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537 Poster

Evaluation of the photodynamic potential of curcumin in fractionated light doses against methicillin-resistant Staphylococcus aureus

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The emergence of antibiotic-resistant highlights the need for alternative treatments. Therefore, one treatment that has shown efficacy is photodynamic inactivation (PDI), which is capable of inactivating microorganisms through the interaction of a photosensitizer, light, and oxygen. In this study, the bacteria methicillin-resistant Staphylococcus aureus (MRSA), curcumin, and continuous and fractionated doses of blue light were used as a model. The results demonstrated that curcumin is capable of inactivating MRSA at the highest concentrations and doses of light tested. However, fractionated light application achieved more promising results compared to continuous light. It was possible to conclude that light fractionation has photodynamic potential under the conditions tested. However, further studies are needed to improve the technique to enable better results for the inactivation of resistant bacteria.

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538 Poster

Investigation on the Occupational Skin Health Status of Workers in Chemical Enterprises in Shanghai: A Cross-sectional Study

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Significance: Occupational skin diseases pose a significant threat to the health and safety of workers in the chemical industry.
Approach: Using a self-made questionnaire, a survey was conducted on 810 chemical enterprise employees.
Results: 19.26% of the respondents had a history of allergy related diseases lasting at least 6 months, and only 83 people (20.75%) had received formal medical testing. 39.01% of respondents are aware of the occupational skin disease risks associated with their work, but only about 15% take effective protective measures. The mastery of occupational skin health knowledge is relatively good, but only 92 respondents (11.36%) have truly mastered more knowledge related to occupational skin diseases.
Conclusions: Frontline workers lack awareness, and the focus of prevention and control should be on changing employees' behaviors. Enterprises do not attach enough importance to the prevention and management of occupational skin health.

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539 oral

Skin imaging technology assisted evaluation of photodynamic therapy for the treatment of Actinic Keratosis

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In recent years, skin imaging technology has shown significant application value in photodynamic therapy for Actinic keratosis. It plays an important role in the diagnosis and evaluation of diseases, monitoring during the treatment process, and evaluation after treatment. Skin imaging techniques such as dermatoscopy, optical coherence tomography, and reflective confocal microscopy can provide high-resolution skin images to assist in early diagnosis and assessment of the condition. During photodynamic therapy, real-time monitoring of changes in skin lesions and potential adverse reactions can help doctors adjust treatment parameters to ensure treatment effectiveness. Evaluate the regression of skin lesions after treatment, assess treatment effectiveness, monitor the recurrence of skin lesions, and improve the long-term prognosis of patients.
Future research needs further optimize technology, combining multimodal imaging technology and artificial intelligence technology to improve the popularity of equipment and the convenience of operation, in order to provide more effective treatment plans for more patients.

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540 oral

Safety and effectiveness of robotic photodynamic therapy

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Significance: The relevance of conducting photodynamic therapy (PDT) in oncology using robotic systems offers a significant potential to minimize manual errors in light dose calculation, enhances precision in radiation targeting, and improves the overall effectiveness of PDT treatments.
Approach: This study evaluates the safety and effectiveness of robot-assisted PDT.
Results: Robot-assisted PDT demonstrates high efficacy in treating tumors, comparing to conventional manual PDT.
Conclusions: Robot-assisted PDT may facilitate better integration with imaging technologies, allowing real-time monitoring and adjustments during the procedure, further enhancing its effectiveness.

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541 oral

Enhancement of photodynamic therapy for pneumonia treatment: in vitro studies

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The rise of antimicrobial resistance demands alternative therapies targeting multiple molecular sites, such as Antimicrobial Photodynamic Therapy (aPDT). By inactivating microorganisms through oxidative stress, aPDT reduces the risk of resistance development. Our research focuses on the efficacy of aPDT against pneumonia-causing pathogens, a leading cause of global mortality. While *in vitro* studies have demonstrated the safety and effectiveness of aPDT for *Streptococcus pneumoniae*

and the successful delivery of photosensitizers (PS) with infrared light in animal models, *in vivo* applications face significant challenges due to lung surfactant (LS). LS traps PS, limiting its efficiency. This study investigated strategies to enhance PS distribution within LS. The combination of indocyanine green (ICG) with the copolymer Gantrez™ AN-139 proved most effective, achieving complete microbial load reduction without toxicity to human lung cells. These findings highlight its potential as a strategy to overcome LS barriers and advance aPDT toward successful *in vivo* applications.

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542 oral

ENHANCEMENT OF IMMUNE SYSTEM CELL ACTIVITY DUE TO THE PRESENCE OF MICROCOMPONENTS WHEN EXPOSED TO PHOTODYNAMIC

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The application of photodynamic therapy (PDT) has aimed at destroying cancer and control infections. Experimentation in vitro with individual elements of a biological system enables study of the mechanism of action and provides directions to in vivo applications where cancer coexists with normal cells and microorganisms, whether opportunistic or not. The action of the combined set of elements leads to a different behavior from each of the components isolated. In this study, we created a simple model to investigate the effects of PDT (1) on the coculture of macrophages (2) and melanoma cells (3) infected with E. coli (4) under different combinations. Applying the photodynamic effect to each component separately or to all of them together resulted in different outcomes. These in vitro experiments provide pathways to understand or to design new and more efficient applications of PDT.

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543 oral

Intrinsic and acquired resistance to photodynamic therapy with 5-Aminolevulinic acid

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5-Aminolevulinic acid (5-ALA) has been approved by the FDA for photodynamic therapy (PDT) and tumor fluorescence imaging of very common and highly morbid human diseases including the skin cancer, bladder cancer and high-grade gliomas. As a prodrug, 5-ALA on its own has neither photosensitizing activity for PDT nor fluorescent property for tumor fluorescence imaging. It needs to enter the cell after oral or topical administration and undergo metabolism in the heme biosynthesis pathway to produce protoporphyrin IX (PpIX) in the mitochondria, which is the active drug with strong photosensitizing activity and red fluorescence upon light activation. Despite the wide clinical applications of 5-ALA-based therapies, tumors may exhibit intrinsic and acquired resistance to the treatment, resulting in heterogeneous treatment responses, disease recurrences and even treatment failures. Strategies to overcome intrinsic and acquired resistance to PDT with 5-ALA will be discussed.

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546 Poster

Preliminary investigation on the sensitization effect and mechanism of photodynamic therapy in combination with chemotherapy for gastric cancer

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Approach: CCK8 assay, cell staining, and flow cytometry were usedand the expressions of Caspase-1 and GSDMD (N) were analyzed by Western blotting. Additionally, GC transplant tumor model in mice.
Results: PDT can significantly enhance the chemosensitivity of GC cells and substantially reduce the required drug dosage. The chemotherapy combined with PDT group exhibited the highest levels of ROS production and increased expressions of pyroptosis proteins GSDMD-N and Caspase-1, when compared to the chemotherapy alone group. Additionally, the cell death morphology observed in this group was consistent with the typical characteristics of pyroptosis. The combined treatment group exhibited the smallest tumor tissue volume and the most pronounced infiltration of internal inflammatory cells, indicating that it could aggravate acute tissue inflammation and induce pyroptosis in tumor tissue.
Conclusions: PDT-sensitized chemotherapy drugs. In this process, the classical pyroptosis pathway involving ROS and Caspase-1/GSDMD is implicated in the PDT-induced cell death of GC cells.

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549 oral

Photodynamic therapy can change the tumor immune microenvironment and improve the prognosis of patients with advanced colorectal cancer

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Photodynamic therapy (PDT) has shown potential in the treatment of various cancers. We conducted a retrospective analysis was conducted on 119 patients diagnosed with stage III-IV colorectal cancer at Lanzhou University Second Hospital between November 2020 and November 2023. The results showed that the overall survival (OS) of the PDT group was significantly longer than that of the non-PDT group (p=0.005). Two months after PDT treatment, the objective response rate (ORR) was 43.9%, and the disease control rate (DCR) was 88.5%. A marked increase in the local infiltration of various immune cells, including CD3+ T cells, CD4+ T cells, CD8+ T cells, and macrophages, was observed in the tumor tissue. No severe PDT-related adverse events were noted. In conclusion, PDT is an effective treatment for advanced colorectal cancer with no significant adverse reactions. PDT may enhance the effects of immunotherapy by recruiting immune cells into the tumor microenvironment.

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556 Poster

Improved long-term survival of PDT and PDT plus for Advanced Obstructive Esophageal Cancer by dual modulating Systematic Macroenvironment and Local Immune Microenvironment

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Significance: his study evaluates the effects of photodynamic therapy (PDT) alone and in combination with chemotherapy, immunotherapy,