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**COVER LEGEND**

Joseph W. Beard (b. 1901) and W. Ray Bryan (b. 1905) played pioneering roles in the science of tumor virology, contributing more than 40 years to teaching and research on the role of viruses in various animal cancers. They made major contributions in the area of avian cancer viruses.

Dr. Beard was one of the first scientists to study the role of host susceptibility in the induction of cancer by viruses. Working with Peyton Rous, Richard Shope, and associates in New York in the 1930's, he helped demonstrate that a usually benign rabbit tumor caused by a virus sometimes becomes cancerous. Later, he and Rous purified the causative virus. In 1937, Beard helped develop the first useful vaccine for equine encephalitis. He established his research group at Duke University in North Carolina and taught experimental surgery until 1960. In the 1940's by applying the differential centrifugation methods of Albert Claude, Beard and his associates purified the influenza and mumps viruses of humans and a similar virus which causes Newcastle disease in chickens. Since 1949, his work has been devoted primarily to the avian tumor viruses, particularly two leukemia viruses of the chicken, avian myeloblastosis, and erythroblastosis viruses.

Dr. Bryan laid much of the groundwork for today's quantitative research on cancer viruses by applying statistical techniques to the study of viruses in animal cancers. As early as the 1930's, while a National Cancer Institute Research Fellow working at Duke University under Beard, Bryan studied the relationship between amount of Shope virus inoculated and the development of rabbit papillomas. In the early 1940's at the National Cancer Institute, he also analyzed the effects of cancer-causing chemicals on mice and helped show that the mouse breast cancer "agent" was, in fact, a filterable virus.

Bryan turned to the study of Rous sarcoma virus, a solid tumor virus of the chicken, in the 1950's. By applying statistical methods, he demonstrated correlations between the amount of virus inoculated into a chicken, the time to appearance of a tumor, and the amount of virus recoverable from that tumor. On occasion, very small amounts of virus would induce tumors from which no virus was recoverable, establishing the concept that absence of demonstrable virus in tumor tissue extracts does not prove that a tumor is not of viral origin.

The quantitative methods and principles of virus dose and tumor response established by these two leaders of animal cancer virology have enabled others to confirm and extend their studies of leukemias and solid tumors in mammals. Today, viruses of RNA type studied by Beard and Bryan in avian cancers are known to cause many kinds of cancers in mammals and are increasingly suspect as having a role in human cancers.

Now retired from his faculty and research positions at Duke University, Dr. Beard continues to study avian myeloblastosis in St. Petersburg, Florida. Dr. Bryan, retired after 34 years with the National Cancer Institute, now serves as a consultant to the National Cancer Program in Bethesda, Maryland.

We are indebted to the National Cancer Institute for the portraits of Beard (top) and Bryan (bottom) and for the electron microscope photograph, at \(\times 70,000\), of the BA1 strain of avian myeloblastosis virus.