

Evolution of Tumor Viruses

Angelo Kontgas¹, Bino John²

¹Chemistry and Biochemistry Department,
Utah State University, Logan, UT 84322 USA

²Department of Computational Biology, School of Medicine,
University of Pittsburgh, Pittsburgh, PA 15213 USA

Several viruses that predispose humans and animals to the development of cancer are known. We hypothesized that such viruses may have common genomic signatures that help promote tumorigenesis in their hosts. Therefore, we investigated whether sequence elements that are conserved between humans and a set of 12 cancer-associated viruses and can be identified. The Mouse Mammary Tumor virus (MMTV), in stark contrast to all other 11 viruses displayed significant sequence similarity to the human genome. We identified 28 instances of similarity between MMTV and human genome. Four unique segments of MMTV DNA are incorporated at 28 locations in the human genome. One of the four MMTV segments is also evolutionarily preserved in three other cancer-associated viruses. Evolutionary analysis of the viral segments and the human DNA indicate that humans were originally infected by a variant of this virus through the consumption of animal milk.