Babies: Measles and malformations . . . selecting the sex

Four viruses vindicated from causing birth defects

In recent years a number of viruses have been suspected of causing serious birth defects in unborn babies. To date one is well documented—the rubella (German measles) virus. Two are fairly well documented—the cytomegalovirus and a herpes simplex virus (also implicated in cancer). As a result of the widespread rubella epidemic of 1964-65, some 30,000 American women gave birth to babies with hearing loss, cataracts or heart malformations. Cytomegalovirus and herpes simplex virus have led to brain damage, deafness, blindness and other malformations of the central nervous system.

Some other viruses have also been tentatively linked with birth defects—the ordinary measles virus (not the same as the German measles virus), the chickenpox virus, the mumps virus and the infectious hepatitis virus. But case reports of their damage have been sporadic and selective, their epidemics have been poorly investigated and case findings by immunological tests have been of doubtful specificity.

Now a thorough study, reported in the Dec. 24-31 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, vindicates these four viruses from causing birth defects. However the author, Morris Siegel, an environmental specialist at the Downstate Medical Center in Brooklyn, cautions that the viruses can present other types of pregnancy problems.

Siegel designed his study so that he could follow pregnant women as soon as they were infected with chickenpox, measles, mumps or hepatitis. Virus-infected women were matched as soon as possible and as carefully as possible with noninfected pregnant women (controls). The women with virus infection and their matched counterparts were observed throughout pregnancy by a public health nurse, and their babies were examined by a physician shortly after birth and at ages one, two and five years for evidence of birth defects. Altogether 409 infected mothers gave birth to 372 babies, and 409 control mothers gave birth to 393 babies.

Siegel found no apparent difference in the incidence of birth defects between babies born to virus-infected mothers and those born to noninfected mothers. Their total rates were 2.2 percent and 2.3 percent respectively. The rates in specific virus and control groups varied from 1.7 percent to 1.6 percent for mumps, measles and hepatitis and from 3 percent to 3.4 percent for chickenpox. The most common defects, mental retardation and other nervous system problems, as well as multiple cases of deafness, were fairly equally distributed between babies born to infected mothers and those born to noninfected mothers and showed no distinctive concentration by period of pregnancy at onset of disease. In three cases major malformations were associated with viral disease in the last three months of pregnancy, namely mental retardation and mumps at term, deafness and chickenpox at 35 weeks of pregnancy. There was a single case of cataracts, associated with chickenpox in the eighth week of pregnancy. But on the whole, factors other than viruses appeared to have caused these isolated cases of defects because isolated defects cropped up among the control children as well. The only two cases of cardiac defects and mongolism occurred in controls.

Siegel believes that mothers who get chickenpox, mumps, measles or hepatitis have no need to contemplate a therapeutic abortion. "I realize that because of the abortion problem this is uppermost in the minds of some people. But since there is no evidence for an increase in defects following these four diseases, therapeutic abortions are not indicated."

Siegel does stress, however, that maternal infection with these viruses can cause harm other than birth defects. Infection increases the chance of premature delivery and fetal deaths. In a 1966 study, he found that hepatitis in the latter half of pregnancy resulted in an increase in prematurity and fetal deaths. This increase was attributed to the greater severity of the disease in the later stages of pregnancy. With measles, there was also a probable increase in prematurity that was due to an early onset of labor. In the case of mumps, an increase in fetal deaths followed onset of the disease in the first three months of pregnancy, which might have been caused by changes in the ovaries. In chickenpox, the ill effects seemed to be minimal, with the exception of an apparent increase in fetal deaths early in pregnancy when the mother's life was threatened. □

Frequency of Major Congenital Malformations in Virus and Control Groups

Maternal Disease	Virus Groups: No. of Children	Virus Groups: Defects No.	Virus Groups: Defects %	Control Groups: No. of Children	Control Groups: Defects No.	Control Groups: Defects %
Chickenpox	135	4	3.0	146	5	3.4
Mumps	117	2	1.7	122	2	1.6
Measles	60	1	1.7	62	1	1.6
Hepatitis	60	1	1.7	63	1	1.6
Total	**372**	**8**	2.2	**393**	**9**	2.3

Siegel/JAMA

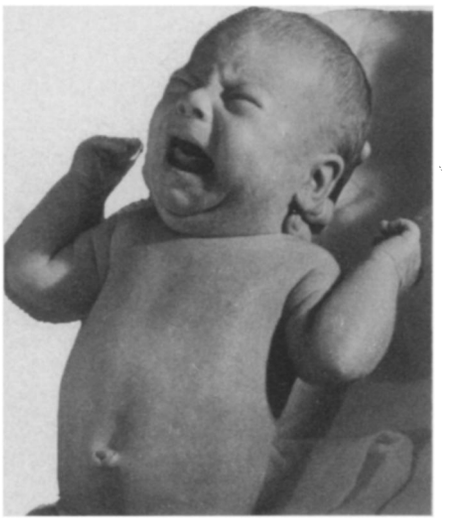
The virus-exposed children had no more defects than the control children.

Babymaking: Dress them in blue

German biologists have devised a method that may offer couples the option of making a baby boy rather than a baby girl, provided they're willing to reproduce by artificial insemination instead of in the time-honored way. Having the option to make more boys would be a boon to the many men who dream of siring a son, also to the many women who suffer from a worldwide male shortage (men being killed at war and dying earlier than women for other reasons).

A baby's sex is determined by the father, not by the mother. Sperm that contain an X chromosome confer the female sex on the eggs they fertilize. Sperm that contain a Y chromosome confer the male sex on the eggs they fertilize. Since X sperm are richer in DNA (genes) than are Y sperm, they're fatter than Y sperm. A. M. Roberts of

. . . movements echo speech



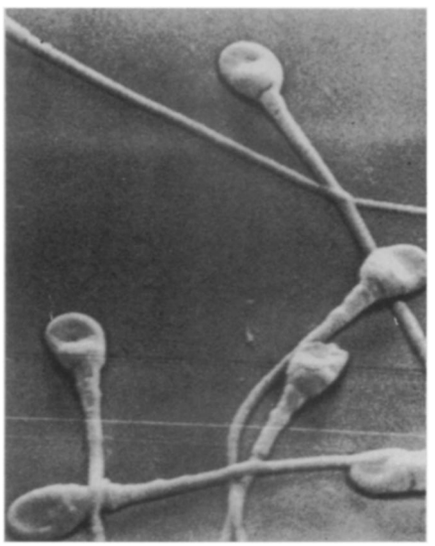
Guy's Hospital Medical School in London discovered in 1972 that X sperm swim slower than do sleeker Y sperm.

Roberts took sperm from a tube of seminal fluid, then poured the sperm back in the tube. He found that Y sperm moved down the tube more rapidly than X sperm did. Since male babies outnumber female babies in the ratio of 106 to 100, Roberts suggested that the difference might be due in part "to preferential progress of the lighter Y sperm through the female reproductive tract."

R. J. Ericsson, C. N. Langevin and M. Nishino of the A. G. Schering Co. in Berlin, Germany, have now built upon the work of Roberts and some other investigators. They have come up with a technique that progressively culls Y sperm from X sperm.

First they collect semen from human volunteers. They then spin sperm out of the seminal fluid and place the sperm in a special solution. The solution is dense and resists sperm swimming in it. So Y sperm are able to swim through the solution faster than X sperm can. As a result, the sperm they collect at the bottom of the solution are mostly Y sperm. They confirm this fact by fluorescence microscopy (sample sperm are stained and viewed under a fluorescence microscope, where Y sperm show up as bright dots). Then they reprocess the solution of Y-rich sperm, and again. Each time the resulting solution is richer in Y sperm. So far they've been able to collect sperm that are up to 85 percent the Y variety. Although they have not tested the sperm for fertility, they assume the sperm are fertile. Rabbit sperm subjected to similar isolation procedures are fertile.

". . . the isolation procedure," Ericsson and his co-workers report in a recent issue of NATURE, "is one that adapts to practical applications." In other words, provided Y sperm collected by this method are healthy and fertile, there is little reason why they could not be injected in the reproductive tracts of women and result in the conception of baby boys. □



A. G. Schering/Nature

Male-making Y sperm is more mobile.

Getting the rhythm of human speech

People talk with their hands. They also talk with their arms, legs, torso and almost every movable part of the body. An elliptical sentence is completed with a wave of the hand. An exclamation point or a question mark is added with a movement of the head. But there are hundreds of micromovements that go unnoticed. These also are important parts of speech. A frame-by-frame analysis of sound films of someone talking reveals these movements and shows that they are highly organized and specifically related to the structure of speech. This interaction of speech and body movement is called "self-synchrony."

People listen with their eyes. They also listen with their hands, arms, legs. . . . A close analysis of a listener reveals micromovements that are not detectable at normal communication speed. The listener, like the speaker, moves to the rhythm of the speech pattern. This is called "interactional synchrony."

Researchers at the Boston University Medical Center have found that infants begin learning these movements—and, therefore, the rhythms of speech—as soon as they are born and possibly in the womb. William S. Condon and Louis W. Sander report in the Jan. 11 SCIENCE experiments performed on infants, some only 12 hours old. Films of these infants showed that the movements of even the youngest correspond to adult speech patterns. It is hard to pick out the relationship, Condon explains, until you examine the films. But he says the total organization of the infant's behavior seems to synchronize with the speech pattern of the adult. The infant seems to be dancing to the rhythm of the articulatory structure of the adult voice. If the child is in motion before the talking starts, its movements lock into the sound. Head, elbows, shoulders, feet, hips and toes all pick up the rhythm.

The children did not respond in this fashion (though they did move) to the sound of disconnected vowels or tapping. They did respond to the Chinese language and to a tape recording of someone talking. It seems, says Condon, that they only synchronize with human speech patterns. The tape experiment showed that the children were not responding to the movement of the speaker and that the speaker was not talking in time to the child's movement.

If the infants are moving in precise, shared rhythm with the organization of the speech structure of the culture, they are participating in and practicing (millions of times) the form and structure of the language they will eventually learn. This, the researchers point out, may help explain how the richness and syntactic complexity of language behavior are learned.

Condon believes there may also be other implications. His work with autistic children, for instance, seems to indicate that they hear things twice and, therefore, react twice. Other children may react slowly or not at all. Eventually, he and his colleagues hope to be able to analyze an infant's movements in relation to speech and detect brain damage or developmental problems much earlier than is now possible. □