For more than a century researchers have known that most men’s ring fingers are longer than their index fingers; the ring finger is shorter than or the same length as the index finger in most women. Previous studies have suggested a link between sex hormones and the discrepancy in finger length between the sexes, but the precise developmental basis of the difference was unknown. Zhengui Zheng and Martin Cohn (pp. 16289–16294) reveal a likely piece of evidence: The authors followed the development of the limb buds of mouse embryos by tracing the expression of a gene network involved in cartilage formation. In mice, the authors report, a sex-biased digit length ratio similar to that seen in people is established after the formation of digit precursors and persists throughout life.

The discrepancy in the length of the second and fourth digits between the sexes appears to be controlled by balancing the signaling effects of the male hormone androgen and the female hormone estrogen. That balancing act, which affects genes that control the development of digit progenitor cells, helps control the growth of the fourth digit, which contains higher levels of receptors for both sex hormones, thus establishing the discrepancy. Hence, the ratio of the digit lengths might serve as a permanent signature of prenatal hormone exposure in people. Digit length ratios have been linked to fertility, athletic ability, and sexual orientation; the findings might help researchers interpret the developmental basis of behavior and disease, according to the authors. — P.N.

Fatherhood might reduce men’s testosterone levels

Researchers have established that fathers have lower testosterone levels than single men, but because most previous studies provided a snapshot of information at a given time, it was unclear whether fatherhood suppressed testosterone or if men with low testosterone were more likely to become fathers. Lee Gettler et al. (pp. 16194–16199) examined information collected over a period of nearly 5 years from more than 600 young men enrolled in a long-running health and nutrition study in the Philippines. During the study period, about one-third of the men entered stable partnerships and became first-time fathers. The authors report that single men with higher testosterone levels were more likely than others to become partnered fathers, suggesting that testosterone helps boost men’s ability to attract and secure a mate. Once these men became fathers, they experienced a drop in testosterone levels greater than any drop seen among single men without children. More importantly, fathers involved in child care had less testosterone than those who were not, suggesting that direct care of dependent children suppresses the hormone. Thus, testosterone might help mediate a trade-off between mating and parenting among people, according to the authors. — P.N.
Water flow on a sticky surface

A slippery surface can reduce drag, resist dirt buildup, or prevent ice formation. Traditionally, researchers have looked to water-repelling materials to increase slip, but Tuan Anh Ho et al. (pp. 16170–16175) found that some water-loving, or hydrophilic, surfaces can be slippery, too. The authors used computer simulations to model interactions between droplets of 1,000 water molecules and three solid surfaces. Unexpectedly, the researchers found that liquid slip can occur on a hydrophilic surface as long as water-to-solid attractions are not too strong and the sites that attract the water are closely spaced. Under these conditions, water can travel along the solid’s surface by migrating from one adsorption site to the next, the researchers report. The authors modeled the spacing of adsorption sites by increasing or decreasing the distance between atoms of a simple MgO surface. Natural MgO typically allows little, if any, water slip. But when the authors decreased the atomic spacing in the simulation by approximately one-third, the surface remained hydrophilic and began to allow liquid slip. According to the authors, the results could potentially help researchers design self-cleaning membranes or other materials in which slippery but water-attractive surfaces are needed. — J.M.

Laboratory cloud simulations reveal key role of internal heating

Cloud quantification represents the largest source of uncertainty in climate change science and remains a weak link in tropical circulation models. Condensation and other microphysical processes influence and are influenced by macroscopic motions of air, and researchers have struggled to simulate these interactions in a controlled laboratory setting. Roddam Narasimha et al. (pp. 16164–16169) designed a bench-scale apparatus that allows researchers to reproduce analogs of various cloud forms by manipulating the flow, temperature, and stratification of fluids at different densities. The apparatus allows a specially prepared cloud-proxy fluid to be injected through an orifice in the base of a water tank. The tank is equipped with heating elements that simulate energy transfers due to condensation and freezing, and establish atmosphere-like temperature profiles. The authors used the apparatus to control microphysical “in-cloud heating” and track the life cycles of several cumulus cloud types. Energy transferred by water state changes play a pivotal role in how clouds form and evolve, the authors suggest, and could provide a crucial link between microphysical processes and cloud-scale dynamics. The findings can potentially lead to more effective cumulus cloud models, which in turn could enhance the ability to predict climate features such as the Indian monsoons, according to the authors. — T.J.