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Dear ,

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MESSAGE FROM NEIL B. GODICK

This month we focus on Russia's work in health sciences. I mentioned last month - Russia has adopted a technology policy to develop those technologies that will enable it to compete in seven world markets. One of these industry targets is health sciences. Russia has a different and less stringent registration process for new vaccines, drugs, diagnostics, and devices than the EU and US. You will see that in the summaries below.

We do not intend for these reports to solve any need our readers may have. We do intend to keep everyone current on technology developments in Russia. If you would like any additional information on any of the developments reported – send us a note

Health Sciences

Anti-HIV Vaccine

Vladimir Orlovsky, Chief Surgeon of the Novosibirsk Oblast Center for prevention and control of AIDS and contagious diseases Scientists of Novosibirsk Research Center, *Vektor*, reported that *Vektor* has developed a vaccine against human immunodeficiency virus (HIV). He said: "We can now definitely declare that, by developing that vaccine, our scientists made a great step forward. The new preparation might not be 100% effective but it marks great progress". Orlovsky added that it was the first successful attempt to develop an anti-HIV infection vaccine in Russia.

Compared to the *candidate-vaccines* earlier developed outside Russia, this preparation has several significant differences. In particular, it is polymorphous and therefore one can be more confident that it will be effective. The difficulty lies in the fact that the HIV changes, while the goal of any vaccine is to produce stable immunity. The Center scientists are now conducting clinical tests.

Natural compounds in the development of new-generation drugs

The Pacific Institute of Bioorganic Chemistry, RAS (Far-Eastern Branch) and Novosibirsk Institute of Organic Chemistry, RAS (Siberian Branch) have completed studies of low-molecular bioregulators aimed at the structural identification and investigation of natural compounds 'physiological activity, and investigation of the

chemical conversion of these substances into compounds with an extremely high physiological activity.

Either by separation from natural biological sources or synthesis they obtained over a thousand new natural compounds, their derivatives and analogs. It was possible to establish the chemical structure of these substances. The compounds studied displayed unique properties, e.g. high anticarcinogenic, nootropic, neuritogenic, antiviral (including AIDS virus) and antitumor biological activity.

The findings of these two institutes resulted in the development of a series of new Russian drugs (*Gistokhrom for cardiology*, *Gistokhrom for ophthalmology*, *Maksar*, *Kollagenaza KK*, etc.). New potential drugs are under development, including *Betulavir*, *Kumazid*, *Translam*, *Biomaksar* and others that are now at different stages of preclinical and clinical tests. Biologically active food supplements permitted for production and application in Russia were also developed.

Nanotechnologies triumph over infarction

The *trombovazim* preparation that prevents infarction and stroke was developed by scientists of the Institute of Cytology and Genetics, Institute of Nuclear Physics and Siberian Center of Pharmacology and Biotechnology. It was developed by using cathode-ray technology and nanotechnology. *Trombovazim* is not toxic, it does no damage to healthy body tissues. It does not cause complications like some of its analogs. The drug has already passed preclinical and clinical tests and is approved for production.

Andrey Artamonov, member of the Board of Directors, Siberian Center of Pharmacology and Biotechnology says: "This is the world's first peroral tableted thrombolytic that is absorbed in the gastrointestinal tract".

According to Gennady Kulipanov, Deputy Director of the Institute of Nuclear Physics, RAS (Siberian Branch), "these technologies make it possible to obtain a nanosized biopolymer artificial structure, with a certain drug cross-linked on it."

Early detection of malignant tumors

Scientists of Rostov Research Institute of Oncology (RRIO) have discovered how to detect a growing malignant tumor at the earliest stages. A singular marker that signals active development of a disease turned out to be nitrogen oxide. Its content in the blood plasma of cancer patients goes up even at the preclinical stage.

24 patients of the RRIO neuro-oncology ward took part in the experiments staged by scientists of the Russian Fund for Fundamental Studies. Among them were patients with malignant tumors of the mammary gland, lung, kidney, thyroid gland and with melanoma.

The control group included several people without cancer pathologies. Tests were made to determine the nitrogen oxide derivatives content in the blood plasma of all the patients. It was found that in patients with metastases the nitrogen oxide derivatives content in the blood plasma was much higher than that in healthy people. Moreover, this substance affects the growth of vessels inside tumors, the growth of tumors themselves and the process of apoptosis, (programmed cell death). Its level depends on the efficiency of treatment. Since the level of nitrogen oxide increases even before clinicians are able to register primary tumor growth, the Rostov oncologists suggest using this indicator to predict the disease.

Laser Technology

Remote-action laser

A St. Petersburg area company has developed a laser that is able to remotely (through the windshield) determine the presence of alcohol vapors inside a moving vehicle. At the same time, it is capable of distinguishing alcohol vapors inside the vehicle from other alcohol-containing liquids that are, for example, used for cleaning glass. The minimum concentration of alcohol detected by the device is about 1 ppm.

Computer Sciences

A unique computer integrated circuit

The integrated circuit developed by scientists of NII of Information Technologies (Vladivostok) was the winner at the international exhibition of innovation technologies in microelectronics *ChipEXPO-2007* held in Moscow.

According to Konstantin Radchuk, spokesman for NII, what was presented at the exhibition was a pilot sample of their invention – chip for a new current amplifier. The invention is an electronic component serving as the base for high-speed computer fuzzy processors on ternary logic. Application of this chip helps increase the speed of data processing more than thousand-fold.

Similar circuits developed in the USSR back in the 1960's required vast rooms to house them, as special semiconductors were not yet available. The application area of this new technology is very wide. The chip can be used in engineering systems of vehicles, rocket and space engineering, machine-building, power engineering, computer engineering, management, communication and information systems, and medicine. The invention has already attracted the attention of specialists working for the RF Ministry of Industry and Power Engineering, as well as Ministry of Defense.