

Front cover legends



CENTER. Composition representing some of the marine protists studied by the researchers at the Arago Laboratory of Banyuls-sur-Mer, to which is devoted the Research Review by Marie-Odile Soyer-Gobillard in this issue (pp. 183-190). The image is composed by a foraminifer (possibly *Globigerina*), two species of dinoflagellates (*Ceratium* and *Ostreopsis*), and a diatom (unknown species) over a background of microflagellates (un-

known species). Photos by Rubén Duro, Center for Microbiological Research (CIM), Barcelona. (Magnification, 500×)

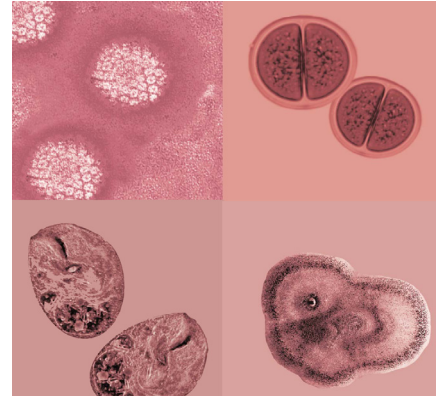
UPPER LEFT. Papillomavirus, the causal agent of several human diseases, some of them developing as cancers. Several Spanish groups perform outstanding research on this virus and on the illnesses that it causes. The definitive link between the presence of the papillomavirus and cervix cancer in women was established by Colombian physician and researcher Nubia Muñoz, in Lyon, France. (Magnification, 600,000×)

UPPER RIGHT. Dark field micrograph of the cyanobacterium *Chroococcus* sp., isolated from a freshwater pond. Note the envelope surrounding the paired cells. Photo by Rubén Duro, Center for Microbiological Research (CIM), Barcelona. (Magnification, 1500×)

LOWER LEFT. Dark field micrograph of the predator ciliate *Pseudoprodon* sp., isolated from a freshwater lake. Note the pieces of food inside the large digestive vacuoles and the small ciliate being engulfed near the cytostome of the cell on the left.

Photo by Rubén Duro, Center for Microbiological Research (CIM), Barcelona. (Magnification, 300×)

LOWER RIGHT. Macrograph of a growing colony of the mold *Aspergillus* sp. The colony is growing in a Petri dish. Note the whitish, button-like structure formed by a drop of liquid secreted by the sector on the left. Photo by Rubén Duro, Center for Microbiological Research (CIM), Barcelona. (Magnification, 1.4×)



Back cover: Pioneers in Microbiology

Paulina Beregoff (1902–1989), Colombia



Paulina Beregoff was the first woman to obtain a degree in medicine in Colombia. She was born in 1902 in Kiev—by then a city of the Russian Empire—, in an aristocratic family of Jewish descent. Due to the political situation in her country, she was educated in the United States, where, in 1921, she graduated in Bacteriology and Parasitology and Pharmacy and Chemistry at the University of Pennsylvania. She

started working at the laboratory of Pathology of that university and became a member of the Rivas Bacteriological Society of the University of Pennsylvania. In 1922, the Dean of the School of Medicine of the University of Cartagena, Colombia, asked the University of Pennsylvania for an expert in tropical diseases, including yellow fever. This disease was a great concern in Cartagena due to the high mortality rates it caused and because of the implications on the image of the city, which was a major commercial and harbor center. The University needed a qualified advisor that could also train local physicians, and the University of Pennsylvania chose Beregoff for that task. Once in Cartagena, she had to identify an epidemic outbreak that had been causing many fatalities, mostly among indigenous peoples living in the Magdalena River shores. Colombian physicians were not familiar with symptoms and causal agents of diseases such as yellow fever, typhoid fever and malaria, but thought that the epidemic outbreak could be due to one of them. Beregoff sent samples of cultures

from corpses of people killed by the disease to be analyzed at the University of Pennsylvania. The disease turned out to be *fiebre tifomalárica* and not simply malaria, as they first had considered. Beregoff thought that the infection depended mostly on the deficiencies or resistance of the immune system and proposed that physicians should work to prevent the disease. Once she had achieved her task, she intended to go back to Philadelphia to study medicine at Temple University, but she was asked to remain in Cartagena, where she could also study medicine. In 1922 she enrolled at the University of Cartagena under special conditions. Due to her previous studies and qualification, she could be waived the first two years of the studies of medicine. She set up the first laboratories of bacteriology and parasitology in Cartagena, with microscopes and other equipment donated by the University of Pennsylvania. Her thesis director recognized her great contribution, she having been able to differentiate the various species of Laveran's haematozoa, to observe the treponema causing yaws, to find the *Piroplasma Donovanii*, the parasite of Kala-Azar (visceral leishmaniasis) in the blood, and having been the first to isolate the "typhoid bacillus", confirming thus the presence of typhoid fever in town. She could also to properly perform the Wassermann technique on syphilis. The fact that she was a foreign woman and she had had some privileges in her medicine studies was criticized by some people. In 1933 she married bacteriologist Arthur Stanley Gillow and they moved to Canada. Since then she signed her publications as Pauline Beregoff-Gillow. After her husband's death, in 1964, she returned to Colombia and dedicated his husband's legacy to set up a foundation under his name that should work on preventive medicine. She died on September 20, 1989 and left her fortune to the foundation.