Mother–infant HIV transmission: Making the most of what we know

To the editor — The News & Views "Closing in on HIV-1" (*Nature Medicine* 2, 274–275; 1996) correctly identified the new optimism resulting from the clinical results of HIV-1 protease inhibitors and combination therapy. This contrasts with the continued mood of pessimism that pervades the area of HIV-1 vaccines[1,2]. However, as the debate on vaccine trials continues in the United States and vaccine trials are initiated in developing countries, we must not lose sight of the fact that treatment of HIV-1-infected pregnant women with zidovudine has been shown to prevent HIV-1 infection of infants, reducing transmission by more than 60% (ref. 3). In a sense, this could be considered a "pharmacologic vaccine" for prevention of HIV infection.

The 60% reduction in transmission is a result that is significantly greater than even the most optimistic vaccine efficacy projections given by proponents of HIV-1 vaccines[1,2]. I would argue that while we wait for a vaccine we must put full emphasis on prevention of maternal–infant transmission by therapy already available. The scientific community must remember that decades were required to develop a relatively simple 80% effective pneumococcal polysaccharide vaccine consisting of 23 individual polysaccharides[4]. Even if one or more of the current HIV-1 vaccines were partially effective, it is likely that it would take decades to develop and evaluate an HIV-1 vaccine that would protect against infection from diverse strains. The cost of such a vaccine would likely be equal to or greater than the cost of treating an HIV-infected mother and her infant with drugs.

Peter Piot, in discussing the United Nations Global Programme for AIDS, is quoted as saying, "the mechanism of control adopted four or five years ago, whereby efforts go mainly towards prevention, is no longer appropriate. Today, we cannot separate prevention, the treatment of those touched by AIDS and the impact of the epidemic on communities and families alike" (*Nature Medicine* 1, 862; 1995). Even if zidovudine therapy in developing countries were less effective than the 60% reduction in transmission reported in the United States, it could still have a dramatic effect. A 40% reduction, for example, would prevent HIV infection and death in an estimated 400,000 infants each year worldwide. Further, it is entirely possible that the new protease inhibitors, alone or in combination with zidovudine or lamivudine, might result in a transmission rate in the United States of less than 1%. This could result in fewer than 100 newly infected infants per year, effectively bringing the pediatric HIV-1 epidemic for newborns under control. This should motivate all of us to find ways to universally implement the successes already achieved.

Thus, while we wait for a preventative vaccine or other methods of prevention and treatment, we could save the lives of millions of children worldwide over the next decade by using the "pharmacologic vaccines" we already have.

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To the editor — Once upon a time there were three brothers. They lived in the same house, ate the same food, drank the same water and breathed the same air. One day one of the brothers came down with pneumonia. The second one simply had the sniffles, and the third remained unscathed.

The question as to why people subjected to the same external threat (germs) should react so differently is usually taken for granted: genetic background. While there is a role for genetics in health and disease, just as important as inheritance is the environment[1].

That people so often react so differently has been noted for many years. More than a century ago, Claude Bernard called the process "milieu interieur." Others have referred to it as host resistance/susceptibility, tissue tolerance, predisposition, constitution, metabolism, harmony, balance and, increasingly, immunocompetence. In other words, seemingly similar people react differently because they are in fact different! Although these differences may be obscure and subtle, they can be measured. A very timely, common and dramatic example of their variations is the story of the transmission of HIV in pregnant mothers to their offspring[2]. It is generally agreed that somewhere between 10% and 40% of pregnant HIV-positive women will give birth to HIV-positive infants. The question is why are not all these babies HIV positive? Studies of the relationship between serum vitamin A concentrations in the mother and the development of HIV in the offspring show that the higher the maternal serum vitamin A levels, the less frequently is the baby a victim. As the serum vitamin A progresses upward from 20 to 30 to 40 μg%, the prevalence of infected offspring declines from 32.4% to 26.2% to 16.0% and 7.2%, respectively.

There are hundreds, if not thousands, of such highly measurable examples in the case of HIV (ref. 3, 4) and many other disorders[5]. We hope that this letter will catalyze greater interest in explaining why seemingly similar people respond so differently to the same challenges.

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