods and lowering the intake of animal foods will lower the amounts of fat and cholesterol ingested.

There is some controversy over whether a diet high in dietary fiber reduces the risk of certain cancers, especially colorectal cancer. The National Academy of Sciences cites case-control studies that both support and contradict this link, concluding that "an inverse relationship between total fiber intake and the occurrence of colon cancer is not yet compelling" (National Academy of Sciences, 1982). The Academy does not recommend a specific level of intake of fiber and claims that because a "reduction in absorption of mineral elements induced by high dietary fiber

intakes, marked increases in dietary fiber should be avoided" (National Academy of Sciences, 1980).

The World Health Organization, on the other hand, cites several international studies that show high consumption of fiber and low consumption of saturated fats leading to a lower rate of colorectal cancer. The WHO notes the virtual absence of this disease among the indigenous populations of southern Africa who eat a lot of plant foods (WHO, 1990). In Diet, Nutrition and the Prevention of Chronic Disease, the WHO states:

> "...(fiber and vegetables to a large extent) are rich sources of other nutritive and non-nutritive constituents with potential cancer-inhibiting properties. Lower rates of colorectal cancer in Californian Seventh-Day Adventists, half of whom are vegetarians, support a protective effect of a vegetarian diet... In summary, an increased risk of colorectal cancer appears to be associated with high fat intake (particularly saturated fats) and low vegetable intake." (WHO, 1990)

The WHO also refutes the claim that high dietary fiber limits the absorption of minerals by the body, suggesting that the problem has more to do with the way grains are prepared rather than with the diet as such. "Any whole grain provides an additional intake of the minerals that compensates for any reduced mineral availability," according to the WHO (1990). The WHO goes on to recommend that each person eat 16-24 grams of fiber a day.

A study of 6500 Chinese, where the average daily fiber intake is 34 grams (compared with 10 grams in the U.S.) and only seven percent of their protein comes from animal sources, showed the people had high level of iron in their blood, as well as much lower rates of colorectal cancer. When compared to regions in the country that consumed a diet closer to the Western model (high in animal fats and low in fiber), there was an appreciable increase in the so-called "diseases of the affluent": cancers, diabetes and coronary heart disease (Campbell & Bloyd-Peshkin, 1992).

CALCIUM

Calcium is an essential nutrient in building healthy bones and teeth, but there is controversy over how much calcium children need and what is the best source of this mineral. The National Academy of Sciences (1990) recommends 800 mg for children who are four-to six years old; however, African Bantu women who eat no more than 250-400 milligrams a day from plant sources all their lives have a rate of hip fractures (due primarily to osteoporosis) that is about a twentieth of their U.S. counterparts, who eat several times more calcium every day (WHO, 1990).

The National Dairy Council recommends three servings of dairy a day for children one-to 10-years-old to meet their dietary calcium needs. Milk and dairy foods

do contain high amounts of calcium: a cup of whole cow's milk has almost 300 milligrams and an ounce of cheddar cheese has 204 milligrams (National Dairy Board, 1990). How does this compare to plant sources? A cup of cooked broccoli contains 178 milligrams of calcium, half a cup of tofu 258 milligrams and two slices of whole wheat bread has 60 milligrams. Plant foods have the advantage of being low in fats and cholesterol, while milk and dairy sources of calcium are high in saturated fats: even low fat milk has 31% of its calories as fat (USDA brochure, undated). Consumption of dairy foods also has been linked to the onset of diabetes, internal bleeding in the colon, asthma and other allergies, as discussed previously.

Dairy provides 60% of the U.S. calcium intake (National Academy of Sciences, 1980); yet despite the high intake of dairy foods, the U.S. has a relatively high rate of bone loss due to osteoporosis. According to the World Health Organization (1990), "It is by no means certain that calcium intake is the key feature determining bone density and bone loss in adult life. High protein and high salt diets, for example, are known to increase bone loss." Many studies have shown a correlation between a high protein intake and osteoperosis; a study of Eskimo women list the consumption of meat as the one factor all women who showed a huge loss in bone mineral mass had in common (Marsh, 1983). A study involving college-age males found, "The dramatic increases in urinary calcium which followed increases in protein intake were not accompanied by comparable increases in absorption at the high protein intake" (Hegsted et al, 1981). By age 65, both male and female vegetarians had half the rate of bone loss of their peers (Michigan State University, 1983). So although milk contains a high amount of calcium, this benefit may be countered by the high amount of protein it contains, especially those at risk for osteoporosis.

IRON

Anemia is a widespread problem in the world, particularly among pregnant women and younger children in poor regions. According to the World Health Organization, approximately half the children and 59% of pregnant women living in developing countries are anemic. The problem is due to loss of blood through the intestines, a low intake of iron and its poor absorption (WHO, 1990). The WHO lists the ingestion of animal foods and vitamin C as promoters of iron absorption, and they recommend the consumption of some meat to prevent iron deficiency.

But as stated earlier, a widespread study of the Chinese (who eat very little animal foods) shows that their bodies contain ample amounts of iron. Randall Lauffer, from the faculty of the Harvard Medical School, says that widespread iron deficiency only occurs in populations that are malnourished; in well-fed western countries, iron deficiency is increasingly rare (Lauffer & Barnard, 1993). This is backed up by WHO statistics which show that only seven to 12% of children and 14% of pregnant women in developed countries are anemic (WHO, 1990).

Iron deficiency is over-emphasized in developed countries because of the

influence of vitamin manufacturers, industries that produce iron fortified breads and cereals and the beef lobby, according to Lauffer. Excess iron is of greater concern; this condition can release free radicals from cells which damage surrounding tissue and can cause heart disease, cancer and arthritis. Geritol ads in the 50's and 60's promoted iron as a way to prevent fatigue; they were forced to stop making the claims by the Federal Trade Commission because they could not be scientifically substantiated (Lauffer & Barnard, 1993).

Do children need animal foods to get enough iron? "There are many studies in vegetarian populations where the iron level are lower than they are in a meat-eating population, but they're certainly adequate--more than adequate in many cases," Lauffer says. Fruits are an an excellent source of vitamin C (which aids iron absorption), and most vegetables contain more iron per calorie than animal sources. For example, sirloin steak, ground beef, chicken, pork chops and perch all contain less than 2 milligrams of iron per 100 calories; spinach and beet greens have over 11 milligrams of iron per 100 calories. Broccoli and green peppers, popular foods among young children, have over 3 milligrams of iron per 100 calories, and dairy products contain virtually no iron (USDA, 1977).

VITAMIN B12

The most common source of vitamin B12 is animal foods; it is produced by bacteria in animal's intestines and disperses throughout their body and is contained in their muscles, organs and milk. Some B12 is present in fermented plant foods, such as miso and tempeh. A prolonged B12 deficiency can cause pernicious anemia and neurological damage in humans, and has been part of the rationale that people continue need to eat some animal products (WHO, 1990).

However, B12 deficiencies are extremely rare throughout the world: one study of Asian Indian vegetarians found no red cell or neurological damage (Smith, 1965). Many vegans (people who eat no animal products at all) continue to enjoy good health even after years on the diet, possibly because their bodies were able to absorb B12 synthesized in their own intestines (Smith, 1965); also it is possible for the body to store a several year supply of this vitamin.

Young children that consume dairy or even a limited amount of animal products are at a very low risk for a B12 deficiency. The WHO recommends a dietary allowance of only 1 milligrams daily for three-to six-year old, and adds that the vitamin does not have to be ingested every day. Children who consume no animal foods at all can take a supplement with B12 extracted from plant sources. Nursing mothers who maintain a vegan diet should take a B12 supplement to insure that their infant gets an adequate amount of this essential nutrient (Robins, 1987)

DIETARY PATTERNS OF YOUNG CHILDREN

To obtain and renew their state license, early childhood programs in Missouri are required to serve three-to five-year-olds lunch that contains meat (or "meat substitutes"), 6 ounces of milk, a grain product and two servings of a fruit or a vegetable (Missouri Division of Family Services, 1991).This emphasis on animal products compels centers to serve meals that are very high in saturated fats. A review of the lunch menus at three centers in the St. Louis area reflects this emphasis on fatty foods: the meal programs used either 2% or whole milk and served such entrees as ground beef (in hamburgers or spaghetti sauce), breaded fish sticks deep fried in oil, scrambled eggs, chicken served with the skin, cheese and bologna sandwiches, and hot dogs. None served a meatless meal or even a meal with lean meat; one center listed a lunch with pinto beans, but it was cooked with a ham hock.

The meal program requirements for a state license are based on the Recommended Daily Allowances (RDA) according to a nutritionist for Missouri's Child and Adult Care Food Program; she also indicated that the RDA is based on data from the National Academy of Sciences (personal communication with Charlotte Anderson, April 22, 1993). But as indicated earlier in this paper, the Academy recommends a diet much lower in saturated fats; the question is, why has this information not trickled down to centers?

At least part of the answer is that school and center programs still teach and abide by the four food groups, which give much emphasis to meat and dairy foods. This is because these dietary guidelines are set by the Department of Agriculture (USDA), which has the dual role of promoting agricultural commerce and setting the RDA; since agriculture is so dominated by the meat and dairy industries, this represents a conflict of interests. The influence of these industries is reflected in the fact that in 1930, the USDA created the basic 12 food groups which listed four categories for animal foods; this was reduced to seven food groups in 1940 (with three animal food categories) and further reduced to four food groups in 1956 (Earthsave Foundation, 1992). The primary source of nutrition educational materials (which espouse the Basic Four Food Groups) for schools and centers in the U.S. is the National Dairy Council (Robbins, 1987).

The risks of eating animal foods and diets high in saturated fats were discussed earlier in this paper. Are the fatty foods eaten by young children affecting their health? One way to measure this is to look at their total blood serum cholesterol level, which is measured in milligrams (mg) of cholesterol in a deciliter (dl) of blood. There is no benefit or harm at a cholesterol level below 150 mg/dl (Barnard, 1990); however, the risk of coronary heart disease rises progressively above the 150 mark (World Health Organization, 1990); The cholesterol level of the average U.S. heart attack victim is 244 (Barnard, 1990).

Numerous studies have shown that many young children eating a typical U.S. diet high in saturated fats (from animal foods) already have a total cholesterol level

over 150. In a study of the effect of a low saturated fat low cholesterol diet on cholesterol levels of three-year-olds, the 420 children in the control group (who ate a typical U.S. diet) were found to have cholesterol levels already over 150. The children in the experimental group, who had been on a low saturated fat/low cholesterol diet since birth, had cholesterol levels below 150 (Friedman & Goldberg, 1976).

In another study of 1321 children from ages six to 20, European-American six-year-olds had an average cholesterol level of 157; by 12 the average was 176 and by twenty the average was near 200. The cholesterol level of African-American children was considerably lower at six-years-old, but by nine the difference had vanished (the authors of the study suspected this could be the effect of a school lunch and milk program) (Hames and Greenberg, 1961). Evidence of high cholesterol levels in young people was discovered when an examination during autopsies of the veins of young soldiers killed during the Korean war revealed that arteriosclerosis had already begun (Enos & Holmes, 1953).

A report published by the National Institute of Health (NIH, part of the Department of Health and Human Services) states, "Compelling evidence exists that the atherosclerotic process (which leads to arteriosclerosis) begins in childhood and progresses slowly into adulthood, at which time it leads to coronary heart disease, the major cause of death in the U.S." (NIH, 1991) NIH says that five per cent of U.S. children and adolescents have a cholesterol level over 200. The report recommends diet therapy as the "primary approach to treating children and adolescents with elevated blood cholesterol" (NIH, 1991), specifically reducing the intake of saturated fats and cholesterol.

Is it feasible to de-emphasize animal foods in young children's diet? Will they be happy if they are raised on a diet that is low in saturated fats, or will they crave these foods? What do young children want eat?

To answer these questions, I interviewed 58 children, ages three-to six-years-old, at four inner-city early child care programs. I talked to 35 males and 23 females; 29 were European-Americans, 24 were African-Americans, four were Asian-Americans and there was one Hispanic child. During conversations with the children, I asked four types of questions: "What did you eat for dinner last night at home?", "What did you eat for breakfast?", and "What are your favorites things to eat." I followed up by asking why they ate one of the foods they mentioned (usually one of the animal foods).

Overall, 23 of the children remembered eating meat or eggs at a recent meal, and 18 named one of them as a favorite food. None of the four Asian children mentioned meat per se at all, naming mostly staples of the U.S. diet such as donuts, spaghetti, pizza and Cheerios. European-American children did not name meat and eggs as favorites by a three to one margin, while African-American children were more evenly divided (11 did, 13 did not). I followed up the questions about their preferences and asked 17 of the children why they ate meat or eggs, the responses were evenly

divided between those who stated a preference for meat and those who either said their parents told them to eat meat or that it was "good for you".

When asked about consumption of milk or dairy foods, 42 of the children mentioned eating some at a recent meal; however, only 24 (less than half of all respondents) named milk or dairy as a favorite food. Approximately this same ratio was reflected in the responses broken down by race. Of the 23 children who were asked why they drank milk, 14 responded that either their parents wanted them to or that it was healthy for them; most of these children repeated slogans from National Dairy Council Advertising. A three-year-old girl told me, "Cause I see it on commercials, that boy says it make you have beautiful teeth, skin and hair." Typical responses were "It's good for your body," "it gives you strong bones and teeth," or "It gives you strong muscles."

Carbohydrates were by far named most often as a favorite foods, with 72% (42 out of 58) naming sandwiches, spaghetti, cookies, pizza (which I counted as a carbohydrate only unless they said a cheese pizza) and breakfast cereals. Fruits and/or vegetables were named by 31 of the children (53%) as favorites, making these two categories of foods the clear favorites. One child identified herself as a vegetarian, and all but four of the children mentioned animal foods at one point or another.

Answers from the children were no doubt influenced by the foods they had eaten close to the time the questions were asked, so I conducted the interview several hours after the children had a meal. Because of the short attention span of preschool age children (especially the younger ones), the interviews had to be short, for the most part, and not in depth. However, the preference for non-animal foods such as fruits, vegetable, grains and cereals was so high that it cannot be disregarded. It indicates that the children do not see animal foods as an essential or at least as a preferred part of their diet. Interestingly, this preference for carbohydrates, fruits and vegetables reflects the pre-agricultural diet of humanity: a low-fat, high fiber intake rich in vitamin C that is still maintained by the world's surviving tribal peoples (WHO, 1990).

CONCLUSIONS AND RECOMMENDATIONS

Are animal foods essential to the health of young children, or can they can they ingest the nutrients they need from primarily (or only) plant sources? There are conflicting viewpoints on this subject; the position of the USDA is that because of the small capacity of the stomach of young children, they are not likely to consume all the calories they would need to get enough protein, iron and calcium from plant foods. These nutrients are concentrated in animal foods and are therefore a better source of them, according to the USDA. They also maintain that micronutrients in animal foods are more bioavailable to young children (personal communication with Vee Ann Miller, USDA Regional Nutritionist, May 3, 1993). Studies have suggested that some vegan children are not getting some of the essential nutrients they need (Truesdell & Acosta, 1985).

The USDA maintains that cow's milk is essential to a healthy diet. In a written response to the charge that parents should be alerted to the potential risks their children face from ingesting cows milk, Joseph Shepherd, Director of the USDA's Nutrition and Technical Services Division, said, "Milk is a major source of nutrients in children's diets and...most children grow and develop normally on a diet of which milk is a major component" (from a letter to Dr. Neal Barnard, December 8, 1992).

Do young children need animal foods to get all the nutrients they need? Another study of vegetarian children's diets showed that they were meeting the RDA (Fulton et al, 1980). As noted earlier, African women and Chinese who eat very little animal foods had plenty of calcium and iron in their bodies. Menus based on the USDA's four food groups were found to have only met 9 of the 17 RDAs (King et al, 1978).

The Physician's Committee for Responsible Medicine (PCRM) has created "The New Four Food Groups" that contain no categories for animal foods; the food groups are whole grains, vegetables, legumes and fruit (PCRM, 1991). According to PCRM:

> "The USDA's 'Daily Food Guide' encourages continued consumption of unhealthful, albeit familiar, foods and fails to encourage consumption of lower-fat, higher-fiber foods. For example, beans, which are low in fat and rich in fiber, are equated with meat, a food high in saturated fat and cholesterol and completely lacking in fiber" (PCRM, 1991).

Can a young child eat the RDA requirement of calcium, for example. without eating any animal foods? This sample menu, created by PCRM, meets the RDA:

Breakfast: three pancakes, one orange
Lunch: one cup lentil soup, romaine lettuce, one English muffin
Dinner: one cup vegetarian baked beans (with blackstrap molasses), one cup broccoli, one piece of corn bread (two ounces)

For a child to eat enough calories to get enough nutrients from a diet such as the one listed above, he/she would have to limit his/her intake of empty calorie foods such as potato chips, sodas, candy, donuts, cake, gum and the like. For many children and parents, this would be a real challenge: we are bombarded with suggestions to eat these nutrient empty foods from media advertising, their ubiquitous presence in grocery and convenience stores and their association with holidays and special events such as birthday parties. These foods may not be as popular with children as we think: during the interviews of preschool age children, only 20 of the 58 mentioned treats as a favorite food, far less than those who named carbohydrate foods, fruits and vegetables as favorites. Perhaps part of the reason that children eat these foods is that they associate them with rewards and happy times spent with friends and parents.

It is possible for children to get all the nutrients they need from a plant-based diet if they stick to nutritious foods. We should heed the warning from the examples of societies that have switched from traditional high fiber, low-animal foods diets to the affluent, western-style diet low in fiber and rich in saturated fats from meat, eggs and dairy: eventually, there is always a huge increase in the rate of cancers, coronary heart disease, strokes, diabetes, obesity, osteoporosis, gallstones and appendicitis (WHO, 1990). This connection between diets high in saturated fats and cholesterol and these degenerative diseases has been noted by the National Academy of Sciences (1989), one of the most prestigious research and scientific institutions in the U.S. Parents and educators should take heed of these warnings and reconsider children's and their own intake of animal foods.

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