in combination with HAART, adequate CT to type and stage of lymphoma, and Rituximab in CD20 B-cell lymphomas improved overall survival rate. Usage of Rituximab reduced the probability of progression of CD20 B-cell lymphoma in HIV infected individuals.

Epstein–Barr virus and HIV-associated lymphomas

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Three main factors of the development of lymphomas in immunosuppressed patients are recognized: immune dysfunctions, oncogenic viruses (Epstein-Barr virus and type 8 herpesvirus), and molecular and cytogenetic anomalies associated with HIV infection (Besson et al., 2003; Martinez, 2011). EBV is oncogenic: it is able to transform B-cells *in vitro* into immortal lymphoblastoid cell lines. EBV genome is found in 30–70% of HIV-associated non-Hodgkin lymphomas, depending on their histological types, and in virtually all Hodgkin lymphomas. HIV influences the development of lymphomas indirectly, since it does not infect tumor cells (Besson et al., 2003; Pivnik et al., 2014). Nevertheless, HIV compromises viral setpoint by suppressing the cellular immunity (Rickinson et al., 1997; Harty et al., 2000) and thus promoting EBV reactivation. In the course of advancing of HIV infection, the initial drastic increase in VEB replication is followed by a slow increase in EBV load in the course of chronic HIV infection (Piriou et al.,2004). The loss of control over EBV results in the expansion of the population of infected lymphocytes and in the development of a lymphoproliferative state (Moses et al., 1998). In patients having HIV-associated lymphomas, EBV loads are higher (>2500 copies per 1 mL) than in controls (Fan et al., 2005), and this is associated with the presence of a lymphoma. High EBV loads found several months before a lymphoma has developed are associated with that the risk of the development of HIV-associated lymphomas, including systemic B-lymphomas, increases (Leruez-Ville et al., 2012). Also, a negative correlation is found between EBV load and CD4 cell counts (Bonnet et al., 2006; Amiel et al., 2009). In their turn, the titers of VCA and EBNA-1 IgG antibodies increase. These serological parameters and EBV load may serve as indirect prognostic markers, albeit week, for managing HIV patients.

Some aspects of the HIV replication inhibitors design: depot forms and new acyclic nucleotide analogues

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There are about 30 currently used drugs against HIV. Since the approval of the first-in-class anti-HIV drug 3'-azido-3'-deoxythymidine (AZT), nucleoside and nucleotide analogues have gained much attention, even now, with new classes of antivirals found. This conservative therapy is the most affordable; currently used drugs offer such pharmaceutical benefits as good water solubility, inexpensive synthesis, thoroughly studied mechanisms of action and resistance. Nevertheless, 30 years on, the topic remains: to make nucleosides and nucleotides less toxic in the long-term treatment. Therefore, prodrug and depot-form approaches have been developed.

We have synthesized two types of prodrugs based on phosphonate and carbamate derivatives that allowed us to lower the toxicity of AZT and L-2',3'-dideoxy-3'-thiacytidine (3TC) and tested them in cell cultures and animal models. We consider that 5'-O-AZT morpholinocarbamate, 5'-O,O'-bis-AZT fluoromethylphosphonate and 5'-O-3TC H-phosphonate are most potent prodrugs of these series.

More of ten than not, several viruses occur in a HIV-infected patient simultaneously, e.g., over 80% of patients suffer from herpes and other virus-induced infections. Search for substances with combined activity against different types of viruses is inevitable. Herein, we report synthesis of new acyclic nucleoside phosphonate analogues bearing unsaturated fragments in the chain. Phosphonate moiety is a useful bypass of the limiting first phosphorylation step, besides, it does not undergo enzymatic hydrolysis as natural phosphates do. The problem of a selective phosphonate attachment may be solved by the «click»-reaction with carbonyl group forming the oximes. Oximes are rarely used in drug design and yet their conformational rigidness and their stability in hydrolytic tests may be useful for nucleoside side chain drug design. One of the synthesized series is oxime-containing nucleoside phosphonates with activity against several types of viruses: 9-{2-[(phosphonomethyl)oximino]ethyl}adenine, -guanine and 9-{2-[(phosphonomethyl)oximino]propyl}adenine.

FOF1 ATP synthase, a Therapeutic Target for AIDS Associated Lymphoma: Design of New Inhibitors

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AIDS is associated with a plethora of diseases among which an aggressive lymphoma is a major cause of lethality. In particular, the frequency of Hodgkin's lymphoma increases sixfold in AIDS patients compared to general cohort. About 1% of total newly diagnosed cancer cases, or one per 25 000 individuals, has been reported to be due to Hodgkin's lymphoma. Treatment of this form is complicated by immunodeficiency.

We propose to develop a drug candidate that inhibits energy metabolism in malignant cells, thereby causing their death. Two targets will be blocked, that is, the serine-threo-