Cure For Corona
Introduction to BARDA

The following information is available from the medical countermeasures website and is provided as general background.

President Trump and the US Govt. have mounted an intensely focused campaign to find solutions to the most pressing problems now facing the country. Photosonx has submitted a proposal to BARDA to have their platform of a ‘Broad Spectrum Anti Viral’ treatment enter their testing program. 1. Testing in the lab to see if it kills the Corona and SARS virus. 2. Test on animal models to see if it is effective. (this process could be done within a few weeks)  3. If steps one and two are effective advance to appropriate human trials to test for efficacy (see if it works in real life treating people with this potentially deadly virus). The sensitizer available for treatment of the virus is already being used with complete safety and nil side effects for related medical applications.

BARDA, President Trump and Vice-President Pence all deserve a big shout-out and much appreciation for pulling out all the stops to advance this expedited process. We owe a debt of gratitude to them for the foresight to establish this Program in 2018.

We offer this advanced technology for testing to hopefully develop and make available promptly a safe, affordable and successful treatment for this Pandemic which threatens national security, economic stability and the personal health of people everywhere.
Photosonx submitted the following 500 word summary as requested by BARDA.
Broad Spectrum Anti-Viral Treatment Platform

PhotoSonX Inc. (Canada) offers the following treatment platform as an effective, safe, rapidly implemented, reasonably priced, broad spectrum anti-viral treatment for the COVID-19 outbreak and SARS category viruses.

Photodynamic Antimicrobial Chemotherapy or PACT is the category of technology for this combined platform of sensitizer administration followed by light and ultrasound activation. The PhotoSonX PACT platform involves the interaction of light and ultrasound with a photo and sono sensitive agent (which selectively accumulates on viruses) and oxygen to produce an energy transfer and chemical reaction. This local physical/chemical reaction induces viral damage/death without affecting surrounding tissue.

PACT is a ground-breaking newly emerging anti-microbial therapy based on entirely different principles than existing legacy therapies (antibiotics, antivirals, vaccinations). A wealth of peer reviewed articles and studies (See Appendix) demonstrate the effectiveness of PACT using photosensitizers in the treatment and eradication of viruses such as: Herpes simplex, Herpes Zoster, Human Papilloma virus (HPV), HIV, Adenovirus etc. The mode of action of this technology begins with observed accumulation of sensitizer (in our case chlorophyll derivatives in the Chlorin category of porphyrins) on this wide range of viruses. The accumulation is related to the acid structure of viruses, which are RNA and DNA based. The addition of photonic and ultra-sonic energy results in a cascade of physical chemical processes leading to the formation of ‘singlet’ oxygen. This short lived, highly oxidative oxygen species damages and ‘inactivates’ the virus. It may also lead to ‘auto-vaccination’ of the individual through the ‘in situ’ creation of antibodies to the virus fragments.

PhotoSonX Technology importantly overcomes the previous limitations of PACT for the treatment of viral respiratory infections. 1. Anti-viral systemic therapy is possible at depth because the sensitizer is activated by deeply penetrating ultrasound in addition to external and internal application of appropriate wavelength light. 2. The sensitizer is administered by inhalation for maximum absorption in the target organ (lungs).

This method of pulmonary administration has been used safely for over a decade without evidence of light sensitivity or toxic side effect. All appropriate toxicity background testing has shown the sensitizers to be safe and this pulmonary route of administration is currently routinely used for other PDT/SPDT treatment applications.

The development of this platform has extended over the past 15+ years. The applicants, PhotoSonX Ltd.(Canada) and Science Group Pty Ltd. Australia, have copyright-protected a detailed history of the development of PDT, and Sono-PDT, and their personal roles in its foundations: (i) the invention of the light bed for total body, systemic application of light (ii) the development of porphyrin based light and sound activated sensitizers and (iii) the innovation of ultrasound activation of the sensitizers deep in the body using novel systemic ultra-sound delivery systems. This
copyrighted work is also the basis of a series of existing and upcoming additional patent applications.

PhotoSonX is pleased to cooperate with BARDA to: 1. Confirm virucidal activity against COVID-10/SARS viruses. 2. Test against animal models 3. Trial and document clinical treatment benefits against COVID-19/SARS infections.

Photosonx also sent the following Appendix document to illustrate the established science underlying the PACT technology with the following small sampling of peer reviewed studies from the “PubMed’ site.

Appendix

The following links to peer reviewed articles from PubMed and other websites provide examples of the wide variety of infectious applications which benefit from PACT.

It should be noted that although many of the studies involved the use of inferior sensitizer agents which were developed many decades ago, the effectiveness across a wide range of viruses has been demonstrated.

This quote from one of the referenced papers states:

“Light and photosensitizer-mediated killing of many pathogens, termed photodynamic antimicrobial chemotherapy (PACT), has been extensively investigated in vitro. ...Both enveloped and non-enveloped viruses have demonstrated susceptibility in vitro, in addition to fungi and protozoa. Significantly, however, no clinical treatments based on PACT are currently licensed”

In addition to effectiveness against herpes simplex, HIV, HPV and other viruses, PACT is effective against gram positive and gram negative bacteria, fungi, parasites and Candida albicans. These links represent only a small fraction of the studies which verify the effectiveness of this technology and the huge promise it holds for use as anti viral and anti microbials. All of the links below were obtained from https://pubmed.ncbi.nlm.nih.gov
Photodynamic Antimicrobial Chemotherapy (PACT)

Whereas the photodynamic therapy (PDT) of cancer has recently shown rapid clinical acceptance, photodynamic antimicrobial chemotherapy (PACT)—which predates the related cancer regimen—is not widely appreciated. Like PDT, PACT utilizes photosensitizers and visible or ultraviolet light in order to give a phototoxic response, normally via oxidative damage. Currently, the major use of PACT is in the disinfection of blood products, particularly for viral inactivation, although more clinically-based protocols are being developed, e.g. in the treatment of oral infection. The technique has been shown to be effective in vitro against bacteria (including drug-resistant strains), yeasts, viruses and parasites. A wide range of photosensitizers, both natural and synthetic, is available with differing physicochemical make-up and light-absorption properties. PACT is proposed as a potential, low-cost approach to the treatment of locally occurring infection.

Photosensitizers Mediated Photodynamic Inactivation Against Virus Particles

Viruses cause many diseases in humans from the rather innocent common cold to more serious or chronic, life-threatening infections. The long-term side effects, sometimes low effectiveness of standard pharmacotherapy and the emergence of drug resistance require a search for new alternative or complementary antiviral therapeutic approaches. One new approach to inactivate microorganisms is photodynamic antimicrobial chemotherapy (PACT). PACT has evolved as a potential method to inactivate viruses. The great challenge for PACT is to develop a methodology enabling the effective inactivation of viruses while leaving the host cells as untouched as possible. This review aims to provide some main directions of antiviral PACT, taking into account different photosensitizers, which have been widely investigated as potential antiviral agents. In addition, several aspects concerning PACT as a tool to assure viral inactivation in human blood products will be addressed.

Drug delivery strategies for photodynamic antimicrobial chemotherapy: from benchtop to clinical practice.

Light and photosensitizer-mediated killing of many pathogens, termed photodynamic antimicrobial chemotherapy (PACT), has been extensively investigated in vitro. ...Both enveloped and non-enveloped viruses have demonstrated susceptibility in vitro, in addition to fungi and protozoa. Significantly, however, no clinical treatments based on PACT are currently licensed
The emerging chemistry of blood product disinfection

Wainwright M. Chem Soc Rev 2002 - Review. PMID 12109206

Given the importance and limitations of the blood supply worldwide, widely applicable procedures for the inactivation of pathogens (viruses, bacteria, protozoa etc.) in donated blood and blood products are now required. ...These include targeted chemotherapy, photochemotherapy and photodynamic antimicrobial chemotherapy (PACT).

Photoinactivation of Vesicular Stomatitis Virus by a Photodynamic Agent, Chlorophyll Derivatives From Silkworm Excreta

The efficacy of chlorophyll derivatives from silkworm excreta (CpD) in photodynamic antimicrobial chemotherapy (PACT) was studied. An enveloped animal virus, vesicular stomatitis virus (VSV), was used as a target organism. For CpD mediated PACT, the viruses in suspensions were treated with various doses of CpD (15-60 microg/ml) and visible red light was fixed at 120 mJ/cm². The antiviral effect of the CpD-PACT was measured 1 h after light irradiation by the extent of suppression of plaque forming units (pfu). In cultures inoculated with PACT-treated VSV, suppression of pfu was prominent and the results were demonstrated in a dose-dependent manner. In assays of RT-PCR, a single dose of 30 microg/ml CpD and light caused complete inhibition of viral RNA synthesis in the host cells, which agreed with the complete loss of plaque forming activity observed in pfu assays. An in vitro transcription assay for viral RNA using [3H]UTP and gel electrophoresis for the level of M protein was conducted. A gradual decrease in viral RNA transcription and an immediate decrease in M protein levels were observed in cells inoculated with the CpD-PACT-treated virus. These results demonstrated that CpD is a potential photodynamic antiviral agent, which causes inactivation of the matrix protein as well as transcription mechanisms involved in VSV replication.

Effectiveness of Photodynamic Therapy in Elimination of HPV-16 and HPV-18 Associated with CIN I in Mexican Women.


This study aimed to determine the effectiveness of photodynamic therapy (PDT), using δ-aminolevulinic acid (5-ALA), in the elimination of premalignant cervical lesions in Mexican patients with human papillomavirus (HPV) infection and/or
cervical intraepithelial neoplasia (CIN). ...Of HPV-infected patients without evidence of CIN I, 80% cleared the infection, while HPV associated with CIN I was eliminated in 83% of patients (P < 0.05). ...

**Dynamics of HPV viral loads reflect the treatment effect of photodynamic therapy in genital warts.**


BACKGROUND: Photodynamic therapy (PDT) has demonstrated good clinical cure rates and low recurrence rates in the treatment of genital warts. ...Traditional treatment, such as radiofrequency, microwave, or surgical therapy, was used to remove the visible lesions, and then PDT treatment was performed every week.

**Efficacy and safety of photodynamic therapy for cervical intraepithelial neoplasia and human papilloma virus infection: A systematic review and meta-analysis of randomized clinical trials.**


BACKGROUND: We sought to conduct a systemic review and meta-analysis of randomized clinical trials to assess the efficacy and safety of photodynamic therapy (PDT) in cervical intraepithelial neoplasia (CIN) and cervical human papilloma virus (HPV) infection. ...Randomized clinical trials and qualitative studies comparing PDT and placebo for CIN or HPV-positive patients were included. ...

**A case report of Ramsay Hunt syndrome in a patient with HIV treated by dual-wavelength photodynamic therapy.**


In this paper we report on the application of dual-wavelength photodynamic therapy with a topical chlorin-based photosensitizer for treatment of Ramsay Hunt syndrome in a patient with HIV. Traditional treatment approach (combination of acyclovir and a glucocorticosteroid) failed to provide a significant outcome, while photodynamic therapy resulted in fast positive dynamics.
The combination treatment using CO₂ laser and photodynamic therapy for HIV seropositive men with intraanal warts.

Xu J, et al. Photodiagnosis Photodyn Ther 2013. PMID 23769285

BACKGROUND: We evaluate the effectiveness of combination treatment using photodynamic therapy after carbon dioxide laser in preventing the recurrence of condylomata acuminata for intraanal warts in HIV positive homosexual men. PDT therapy was repeated twice with 2 weekly intervals. Follow up examinations including an anoscopy every 4 weeks after the latest PDT.

Light Activated Compounds as Antimicrobial Agents - Patently Obvious?

Microbial pathogens with resistance to conventional drugs are a problem of global proportions and may be viral such as HIV, bacterial as in the case of MRSA or eukaryotic as seen with the malarial parasite Plasmodium falciparum. In response, photodynamic antimicrobial chemotherapy (PACT) has been developed, which is the delivery of a non-toxic photosensitiser (PS) to the site of a microbial infection. When taken up by the pathogen, illumination of the PS by light at an appropriate wavelength can lead to inactivation of the pathogen through the production of highly reactive free radical species, which induce oxidative damage to lipid, proteins and DNA / RNA, and / or adduct formation between the PS and these microbial biomolecules. Here the photochemical and photophysical steps underlying PS antimicrobial action along with the desirable electronic and physiochemical properties of PS are briefly reviewed. The therapeutic uses of PS are then illustrated with reference to a number that have featured in recent patents, including: The induction of endogenous PS by aminolevulinic acid; phenothiazinium based PS, which are the most studied of PACT agents, psoralens and organorhodium complexes.

Photodynamic Antimicrobial Chemotherapy (PACT) Using Toluidine Blue Inhibits Both Growth and Biofilm Formation by Candida Krusei

Among non-albicans Candida species, the opportunistic pathogen Candida krusei emerges because of the high mortality related to infections produced by this yeast. These results suggest that the inhibition observed in the cell growth after PACT could be related to the ROS production, promoting cellular damage. Taken
together, these results demonstrated the ability of PACT reducing both cell growth and biofilm formation by C. krusei.

Photodynamic Antimicrobial Chemotherapy (PACT) in Osteomyelitis Induced by Staphylococcus Aureus: Microbiological and Histological Study

On the microbiological study, immediately after treatment, the PACT group presented a bacterial reduction of 97.4% (p<0.001). Thirty days after treatment, there was a bacterial reduction of more than 99.9% (p<0.001). In the histological study, it was observed that the PACT group demonstrated an intense presence of osteocytes and absence of bone sequestration and micro-abscesses. The PACT using toluidine blue was effective in reducing the number of S. aureus enabling a better quality bone repair.

Development of Photodynamic Antimicrobial Chemotherapy (PACT) for Clostridium Difficile

Background: Clostridium difficile is the leading cause of antibiotic-associated diarrhoea and pseudo membranous colitis in the developed world. The aim of this study was to explore whether Photodynamic Antimicrobial Chemotherapy (PACT) could be used as a novel approach to treating C. difficile infections

Conclusion: This innovative and simple approach offers the prospect of a new antimicrobial therapy using light to treat C. difficile infection of the colon

Photodynamic Antimicrobial Chemotherapy Activity of (5,10,15,20-tetrakis(4-(4-carboxyphenylcarbonoimidoyl)phenyl)porphyrinato) Chloro gallium(III)

Complex 1 and 1-PtNPs showed promising photodynamic antimicrobial chemotherapy (PACT) activity against Staphylococcus aureus, Escherichia coli and Candida albicans in solution where the log reductions obtained were 4.92, 3.76, and 3.95, respectively

Photodynamic antimicrobial chemotherapy with the novel amino acid-porphyrin conjugate 4I: In vitro and in vivo studies.

Photodynamic antimicrobial chemotherapy (PACT), as a novel and effective therapeutic modality to eradicate drug resistant bacteria without provoking multidrug resistance, has attracted increasing attention. These results imply that 4I-mediated PACT therapy is an effective and safe alternative to conventional antibiotic therapy and has clinical potential for superficial drug-resistant bacterial infections.

Photodynamic Antimicrobial Chemotherapy (PACT) for the Treatment of Malaria, Leishmaniasis and Trypanosomiasis

report the advances in the photoantimicrobial approach that are beneficial to the field of anti-parasite therapy and also have the potential to facilitate the development of low-cost/high-efficiency protocols for underserved populations.

Time-dependent antimicrobial effect of photodynamic therapy with TONS 504 on Pseudomonas aeruginosa.


We have now evaluated the time-dependent effectiveness of photodynamic antimicrobialchemotherapy (PACT) with the chlorin derivative TONS 504 and a light-emitting diode (LED) on P. aeruginosa in vitro. PACT with TONS 504 thus inhibited the growth of P. aeruginosa in a time-dependent manner, and an additional irradiation exposure applied 3 h after the first LED treatment greatly increased the effectiveness of PACT.

Antimicrobial action from a novel porphyrin derivative in photodynamicantimicrobial chemotherapy in vitro.


Efforts to identify improved treatments for corneal infection include the development of photodynamic antimicrobial chemotherapy (PACT). We evaluated the antimicrobial effect of PACT with a novel porphyrin derivative, TONS 504, and...
a novel light system on methicillin-sensitive Staphylococcus aureus (MSSA) and methicillin-resistant Staphylococcus aureus (MRSA)

Antifungal efficacy of photodynamic therapy with TONS 504 for pathogenic filamentous fungi.


We have here evaluated the antifungal efficacy of photodynamic antimicrobial chemotherapy (PACT) with the novel chlorin derivative TONS 504 and a light-emitting diode (LED) with a wavelength of 660 nm for these fungal species. ...The antifungal effect of PACT on A. fumigatus was thus inferior to that on F. solani. PACT with TONS 504 and an LED thus warrants further evaluation with regard to its potential effectiveness for the treatment of infectious fungal keratitis.

BARDA replied with this email
We have prepared the summary deck stack (presentation) they requested and look forward to presenting this very promising broad spectrum anti-viral PACT treatment platform which has the potential to successfully treat the Corona virus (COVID-19) as well as the SARS virus.

We again thank the Trump Administration and BARDA for seeking answers from a wide range of potential therapies. In addition to this PACT technology, BARDA is also encouraging new vaccines which also promise to be of great benefit in the fight against this deadly virus.
PhotoSonx

COVID-19
Broad Spectrum Respiratory Virus
Treatment Platform
PhotoSonx

➢ PhotoSonx Treatment Platform:

1. A Photodynamic Anti-Microbial Chemotherapy (PACT) category technology
2. PACT = 2 step process (sensitizer + Light and Ultrasound = viricidal effect)
3. PACT is a proven broad spectrum viricidal technology
4. PhotoSonx sensitizer: chlorin e6 type (a type with decades long approval)
5. Full toxicology and pharmacokinetic studies documented
6. Ultrasound activation of sensitizer for full body treatment
7. Sensitizer Administration via inhalation safe and effective
8. Proven safe & effective full body treatment in full clinical trials
9. Tests in vitro and animal models can show effectiveness
10. Active clinical trials with sensitizer + light/sound have multiyear history of safety and effectiveness in deep body applications.
PACT = 2 Step Process
(Sensitizer + Light and Ultrasound = Virucidal Effect)

- PACT therapy Process is a well established and documented technology

1. Sensitizers accumulate on microbes; viruses and many bacteria

2. Energy is applied (traditionally light with wave length matching absorption peak of sensitizer)

3. PhotoSonx sensitizer has the additional novel property of being energized by ultra sound as well as light.

4. This dramatic advance allows activation in deep structures/full body where sensitizer has accumulated on target viruses.
PACT Is A Proven Broad Spectrum Virucidal

- **PACT** an established proven successful and safe virucidal therapy for many types of the most common and problematic pathologic viruses.

1. **HIV.** PACT is effective in patients with HIV

2. **HPV** PACT is effective against human papillomavirus in association with cervical intraepithelial carcinoma

3. **Herpes Simplex**  PACT is an effective antiviral treatment for herpes simplex infections in multiple locations.

4. **Vesicular Stomatitis Virus.**  PACT is effective in this virus
PhoSonx Sensitizer A Chlorin e6 Type
(a type with decades long approval)

- Chlorin e6 category of sensitizers have a decades long history of approvals and proven clinical effectiveness as illustrated below.

- MACE Mono Aspartyl Chlorin e6 approved over a decade ago in Japan with many impressive clinical trials showing extraordinary effectiveness against early cancer indications.

- Radachlorin. Full approval in Russia with essentially no light sensitivity and high selectively and singlet oxygen production.

- Chlorin sensitizers developed by Pandy group at Roswell Park Cancer Center in Buffalo, NY, presently in clinic trials with combined diagnostic and therapeutic effectiveness.
Fully Documented Toxicology and Pharmacokinetics

- Toxicology Summary (Certified Results Available)

- 40 standard laboratory mice entered the test: 20 were given the typical therapeutic dose of SF sensitizer of 1 mg./kg. The other 20 were given a 250 times greater dosage of 250mg./kg via peritoneal injection.

- Weights were recorded at 7 days and 14 days and were found to be essentially unchanged and the mice activity was noted to be normal during and at the end of the study.

- There were no deaths in the mice at the 250 mg./kg dosage and the sensitizer was noted to have very little evidence of toxicity.
In Vitro and Animal Model Testing
Can Quickly Show Effectiveness Against the Corona Virus

- PhotoSonX treatment, if shown to be effective against respiratory viruses such as the COVID-19 virus and the SARS virus would be a groundbreaking advance in the treatment of the present Pandemic as well as future potential viral epidemics.

- In contrast with present legacy technologies such as vaccines which are mostly virus specific and often take months or years to develop, test, trial and develop sufficient quantities to combat novel pathogenic viral strains, the PhotoSonX PACT treatment platform, once proven and approved, can be deployed against most all such viruses rapidly and generically.

- In vitro and animal testing can be done without ethical concerns to establish efficacy and the sensitizer has a multi-year history of safety and effectiveness. Also the pulmonary route of administration followed by light and ultrasound has proven safety and effectiveness in patients. With testing and approval, sufficient production can quickly be developed to meet the needs of those requiring treatment.
Sensitizer Administration Via Inhalation
Safe and Effective

- SPDT therapy trials have been conducted using the SF sensitizer for a wide range of cancer indication in patients shown to be unresponsive or too debilitated to continued traditional cancer therapies.

- The sensitizer is administered via pulmonary inhalation and has a multi year history of safe and convenient usage. This method is well tolerated by the patients and systemic absorption is prompt and without side effects. It avoids the usual need for venipuncture and patient discomfort.

- Application of sensitizer to the specific area of viral tropism in the treatment of respiratory viruses such as the Corona virus, it is a preferred and uniquely effective targeted method of administration.
Proven Safe & Effective Full Body Treatment
(Current Full Clinical Trials In Progress)

- Trial Results showing effectiveness of Ultra Sound penetration for deep body therapy and effectiveness of ultrasound in activation of the sensitizer.

- The Tumoricidal Effect of Sonodynamic Therapy (SDT) on S-180 Sarcoma in Mice

- Sonodynamic and Photodynamic Therapy in Breast Cancer - A Pilot Study

- Sonodynamic and Photodynamic Therapy in Advanced Pancreas Carcinoma - A Case Report

- The Sonodynamic Effects of Chlorin e6 on the Proliferation of Human Lung Adenocarcinoma Cell SPCA-1
Active Clinical Trials With Sensitizer + Light / Sound

Summary

- Multiyear history of safety and effectiveness in deep body applications

- Global experience and approvals with Chlorin e6 type sensitizers proven safe and effective in PDT applications

- Novel inhalation administration proven safe and applies sensitizer to Corona virus target of respiratory system

- Ultra sound proven to activate sensitizer in chest cavity

- PhotoSonX available to cooperate to test and prove effectiveness against Corona and SARS virus infections.