WPD Pharmaceuticals

OCTOBER 2020 | INVESTOR PRESENTATION

CSE:WBIO

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Such results, studies or data may not be duplicable in the future. Certain expressions of results, studies or past discoveries may also be anecdotal and non-reproducible in future studies designed specifically to test the robustness, strength or veracity of such results, studies or data. No representation herein is designed to convey any claim regarding the safety or efficacy of any compound owned or licensed by the Company. Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the future events and trends may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements.

Company **Overview**

WPD Pharmaceuticals is a diverse biotech company that has 10 novel drug candidates with 4 in clinical development stage via its development partners. WPD drug candidates are in collaboration via its development partners with institutions including MD Anderson Cancer Center, Mayo Clinic, Emory University, Wake Forest University and leading hospitals and academic centers in Poland.

Alongside direct and indirect investment of $71 million, over $29 million of grant funding (total of $100 million USD) has gone towards the development of our robust drug development pipeline with a focus on melanoma, brain cancer, leukemia and pancreatic cancer. Notably, add to this investment figure $14 million USD in grants recently awarded to WPD Pharmaceuticals from The National Centre for Research and Development in Poland.

With a groundswell of multi-continental grant support and a diverse portfolio of potentially breakthrough drug technologies, WPD Pharmaceuticals, we believer, is now strategically positioned to enter the market with blockbuster potential.

Investment **Highlights**

Experienced Management & Advisors

Team of scientists with extensive pharmaceutical experience

Robust Drug Portfolio

10 novel drug candidates across 5 indications

Strategic Collaborations

Wake Forest University Health Sciences, Moleculin Biotech Inc. and CNS Pharmaceuticals, Inc.

Rapidly Growing Operations

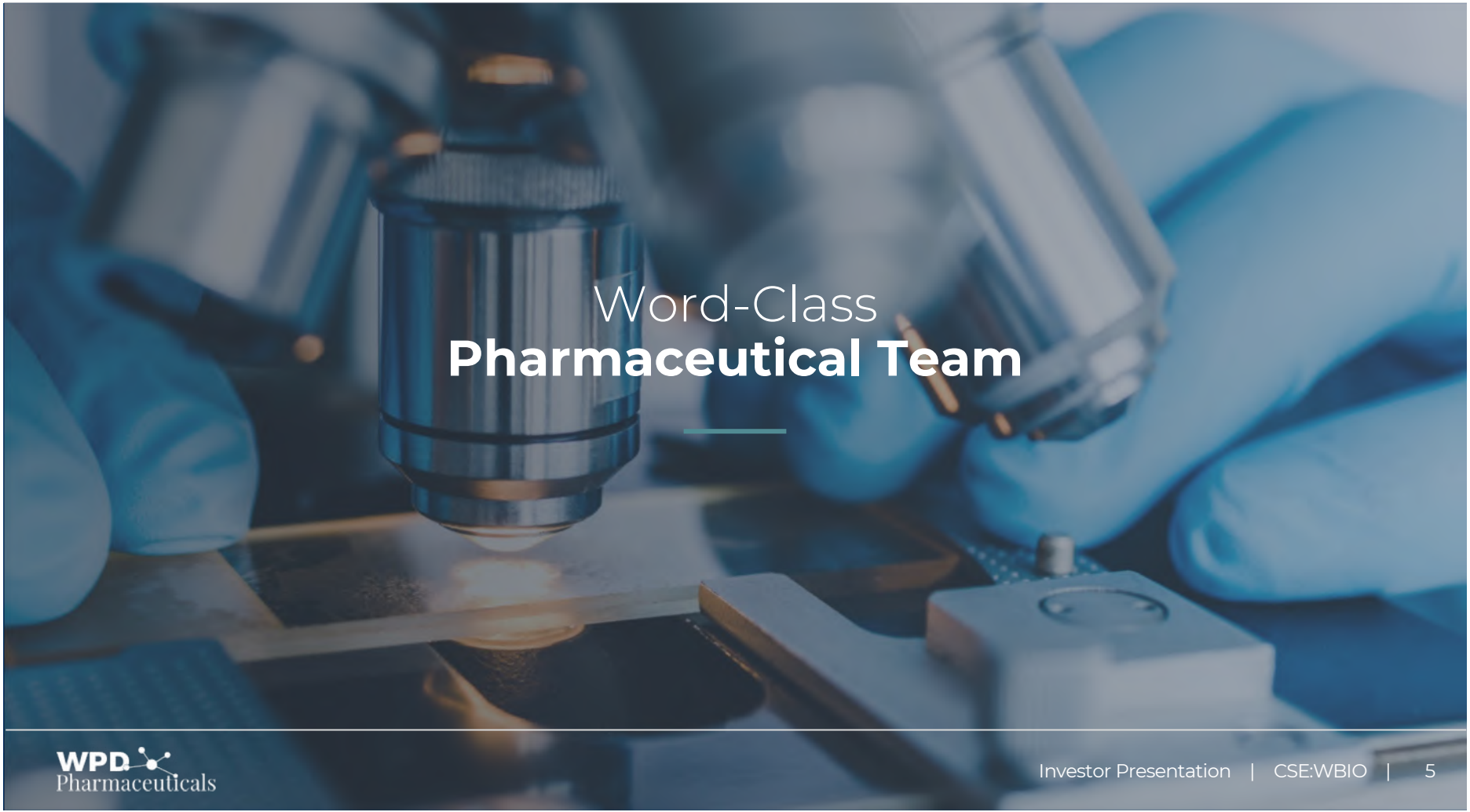
4 drugs in clinical development

Tightly Held Share Structure

Management and Insiders hold ~ 36%

Attractive Valuation

Discount to industry peers



Word-Class
Pharmaceutical Team

Mariusz **Olejniczak**

CHIEF EXECUTIVE OFFICER

Mariusz Olejniczak, CEO of WPD Pharmaceuticals is an experienced professional in medicinal products, medical devices, supplements and plant protection products R&D at every stage - from planning and scientific advice through supervision to the closure and finalization of the project. He is a founder of several start-ups in the e-health industry and a member of the board and supervisory board of several R&D companies. He was also responsible for the acquisition of Bioscience SA. (a CRO operating in Poland) by the Neuca group.

Walter **Klemp**

BOARD MEMBER

Mr. Klemp has 29 years of experience in start-up and high-growth companies, the past nine of which have been spent developing FDA-approved dermatology therapy devices and topical compounds. Mr. Klemp has been the Founder and CEO for Moleculin Biotech, Inc. (Nasdaq: MBRX) since 2007 and also President and CEO of Zeno Corporation from 2004 to 2010, where he successfully developed and marketed a number of dermatology devices and drugs from concept through FDA approval.

Beata **Pająk**

CHIEF SCIENTIFIC OFFICER

Beata Pajak, DSc, PhD is a biotechnologist with experience in the field of medical biology, including: oncology, virology, pathophysiology of neurodegenerative diseases and skeletal muscle physiology. Expert in the field of signal pathways, mechanisms of programmed cell death, chemo- and immuno-resistance of cancer cells. Head and team member in research and implementation projects.

Peter **Novak**

BOARD MEMBER

Mr. Novak is a 30-year veteran of the insurance and financial services industry, he is currently the General Agent of one of MassMutual's largest agencies with $4.8 billion in assets under management. He previously served as general agent to MassMutual's Rochester agency; co-general agent at The New England/Robinson Co. in Waterbury, Connecticut; and as an agent at the New York Life Insurance Company.

Scientific Advisory Board

Dr. Waldemar **Priebe**

FOUNDER, CHAIRMAN OF SCIENTIFIC ADVISORY BOARD

Dr. Waldemar Priebe, Ph.D., is a world renowned medicinal chemist and entrepreneur. Dr. Priebe is a Professor of Medicinal Chemistry in the Department of Experimental Therapeutics at MD Anderson Cancer Center, Houston, TX.

Dr. Priebe is the inventor of more than 50 patents, the author of more than 200 scientific publications, and discoverer of five drugs that have reached clinical studies in humans. As the founder or founding scientist of 6 pharmaceutical companies, including three listed on Nasdaq, Dr. Priebe has been integral in advancing multiple drugs through the preclinical pipeline and clinical development.

Notably, Dr. Priebe was one of the founding scientists of Reata Pharmaceuticals, which has grown into a $5.5 Billion, Nasdaq listed, pharmaceutical powerhouse.

Dr. Sigmund **Hsu**

SCIENTIFIC ADVISORY BOARD

Dr. Tomasz **Skorski**

SCIENTIFIC ADVISORY BOARD

Dr. Donald **Picker**

SCIENTIFIC ADVISORY BOARD

Dr. Sandra L. **Silberman**

SCIENTIFIC ADVISORY BOARD


10 Drugs
5 Indications

	Discovery	Pre-Clinical	Regulatory	Clinical I / II
Brain Cancers		WPD101		Berubicin
				WP1066
Pancreatic Cancers		WP1122	WP1066	
		WP1234	WP1732	
Other Cancers	WPD103			Annamycin
				WP1220
Melanoma	WPD102			

WPD101 - Indications to Treat **Brain Cancers** including **Glioblastoma**

OVERVIEW

The breakthrough of the solution is based on the use of GBM-targeted therapy against IL-13RA2 and EphA2 - brain tumor-specific receptors conjugated with bacterial cytotoxins. It is well known, that interluekin-13 receptor alpha 2 (IL13RA2) is a receptor that is abundantly overexpressed in over 75% of GBMs but absent in normal brain tissue. It is estimated that IL-13RA2 overexpression is reported in >50% of GBM cases. Similarly, EphA2 is cancer specific receptor recognized by ephrin A1 cytokine. Its overexpression is also a hallmark of GBM cells, thus EphA2 receptors are proposed as treatment targets (Wykosky et al., 2005, 2007, Ferluga et al., 2016). It is assumed that more than 90% of GBM overexpress at least of the receptors (Wykosky et al., 2008).

STRATEGY

Immunotoxins are fusion proteins comprised of a toxic moiety and a targeting moiety, that allows concentration of the fusion protein at the plasma membrane of specific cell types.

WPD101 is a unique drug cocktail composed of two immunotoxins targeting simultaneously IL-13RA2 and EphA2 receptors. This strategy guarantees specific drug administration to the majority of GBM cells. Furthermore, to increase tissue distribution, minimize possible side-effects and overcome BBB difficulties, convection-enhanced delivery (CED) of WPD101, directly to the brain tumor will be applied (Debinski and Tatter, 2009)

WPD101

CURRENT STATUS

WPD101 is currently in the preclinical stage of development. Its consistent anticancer properties are demonstrated and validated in dogs with spontaneous GBM closely resembling GBM in human patients. Overall, results of the research indicate significant potential of WPD101 demonstrating the same effective treatment of GBM in humans.

LICENSE

On November 28, 2017, WPD signed a license agreement (the “Wake Forest License Agreement”) with Wake Forest University of Health Sciences (WFUHS). WPD granted an exclusive, worldwide, royalty-bearing license under certain patented and patent-pending technologies for the diagnosis and treatment of GBM, to make, use, import, offer for sale and sell licensed pharmaceutical products, including the right to sublicense its rights under the Wake Forest License Agreement, subject to WFUHS’ retained right to make, have made, and use licensed products solely for non-commercial, educational, academic, and research purposes. The term of the Wake Forest License Agreement is for the life of the licensed patents.

WPD101

FUNDING

In February 2018, WPD received a grant from the European Union, under the European Regional Development Fund, the Smart Growth Operational Program 2014-2020, implemented under the National Center for Research and Development in Poland (NCBiR) for the development of WPD101 that would include Phase I clinical studies in GBM tumors. Management expects this grant to cover 70 – 80% of all research and development costs for the next 2-3 years. Total estimated costs associated with the WPD101 phase I clinical trials are 33,699,206 PLN (CDN$11,457,730), comprised of pre-clinical costs of 6,992,609 PLN (CDN$2,377,487), clinical costs of 17,724,943 PLN (CDN$6,026,480), and lab development/manufacturing costs of 8,982,653 PLN (CDN$3,054,102).

WPD102 - Indications to Treat **Uveal Melanoma**

OVERVIEW

Uveal melanoma (UM), a rare but deadly cancer of the eye that often rapidly progresses to the liver is characterized by the expression of the tumor-specific receptors IL-13RA2. The breakthrough of WPD Pharmaceuticals' solution will be based on the use of targeted therapy against IL-13RA2 by recombinant IL-13 conjugated to a cytotoxic load. Recombinant cytokines preferentially bound to tumor-specific receptors will allow for highly specific targeting of UM cells and their further elimination due to chemically induced intracellular cytotoxic effects. What's more, the planned method of administering WPD102 directly to the tumor tissue should be an advantage over standard intravenous administration, thanks to which patients may avoid the side effects associated with standard chemotherapy. The Project's result should allow patients access to innovative molecular targeted therapies as an alternative to conventional treatment.

PRECLINICAL DEVELOPMENT

Preclinical studies on patients-derived uveal melanoma cell lines confirmed for the first time the high expression of transmembrane IL-13RA2 receptors, making uveal melanoma strong candidate for IL-13-RA2-targeted therapy. Our current efforts are focused on proof-of-concept studies. Due to cooperation with Jagiellonian University in Krakow, WPD Pharmaceuticals has already finished the first *in vivo* experiment using well established rabbit eye model for uveal melanoma. Animal-obtained material is under scrutiny in our labs and next experiment, with modified delivery protocol will be proceeded shortly.

WPD102

CLINICAL DEVELOPMENT

WPD102 is currently in preclinical development and based on the data obtained from *in vitro* studies using cancer cell lines, we see significant potential for WPD102 for the treatment of uveal melanoma in humans. A Phase I clinical trial is expected to begin in 2021-22.

LICENSE

WPD102 fall under the license agreement (the “Wake Forest License Agreement”) with WFUHS granting WPD an exclusive, worldwide, royalty-bearing license under certain patented and patent-pending technologies for the diagnosis and treatment.

WPD103 - Indications to Treat **GBM**, **Melanoma**, & **Other Cancers**

OVERVIEW

WPD103 is a radiopharmaceutical that is expected to be a new diagnostic tool and targeted therapy drug. In cooperation with Institute of Nuclear Chemistry and Technology, WPD Pharmaceuticals is going to submit grant proposal to National Center of Science (NCN) in Poland. WPD will provide proteins having high affinity for the IL13RA2 receptor for conjugation with low-molecular ^{89}Zr carriers. Developed constructs will be used in PET, to image metastases of uveal melanoma (UM) and other cancers characterized by IL-13RA2 overexpression. A unique advantage concerning the planned research is the use of the mutated variant of interleukin 13 (IL-13), the IL-13RA2-targeted quadruple mutant of IL-13 (TQM13, IL-$13^{E13K/R66D/S69D/K105R}$) that has been shown to bind to oncogenic IL-13RA2, but not to IL-13RA1/IL-4RA heterodimer (Sattiraju et al., 2017, Debinski and Thompson, 1999).

The solution falls within the scope of theragnostic, a novel approach combining diagnostics with cancer therapy. We believe, that with no other curative options availableWPD103 may have the potential for an early approval and to become a highly effective and safe therapy for different types of tumors. The most sensitive and accurate of currently used 3D radiographic visualization methods is positron emission tomography (PET). It involves detecting gamma quantum pairs that are emitted by the positron-electron annihilation reaction. However, the most important issue with positron tomography is to design a highly selective marker that precisely locates within tumor cells.

WPD103

CLINICAL DEVELOPMENT

WPD103 is currently in preclinical development and based on the data obtained from *in vitro* studies using cancer cell lines and WPD101 in spontaneous GBM dog model studies, we see significant potential for WPD103 in diagnostics and therapy in humans. Phase I clinical trial is expected to begin in 2022-23. WPD started developing a scientific program and grant proposal for submission in 2020 that will be followed by submission in upcoming years to the EMA for the phase I/II clinical trials. To support the preclinical WPD102 development, grant proposal in under preparation and will be submitted to National Center of Science (NCN) in Poland.

LICENSE

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BERUBICIN - Indications to Treat **Glioblastoma**

OVERVIEW

Berubicin (BER) is a new anthracycline proven to be able to reach brain tumors by crossing the blood brain barrier (BBB) (Inge et al., 2004). Thanks to this unique property, BER is a drug developed in the treatment of glioblastoma multiforme (GBM). Phase I clinical studies showed promising therapeutic effects in the GBM patients with one complete response. BER, like L-Ann and other anthracyclines, mechanism of action is based on alkylation and destruction of the DNA structure, generation of free radicals, apoptosis induction and direct damage to the membrane of cancer cell (Wu et al., 2004). Moreover, the covalent, biologically inactive BER-DNA-topo II complex prevents the DNA strands from reconnecting, which leads to their fragmentation and thus leads to cell death. Also, Berubicin has strong cytotoxic effects on tumor cells with high MDR1/P-gp protein expression, which significantly limits the effectiveness of others chemotherapeutics (Brooks et al., 2007). Common side effects of anthracyclines, cardio and cytotoxicity, are not expressed by BER in relation to normal cells, as required by FDA preclinical tests (Sterba et al. 2013). These properties allow BER to be considered as a candidate for pediatric therapy when long-term effects of chemotherapeutic agents are of key importance.

BERUBICIN

CLINICAL DEVELOPMENT

WPD Pharmaceuticals conducts research related to the development of the WPD104 molecule - berubicin, as a novel drug in glioblastoma multiforme (GBM) therapy for children and adult patients, as a part of the project “New approach to glioblastoma treatment addressing the critical unmet medical need”. The main goal of the project is to implement the multicenter pediatric phase I clinical trial (“First In Children”) to determine maximum tolerated dose (MTD) and phase Ib and phase II clinical trials in adults, in order to confirm the efficacy of Berubicin, an innovative drug to eliminate brain cancer cells that are resistant to temozolomide – a standard chemotherapeutic. The project also provides for preclinical testing to determine the prospective use of berubicin with temozolomide and with other compounds developed by the WPD Pharmaceuticals as candidates for anticancer drugs.

LICENSE

WPD owns the exclusive license from the CNS Pharmaceuticals, LLC. The sublicensed territories are Poland, Estonia, Latvia, Lithuania, Belarus, Ukraine, Moldova, Romania, Bulgaria, Serbia, Macedonia, Albania, Armenia, Azerbaijan, Georgia, Montenegro, Bosnia, Croatia, Slovenia, Slovakia, Czech Republic, Hungary, Chechnya, Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Greece, Austria, and Russia.

BERUBICIN

FUNDING

On January 31, 2019, WPD received notice that it had been awarded a conditional grant in the amount of 22,033,066 PLN (CDN$7,625,287 as at July 22, 2019) from the European Union's Regional Development Fund ("EURDF") under the Smart Growth Operational Program 2014-2020, Sectoral Program InnoNeuroPharm, Priority Axis I: Support R&D carried out by enterprises, Measure 1.2: Sectoral R&D Programs, implemented under the National Center for Research and Development, for development of its drug Berubicin hydrochloride, which is utilized via injection as a novel drug in GBM therapy for children and adult patients.

ANNAMYCIN - Indications to treat **AML**, metastasis to **lungs**

OVERVIEW

Annamycin is a derivative of doxorubicin, which, due to its high affinity for the cell membrane of liposomes, facilitates rapid penetration of the drug and effective delivery of Annamycin to cancer cells, effectively limiting adverse effects on myocardial cells. In addition, Annamycin has strong cytotoxic effects on tumor cells with high MDR1/P-gp protein expression, which significantly limits the effectiveness of the liposomal form of doxorubicin (Kolonias et al., 1999). *In vitro* and *in vivo* preclinical studies have shown the high cytotoxicity of Annamycin against many types of cancer (breast, cervix, melanoma, AML). The mechanism of action of Annamycin is based on binding to DNA and inhibiting the function of topoisomerase II leading to the formation of double-stranded DNA breaks (Gruber et al., 2007, Trevino et al., 2004), inhibition of survival pathways and the induction of cell apoptosis (Gruber et al. 2008).

CLINICAL DEVELOPMENT

Annamycin was originally developed for the treatment of relapsed or refractory acute myeloid leukemia (AML) and was tested in 6 prior clinical trials where 114 patients were treated (Wetzler et al.,2013). Low incidence of side effects, especially cardiotoxicity, was observed after L-ANN (liposomal Annamycin formulation) administration, which is a unique feature among anthracyclines. Annamycin is in a Phase I trial for AML in Poland. It is reported in dose escalation studies evaluating safety and activity. The US trial for Annamycin has been successfully concluded.

ANNAMYCIN

FUNDING

WPD Pharmaceuticals already submitted grant proposal to National Center of Research and Development in Poland (NCBiR) for phase I clinical studies of Annamycin in combination with cytarabine in AML patients.

AFFILIATIONS & LICENSE

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WP1066 - Indications to Treat **CNS tumors, Pancreatic cancer, Ocular tumors**

OVERVIEW

WP1066 represents a new class of drugs, which WPD calls “Immune/Transcription Modulators”. WP1066 demonstrated the ability to directly induce apoptosis but also the ability to stimulate an immune response to tumors allowing T-cells to attack tumor cells. These unique drug properties are a result of WP1066’s ability to inhibit the activated form of STAT3, (p-STAT3) (Hussain et al., 2007). Regardless of pSTAT3, WP1066 inhibited c-Myc and HIF-1a, two major oncogenes, hyperactivated in various malignancies. WP1066 is able to cross the blood-brain-barrier (BBB) which makes it a good candidate for potentially treating brain tumors and other Central Nervous System (CNS) malignanices. The WP1066 has also a potential to fight against pancreatic cancer, melanoma (Sau et al., 2017), breast (Cheng et al., 2018, Lee et al. 2015), bladder (Tsujita et al., 2017) ocular tumors and others (Geng et al., 2016). WP1066 action has been also reported to be beneficial protective effects against radiation-induced lung injury (Yu et al. 2016).

CLINICAL DEVELOPMENT

WP1066 is currently (as noted on www.clinicaltrials.gov NCT01904123) in a Phase I trial at MD Anderson Cancer Center for GBM and melanoma metastasized to the brain. It is presently in the third cohort of dose escalation evaluating safety and activity.

WP1066

GRANTS / FUNDING

WPD plans submitting a grant proposal in the Q3/Q4/2020 for the use of WP1066 in the GBM. This grant is expected to provide an additional $7 million in the next 48 months to cover 70-80% of the costs of Phase I clinical trial for WP1066 and related analogs. WPD's expected cost of a successful application is $400,000; however, the Company does not anticipate incurring these expenses over the next 12 months.

PARTNERS

WPD will collaborate with Moleculin, which is based in the United States, on the development of WP1066. WPD Pharmaceuticals already prepared grant proposal for WP1066 application in pancreatic cancer patients (phase 1 clinical trial), that will be submitted to National Center of Research and Development in Poland (NCBiR) in case of Annamycin-proposal rejection.

WP1066

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WP1220 - Indications for **cutaneous T-cell lymphoma**

OVERVIEW

WP1220 is an inhibitor of phosphor (p)-STAT3, activated form of a transcription factor, which is key for cancer cell growth and survival. Increased activity of p-STAT3 has been demonstrated in patients with CTCL. WP1220 is an analog compound of WP1066 being developed as a treatment for brain tumors, pancreatic cancer and blood cancers. Preclinical data suggests that WP1220 may be effective in suppressing Cutaneous T-cell Lymphoma (CTCL). WP1220 is the first pSTAT3-targeted drug used in monotherapy for patients with CTCL, giving also the opportunity to be used in other skin cancers and diseases associated with STAT3 upregulation.

WP1220

CLINICAL DEVELOPMENT

In February 2020, data form phase Ib clinical study of WP1220 in CTCL patients in Poland were obtained. To evaluate the safety and efficacy of WP1220, compound was applied topically to subjects in stage I, II or III Mycosis Fungoides over 12 weeks (three 28-day cycles) of treatment and after 28 days of follow. Importantly, no major toxicities were associated with WP1220 application - 1 mild adverse event (mild local dermatitis) was considered not related to the study drug. Efficacy of WP1220 was based on CAILS (Composite Assessment of Index Lesion Severity) and showed evidence of decreased scores for most patients based on standard guidelines performed by a single dermatologist and, verified by dermatologist, confirmed remissions for patients in stages I-II. Planned Phase 2 study will evaluate a larger patient population with longer duration of treatment.

WP1220

PARTNERS, AFFILIATIONS & LICENSE

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WP1732 - Indications to Treat **Pancreatic Cancer**

OVERVIEW

The WP1732 is a new fully water-soluble p-STAT3 inhibitor, technology, which is complementary to orally bioavailable non-water soluble WP1066. Based on preclinical testing, WP1732 is a potential breakthrough discovery. STAT3 inhibitors are an essential part of our efforts to develop new cancer treatments that effectively target highly resistant tumors. The preclinical evidence suggests that WP1732, injectable new molecule, is capable of inhibition of oncogenic transcription factors similarly to orally administered WP1066.

Preclinical animal testing has also shown that WP1732 is capable of disproportionately high accumulation in the pancreas, making it a promising candidate for treating pancreatic cancer, one of the most resistant and deadly forms of cancer.

WPD, with its development partner, plans performing the preclinical work necessary to submit an IND for WP1732 and entered into an agreement with The University of Iowa Pharmaceuticals for the development of a formulation for WP1732.

WP1732 - Indications to Treat **Pancreatic Cancer**

AFFILIATIONS & LICENSE

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WP1122 - Indications to Treat **SARS-CoV-2 Infection**

OVERVIEW

SARS-CoV-2, similarly to other coronaviruses (such as SARS-CoV-2, MERS) upregulates glycolysis process in infected cells to generate ATP necessary for fast virus replication (Thanker et al., 2019; Wang et al., 2014). Thus, inhibition of glycolysis could be an effective antiviral strategy. 2-deoxy-D-glucose (2-DG) is a synthetic analogue of glucose in which the 2' hydroxyl group is replaced by a hydrogen. 2-DG inhibits hexokinase and phospho-hexose isomerase, and thereby blocks glycolysis process at the initial stage. Therefore, 2-DG causes depletion of ATP as well as of glucose derivatives required for protein glycosylation. 2-DG was tested as an antiviral agent against many different viruses (Sanchez et al., 2016), including the coronavirus family –Piglet epidemic Diarrhea Virus (PED) (Wang et al., 2014). Recent results indicate that 2-DG inhibits 100% of SARS-CoV-2 replication (Bojkova et al., 2020).

2-DG has been tested in over 100 patients in seven clinical trials targeting cancer treatment. However, due to its poor pharmacokinetic properties – fast metabolism, inappropriate organ distribution, 2-DG did not receive final approval as a drug.

Prodrug – WP1122 is specifically acetylated 2-DG derivative that shows significantly better pharmacokinetic properties (higher concentrations in plasma and organs, including lungs, longer retention in target tissue, longer half-life), enabling the achievement of high concentration of 2-DG inside cells and effective inhibition of glycolysis. Our results showed that WP1122 generates significantly higher amount of 2-DG in plasma and organs than 2-DG alone (Zielinski et al., 2017). Animal studies with WP1122 do not indicate a potential for side effects due to its metabolism. Moreover, preliminary results confirmed antiviral WP1122 activity against SARS-CoV-2. WP1122 more efficiently inhibits SARS-CoV-2 replication in comparison to 2-DG.

WP1122

GRANTS / FUNDING

WPD is going to submit a grant proposal to National Center for Research and Development in Poland (NCBiR) for the development of WP1122 that would include Phase I clinical studies. Management expects this grant to cover 70 – 80% of all research and development costs for the next 2-3 years.

AFFILIATIONS & LICENSE

WPD owns the exclusive license from the Dermin for the antiviral indications for WP1122. Other Poland rights of WPD Pharmaceuticals to WP1122 are subordinate to any rights of Dermin.

Corporate **Overview**

WPD Pharmaceuticals Inc.

CSE: **WBIO**

Capital Structure

Issued and Outstanding	**111,520,388**
Warrants	**3,949,997**
Fully Diluted	**115,470,385**
Management and Insider holdings	**36%**

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Appendix / References:

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