VACCINE RESEARCH

New Society Seeks Common Ground

LAS VEGAS—Researchers who develop vaccines traditionally have joined any group that would have them. It's not that vaccinologists—who include immunologists, bacteriologists, veterinarians, biochemists, parasitologists, virologists, pediatricians, endocrinologists, oncologists, and molecular biologists—are a particularly desperate bunch. Until now, they just haven't had a group of their own.

Not anymore. In March a handful of scientists created the International Society for Vaccines (ISV), based in Gaithersburg, Maryland, dedicated to fostering dialogue across disciplinary boundaries. Gambling that there were enough researchers with a common interest in vaccinology to warrant holding a conference, its founders scheduled a meeting in Las Vegas, Nevada. Two weeks ago the bet paid off, with 75 researchers showing up for sessions on everything from infectious diseases in children to pregnancy in elephants.

"This meeting's a cross-fertilization of disciplines," said ISV president Peter Nara, an AIDS vaccine developer at the National Cancer Institute. "We're struggling with the same questions, so lo and behold, why not compare notes?" F.E.G. Cox of King's College London, a parasite specialist, admitted that he knew little about the work being done by many who attended the meeting. "One of the pities is that vaccine people don't know each others' fields," said Cox.

Nara's presentation was a good example of the broad perspective the fledgling group wants to foster. Nara discussed common mechanisms developed by an array of viruses to dodge attacks from the immune system—and, by extension, from vaccine developers. One of the more curious "vaccine-resistant viral strategies" he described was the ability of herpes, vaccinia, shope fibroma, and myxoma viruses to commandeer cells and direct them to secrete proteins. They, in turn, interfere with immune responses directed at the given virus.

The meeting gave vaccinologists a chance to recount their successes, which are legion. Because of vaccines, as speakers repeatedly noted, there are no longer wards of polio sufferers trapped in iron lungs, and the smallpox virus has been eradicated from the planet. A more recent triumph has been the childhood vaccine against *Haemophilus influenzae* type b (Hib), a disease that causes meningitis and is now all but eliminated in the United States.

It also provided a forum for scientists to vent their frustrations at the complexity of the work that lies ahead. Ronald Ellis of Merck and Co. described a vaccine made from a polysaccharide on Hib's surface that worked in adults but had little effect in infants. Then researchers found a way around that hurdle by coupling, or "conjugating," the polysaccharide to a protein carrier—such as tetanus toxoid, the key ingredient of the tetanus vaccine. Ellis and colleagues at Merck are now attempting to extend this conjugate trick to vaccines against several other bacterial diseases, including *Streptococcus pneumoniae*, *Neisseria meningitis*, and *Neisseria gonorrhoeae*.

But vaccinologists also spoke frankly about the limitations of their research. Cox asserted that parasites "would laugh" at some of the tricks viruses have come up with to avoid attack. "By and large, all parasitic infections go on for a long time, and the immune response against them is very strong," said Cox. "But parasites are very strong." For one thing, many parasites, like malaria-causing *Plasmodium*, have complex life cycles that allow the bugs to keep changing form, one step ahead of the immune system. Parasites also are deft at hiding from antibodies and other immune system warriors. No vaccine, he predicted, will ever prevent a parasitic infection. "The best one could hope for is to reduce the severity of the disease," he said.

Even that partial success comes at a price, however. Thanks in part to vaccines, said Bonnie Dunbar of Baylor College of Medicine in Houston, world population has nearly tripled in the past 55 years, to 5.6 billion, and some predict that it could top 20 billion by 2040. That frightening prospect has propelled Dunbar's work on contraceptive vaccines.

Healthy start. Part of the logo of the new International Society for Vaccines.

ILLUSTRATION: PETE NARA

Dunbar's vaccine contains a protein from the zona pellucida, the thick shell that surrounds the ovum. In rabbit experiments, the vaccine triggered production of antibodies that coated ova and prevented sperm from binding—and blocked pregnancy. But these rabbit ovaries, dissatisfied with worthless eggs, incessantly recruited more, depleting their entire stock within a few months.

Although most people would consider a vaccine that causes menopause to be an undesirable way to curb human population growth, Dunbar is working to test such a vaccine on three females in a Kenyan elephant herd that lives on a private reserve and has become too large. Culling elephants, she said, is not an option, because the rest of a herd might grieve themselves to death.

Despite its concern for world population, ISV is a society that most definitely wants to grow.

–Jon Cohen

SCIENTIFIC CITATIONS

HHMI: A Dynasty in the Making

Like a visionary team owner with an eye for superstars, the Howard Hughes Medical Institute (HHMI) continues to back many of the nation's most influential biomedical researchers. According to last month's *Science Watch*, Hughes-sponsored investigators claimed nearly 25% of the 200 most frequently cited papers in the biomedical sciences in 1993, going by counts made by the Institute for Scientific Information's citation index. That's up from just 4% in 1985 (see chart).

Part of this jump, of course, is due to roster expansion: The number of Hughes investigators climbed from 96 to 222 during this period. Another 49 were added earlier this year. That shows the kind of personnel you can field with an annual research budget of more than $260 million. But although that's a 131% increase in the number of researchers, the increase in the number of HHMI papers in the top echelon was still higher, climbing by more than 500%. Quality as well as quantity seems at work here.

Every team, no matter how good overall, still has standouts. At HHMI, the scientist with the honor for the most citations is Ronald Evans, a geneticist at the Salk Institute in La Jolla, California, with 13,560 citations over 9 years. He's followed by a pair of Duke University researchers, biochemist Robert Lefkowitz with 12,906 citations and geneticist Marc Caron with 12,861.

–Robert F. Service