Food Science

Babies fuss over postexercise milk...

Babies don't like to nurse after their mothers have exercised heavily. Infants may fuss throughout, or even refuse post-exercise feedings, according to a new study.

Blame lactic acid, a by-product of exercise incorporated into milk, say Janet P. Wallace and her co-workers from the Adult Fitness Program at Indiana University at Bloomington. Although not harmful, lactic acid tastes sour and may alter the flavor of mother's milk, studies show. Even newborns have a sense of taste refined enough to detect such changes (SN: 10/12/91, p.230).

Wallace and her group studied 26 nursing mothers and their babies, measuring lactic acid concentrations in milk samples obtained before and up to 30 minutes after maximal exercise and comparing infants' reactions to the samples. Mothers exercised on a treadmill, gradually working up to their peak heart rates. Results appear in the June PEDIATRICS.

Wallace told SCIENCE NEWS that more recent work suggests a similar, although smaller, increase in lactic acid following low- to moderate-intensity workouts. Also, while exercising with empty breasts may be more comfortable for the mother, lactic acid concentrations may be higher in the milk produced shortly afterward. Lactic acid concentration declines slowly: Levels remain elevated for at least 90 minutes after exercise.

To reduce potential nursing problems, Wallace suggests mothers exercise at low to moderate intensity.

...New formula may come to the rescue

A new process that changes cow's milk to mimic human milk has been developed by chemist John H. Woychik at the Agriculture Department's Eastern Regional Research Center in Philadelphia.

Proteins in cow's milk differ in amount and kind from those in human milk, making cow's milk less nutritious for human babies and harder to digest. As many as 10 percent of all U.S. infants may have adverse reactions to cow's milk at some time, although less than 0.1 percent of the population has either severe or persistent allergies, a previous study has shown.

The protein chiefly responsible for such problems, beta-lactoglobulin, can now be removed cheaply in Woychik's continuous, 16-hour process, which uses a synthetic molecular membrane to filter proteins. This process also concentrates beta-casein, a beneficial protein found in both cow's milk and human milk, thus producing an excellent protein base for infants.

Grape juice vs. wine: A healthy debate

Good news for teetotalers: Grape juice contains resveratrol, the chemical in wine thought to lower cholesterol levels in the blood.

Naturally produced by grapes to fight disease, resveratrol has been identified as the active ingredient in many folk medicines. Research in Japan indicates that it lowers cholesterol levels in rats, but studies on the effects of resveratrol in humans have not been published.

Leroy L. Creasy of Cornell University announced last summer that wine contains resveratrol. Concentrations vary but are generally highest in red wines made from grapes fermented in their skins, where resveratrol is concentrated.

Grape juice lovers clamored to know if their drink also contains resveratrol. Creasy obliged, finding that purple grape juice contains more resveratrol than 60 percent of the wines he analyzed. And like white wine, white grape juice contains little resveratrol, largely due to differences in processing.

Analyses of table grapes reveal only minimal amounts of resveratrol. Creasy plans to analyze other grape products, including jellies, jams, nonalcoholic wines, and raisins.

Paleobiology

Richard Monastersky reports from Chicago at the Fifth North American Paleontological Convention

Ignoble origin for flowering plants

From orchids to oak trees, the angiosperms – also known as flowering plants – currently reign over more ancient divisions of the plant kingdom. Paleobotanists have traditionally thought that angiosperms had a noble origin, having evolved from an ancestral type of tree related to the magnolia. Recently, though, some workers have suggested a much seedier beginning, theorizing that the ancestral angiosperms were small, weed-like herbs that grew in less desirable environments not preferred by the more established forms of vegetation. New evidence from a fossil site near Richmond, Va., supports the lowly origin hypothesis, report Leo J. Hickey of Yale University and David W. Taylor of Indiana University Southeast in New Albany.

At a place called Dutch Gap, the researchers found early angiosperms in silty layers deposited along the margins of ancient river channels – an environment that would have been unstable because of frequent flooding. Paleobotanists have spent years searching for the earliest angiosperm ancestors, but those efforts have failed because researchers have kept the wrong image in mind, say Hickey and Taylor. Instead of looking for large, woody plants, paleobotanists should search for small, weedy vegetation living along riverbanks.

Heirs of ancient enigmas

Living organisms have populated the Earth for more than 3.5 billion years, but for most of that time they remained exceptionally small. Then sometime during the late Proterozoic era, about 580 million years ago, life got big. In rocks dating from this time, paleontologists have found a wide variety of large impressions left by a group of puzzling soft-bodied organisms called the Ediacara fauna, which later disappeared from the fossil record.

Scientists have long puzzled over the fate of the Ediacara: Did they leave relatives that evolved into animals seen in later periods of Earth's history, or did these early organisms represent a failed evolutionary experiment – a separate offshoot of life that did not succeed? One researcher now describes evidence that some of the Ediacara fauna survived.

Simon Conway Morris of the University of Cambridge in England reports that one type of Ediacaran organism, known as *Charniodiscus*, bears a close resemblance to a newly identified animal from the Burgess Shale, a fossil site dating to the middle Cambrian period, roughly 520 million years ago. The Burgess Shale animal is a sea pen-like creature (a relative of the sea anemone) that apparently lived on the ocean bottom, using branched fronds to filter food out of the water. Because of the striking similarity between *Charniodiscus* and the Burgess Shale animal, Conway Morris suggests the two are related. *Charniodiscus* may even represent an ancient member of the sea pen group.

He also points out that several bag-like Ediacaran organisms resemble an enigmatic creature from the Burgess Shale called *Mackenzia costalis*, which looks a little like a zeppelin. Paleontologists do not know how to classify *M. costalis*, though Conway Morris suggests it is similar to cnidarians – members of a phylum that includes sea anemones, jellyfish, and coral.

While debating the fate of the Ediacara fauna, paleontologists have also puzzled over the exact nature of these organisms, wondering whether they were animals, plants, fungi, or something different. The close resemblances between several Burgess Shale organisms and some Ediacaran ones leads Conway Morris to suggest that at least some members of the early group were indeed animals that survived into the Cambrian period. But he also allows that other types of Ediacaran fossils may represent separate branches of evolution that disappeared.