Infant growth: A sporadic phenomenon

Anthropologist Michelle Lampl, trained as a physician and growth researcher, recalls learning that healthy young children experience "a perfectly regular rate of growth, with no breaks or spurts." Indeed, she says, she recently listened to a growth researcher tell pediatricians that any child who does not grow over a 30-day period must be dead.

But Lampl's own findings challenge the notion of smooth, consistent growth, and instead suggest that children grow in sporadic fits and starts.

Conventional wisdom holds that very young children gain an average of about one-half millimeter in body length per day. But Lampl's measurements of 32 healthy infants and one adolescent indicate that growth occurred in a random series of roughly 1-centimeter spurts, each apparently lasting less than 24 hours. During the two to approximately 60 days that separated successive spurts, she says, absolutely no increases in body length occurred.

Lampl, of the University of Pennsylvania in Philadelphia, described her new study in Chicago this week at a meeting of the American Association for the Advancement of Science.

Over periods of four to 18 months, she visited the homes of the youngsters. With the help of a parent, she stretched out and measured each child – four of them daily, 18 twice-weekly and 11 at weekly intervals. Her daily measurements "provide the most precise description of growth yet reported," she says.

The daily data document long quiescent periods of no growth, suddenly punctuated by a permanent lengthening of 0.5 to 1.8 cm over a 24-hour period. Lampl describes these nonperiodic, stepwise changes in the growth curve as "saltatory," or abruptly jumping. Because saltatory spurts of similar magnitude showed up in children who were measured weekly or twice-weekly, she suspects that these growth changes occurred over a 24-hour period.

While conceding she used a very small study population, Lampl says she saw no signs of a correlation between infant size and the total number of discrete growth episodes. However, she notes, "there was a distinct correlation between fussiness and [increased] hunger at the time of the growth episodes." Parents also reported signs of increased sleepiness right before growth spurts, she adds.

At the same meeting, Michael Hermanussen of the University of Kiel in Germany described a study of lower-leg length in healthy schoolchildren. He found evidence of weekly changes, with growth spurts following no-growth periods that sometimes lasted more than 60 days (including occasional intervals of shrinkage). "I was not aware of saltatory [changes in these data]," he says. However, he adds, "I'm aware that I might have missed them."

That's not surprising, says Lampl, because until now, growth researchers have lacked mathematical models for stepwise changes that are nonperiodic. Without such models, they have attempted to fit their growth data points – usually collected weeks or months apart – to a smooth curve. But Lampl found that such a curve didn't really fit her detailed data.

For help in finding a better curve, she turned to biophysicist Michael L. Johnson, handing over her data on a 13-year-old boy whose height she had measured on about 400 consecutive days. Johnson, of the University of Virginia in Charlottesville, reported at the Chicago meeting that a stepwise, saltatory model fits these data better than any previous model. Without Lampl's daily data on dormant periods and growth pulses, the flaws in the old approach remained unrecognized, he adds.

"I would never have imagined pulsatile growth," comments Mark L. Hartman of the University of Virginia School of Medicine, who studies factors affecting growth-hormone secretion and its relationship to human growth.

The body's pulsed secretion of growth hormone can trigger metabolic changes, such as increased protein synthesis, Hartman notes. And since his group has recently shown that growth-hormone pulses occur frequently throughout the day, sometimes at intervals of just 30 seconds, some of his colleagues suspected that these pulses contribute to slow, incremental daily growth. But Lampl's results certainly confound that picture, he adds.

"My mind is going 100 miles a minute trying to explain the new data," Hartman told SCIENCE NEWS. "I think I will have to talk to my colleagues and see if we can generate some new ideas to explain these new findings." *– J. Raloff*

Ozone concerns prompt phaseout fury

Reacting to last week's news that an ozone hole could open over North America, President Bush announced this week that the United States will halt production of ozone-depleting chemicals by the end of 1995, four years ahead of schedule. But a loophole in Bush's proposed policy would allow significant production of damaging chlorofluorocarbons (CFCs) and other chemicals after that date.

Under the President's plan, companies could continue producing the banned chemicals for "essential uses and for servicing certain existing equipment." The Alliance for Responsible CFC Policy in Arlington, Va., estimates that, to provide for existing equipment, production would have to continue at 15 percent of its 1986 level. If the President's policy allows this production level, the new controls would speed the phaseout process by only one year. Current U.S. law requires companies to limit their production to 15 percent of 1986 levels by the end of 1996.

The Alliance, which represents companies that produce and use CFCs, praised the President's policy for balancing environmental and economic concerns. It estimates that by 1996, the United States will have $135 billion in equipment that relies on CFCs.

Liz Cook, with Friends of the Earth in Washington, D.C., calls the exemption "a big loophole." Last year, a coalition of U.S. environmental groups called for a total ban on production of CFCs by the end of 1994, with an immediate phaseout of halons and phaseout of other chemicals by the end of 1992.

Negotiators will meet later this year to discuss strengthening the Montreal Protocol – an international treaty governing the phaseout of ozone-depleting chemicals. Like the U.S. regulations, the Montreal Protocol requires a decrease to 15 percent of 1986 production levels by the end of 1996, with a complete phaseout by 2000. *– R. Monastersky*

Myotonic dystrophy: A short gene is best

For years, neurologists have noticed a strange phenomenon: Patients afflicted by myotonic muscular dystrophy, a muscle-stiffening disorder, often have children with a more severe form of the disease. And their children's children, in turn, are usually affected even more severely, and at a younger age.

What causes this distressing genetic generation gap? Last week, three groups of researchers studying myotonic dystrophy came closer to answering that question in simultaneous findings that they say should allow for better screening tests for the inherited disease.

The three groups of geneticists found that people with myotonic dystrophy have extra bits of DNA at a specific spot on the long arm of chromosome 19. Moreover, they discovered that those with the worst symptoms have the most extra DNA.

In the Feb. 6 NATURE, the researchers speculate that the extra DNA pieces somehow disrupt an as-yet-unidentified gene, one possibly involved in controlling muscle tone. The three teams – led by Duncan J. Shaw of the University of Wales