gist and the senior member of the research group, works, a sign warns: "Danger. Risk of Infection." Inside, Dr. Boudreault studies influenza. He has been doing so for more than 25 years, and is in evident good health.

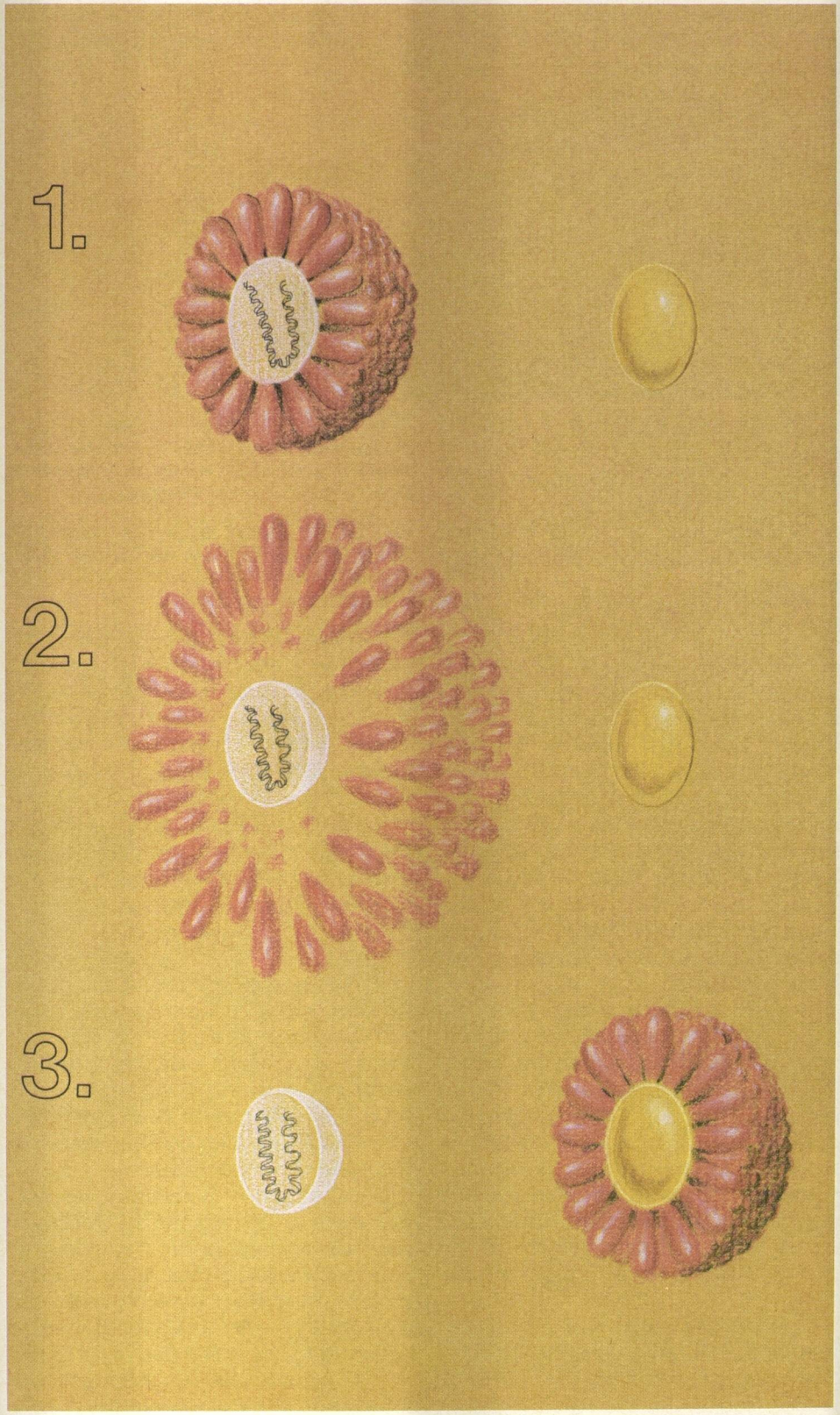
"A very important thing to know about any virus," he explains, "is its antigenic properties. By this we mean the surface features which the body's immune system recognizes as marking a foreign particle."

In his laboratory Dr. Boudreault removes the projecting spikes of protein which are characteristic of the influenza virus, and which give it, when magnified a hundred-thousand fold by an electron-microscope, the bristling look of a sea urchin.

The feat of rearranging these spikes on an artificial membrane is credited to Dr. Lise Thibodeau, a young and radiantly enthusiastic molecular biologist. "We weren't the first to think of immunosomes," she explains, "but we were the first to succeed in building them."

What she has discovered — and, with Dr. Boudreault, patented — is how to liberate these protein spikes, gently, one by one, from the star-like clusters which they form in a solution; and then how, using detergent, to persuade them to orient themselves around a tiny globule, like pins in a pincushion. These globules or liposomes were formed with biological molecules called phospholipids. "It's just biochemical cooking," is her offhand description of the technique with which she has already synthesized the artificial virus.

One reason why the Montreal team finds immunosomes exciting is that they can be made empty, without genes. Inside a real virus there is no room for any metabolic machinery, no room for anything except its bundle of genes. The genes are what make the virus potentially dangerous.



The influenza virus structure is very simple, just a long DNA molecule (the organism's genes) enclosed in a protein coat. Vaccines to influenza are made by inactivating the DNA, but leaving the structure of the protein coat intact; the coat stimulates the body's defence system. In rare cases the DNA retains its natural structure and the vaccine can infect the recipient with the disease. To be safe, the individual protein units of the coat are teased away, separated from the DNA, and regrouped around a fat globule called a liposome. Thus arrayed, much as in their native condition, they function as effective vaccines, but without the potentially dangerous DNA present. *(Illustration: John Bianchi)*

Le virus de la grippe a une structure très simple; il est constitué d'une longue molécule d'ADN contenant les gènes et entourée d'une enveloppe protéique. Les vaccins contre la grippe sont constitués de virus dont l'ADN a été inactivé mais dont l'enveloppe est conservée intacte, et c'est cette enveloppe qui stimule le système de défense de l'organisme. Il arrive parfois que l'ADN viral conserve sa structure naturelle et les vaccins qui contiennent ce matériel génétique actif sont alors susceptibles de communiquer au sujet inoculé la maladie qu'ils sont censés prévenir. Par mesure de sécurité, les éléments protéiques individuels sont détachés de l'enveloppe contenant l'ADN puis disposés autour d'un globule lipidique, appelé liposome, de la même façon que sur le virus original. Ces globules peuvent ainsi servir à la préparation de vaccins au même titre que de vrais virus et leur utilisation ne présente aucun risque étant donné qu'ils sont exempts d'ADN potentiellement dangereux. *(Illustration: John Bianchi)*