

**Next generation of biomarkers: Serum antibody repertoire profiling using next generation sequencing**

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The promising idea of using serum antibodies for diagnosis of cancer is hampered by the heterogeneity of immune response against tumors and by low frequency of serum antibodies against particular autoantigens in cancer patients. The low diagnostic value of serum antibodies against tumor-associated autoantigens is the result of the limitations of the methods used for the detecting antibody responses. Current methods of antibody reactivity are designed for detecting high affinity and/or high titer antibodies. However, a growing tumor may induce a variety of low affinity and low titer autoantibodies which can not be detected by these methods.

We developed a strategy for serum antibody repertoire profiling, which allows detecting high affinity/high titer as well as low affinity/low titer autoantibodies in serum samples. This strategy, which we call virtual antigen array, is based on using random peptide phage display library panning on serum antibodies and NextGen sequencing of DNA from antibody bound phage. The iterative and amplificative nature of phage selection permits identification of antibodies with a broad range of affinities. The next generation sequencing of PCR amplified DNA from antibody bound phage permits detection of binding of a single antibody to a single peptide. The identity of the autoantigens recognized by serum autoantibodies is identified by using statistical analysis of BLAST homology search data for peptide sequences recognized by serum antibodies. The proposed strategy can be used for developing assays for early detection of cancer and prognosis of clinical outcomes and responses to therapies.

**Biography**

Yurij Ionov has completed his Ph.D at the Institute of Genetics and Selection of Industrial Microorganisms (Moscow, Russia). He did his postdoctoral studies at California Institute of Biological Research where he has made his contribution to the discovery of microsatellite instability in colon cancer. He is the Assistant Professor of Oncology at Roswell Park Cancer Institute in Buffalo NY.