

Don't reject me, fetus tells Mom

It's one of the more enduring mysteries of immunology: Why doesn't a pregnant mother reject the baby in her womb as if it were a transplanted organ? In the Aug. 21 *SCIENCE*, investigators present new evidence that the fetus actively defends itself by suppressing the immune cells of its mother.

Scientists often describe the immune system as discerning between self and nonself and attacking the latter. This model, although criticized by some immunologists, has helped to explain how the body defends itself against pathogens, rejects transplanted organs, and, in autoimmune diseases, wages war on its own tissues. The self-nonsel self paradigm also suggests that a mother's immune system should attack a fetus, because it uses some proteins derived from the foreign genes of its father.

Over the decades, immunologists have offered many explanations for this paradox. Some have suggested that the placenta provides a physical barrier, preventing a mother's immune cells from reaching the fetus. Others have said that the fetus in essence hides from the immune system by altering the way it presents proteins on the surfaces of its cells. A third theory holds that the maternal immune system decides to, or is forced to, tolerate the presence of the fetus.

Andrew L. Mellor of the Medical College of Georgia in Augusta and his colleagues have pursued this third possibility, focusing on an enzyme called indoleamine 2,3-dioxygenase (IDO). Previous work by a Japanese research group had shown that cells at the placental interface between the fetus and the mother produce IDO. A member of Mellor's group had found that certain immune cells also make IDO and suppress the proliferation of other immune cells.

In their new work, Mellor and his colleagues show that giving pregnant mice an IDO inhibitor causes them to abort genetically distinct fetuses. "It's an immune-mediated phenomenon that we've allowed to happen because we've blocked a protective barrier the fetus normally provides," says Mellor. To confirm that the inhibitor itself wasn't causing the abortions, the researchers gave it to inbred mice bearing fetuses nearly genetically identical to themselves. Those fetuses survived.

How does IDO suppress immune cells? The answer isn't clear, but the enzyme does break down the amino acid tryptophan, which immune cells may need for proliferation and activity.

Mellor suggests that his group has found a general way that the body controls its immune system, a discovery that might provide leads to new drugs to treat autoimmune disorders or prevent organ rejection. "We're very excited about therapies that might emerge," he says. —*J.T.*

Cloning comes to the rescue of a Lady

In a last-ditch attempt to save an endangered breed of cattle, scientists in New Zealand have cloned a cow named Lady. They plan someday to artificially inseminate her genetically identical calf, a 2-week-old female named Elsie, with sperm now frozen for storage.

Until Elsie's birth, Lady was the last female survivor of the Enderby Island breed, which had been living in isolation on the icy island near New Zealand for more than a century. For several years, scientists tried to use *in vitro* fertilization, but Lady only gave birth to a single bull. Worried about the cow's advancing age—she's now 7 years old—researchers decided to attempt to clone her using a technique similar to the one that created Dolly the sheep. Genetic tests have confirmed that Elsie is a clone of Lady.

"With [Elsie's birth], we have vastly improved the chances of saving this endangered breed, which had adapted genetically to live in sub-Antarctic conditions," says David N. Wells of the Ruakura Research Center in Hamilton, New Zealand, who led the cloning effort. —*J.T.*

Walking lobsters have odd heart rates

When lobsters took treadmill tests, waddling along on an underwater version of human exercise equipment, their heart rates startled researchers.

A team at the University of Calgary in Alberta put the crustaceans through their paces, from a gentle stroll at 1.7 meters per minute to a brisk 8-meter-per-minute stride. Robert A. Rose and his colleagues expected that the faster a lobster walked in the laboratory tanks, the faster its heart would beat.

Not so, the researchers report in the August 25 *JOURNAL OF EXPERIMENTAL BIOLOGY*. "The responses were fixed regardless of walking speed," they say. When the exercise started, lobster heart rates jumped almost instantaneously, but the size of the increase seemed to have nothing to do with exercise speed. During treadmill sessions, lobster hearts thumped a maximum of some 80 to 90 beats per minute at all walking speeds tested.

Ventilating, an underwater equivalent of breathing, followed the same pattern. Rates reached 175 to 180 times a minute regardless of the lobsters' speed.

As to why walking speed mattered so little, the researchers say only "the reason for this phenomenon remains unexplained." —*S.M.*

What a black blob tells other birds

A quirk of flocking birds has allowed scientists to test the idea that a black chest patch works as a badge of status.

In winter, hungry birds often join forces in looking for food, roaming from place to place in flocks. On average, they may find more food than solitary foragers, but a flocking bird that stays too close to a piggy eater can end up hungry. Several studies have documented that birds often avoid flocking with dominant bullies.

This tendency allowed Juan Carlos Senar and Montse Camerino of the Museum of Zoology in Barcelona to see whether siskins use their black chest bibs as an index of dominance. Previous work suggested that the more dominant birds sport the bigger bibs. But do the birds themselves treat the blobs as status symbols?

Yes, the researchers report in the August 22 *PROCEEDINGS OF THE ROYAL SOCIETY OF LONDON B*. They caught wild male siskins and offered them their choice of feeding partners. The birds chose small-bibbed—less dominant—birds twice as often as they chose large-bibbed ones. Enlarging a chest spot with a black marker or slimming it with yellow-green paint changed a bird's desirability as a dining companion. The test birds chose partners without observing aggressive acts, suggesting that they made decisions just by checking the black badge of dominance. —*S.M.*

Healthy fish build better sand castles

Judging a fish by its castle may not be so shallow after all.

Males of many animal species, from stalk-eyed flies to the twelve-wired bird of paradise, go courting with some pretty peculiar displays: bobbling eye stalks, wiggly tail feathers, and . . . let's not even start with the human baubles. This array of male lures has sparked intense debate (*SN*: 8/29/98, p. 140). Do ornaments genuinely indicate some useful trait like health? Or do they simply reflect arbitrary female tastes?

One classic example of showiness—bower-building by fish in Africa's Lake Malawi—turns out to be an honest indicator of an aspect of male health, say Martin I. Taylor from the University of Southampton in England and his colleagues. Male *Copadichromis* fish scatter sand on rocks or build sand structures shaped like upended cones with the points knocked off. Bigger piles attract more females, and the new research shows that the top sandbox studs have fewer parasites in their livers. These results appear in the August *ANIMAL BEHAVIOUR*. —*S.M.*