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Antifungal photodynamic therapy mediated by novel Nano-Photosensitizers reverses azole resistance through ribosome remodeling

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Significance: Azole resistance has become increasingly severe. Antifungal photodynamic therapy (aPDT) reportedly showed valuable therapeutic potential against resistant infection, but it requires more effective photosensitizer.

Approach: *Candida albicans* strain SC5314 and *Candida glabrata* isolated from the clinical were used in the experiments. *Candida* was incubated with photosensitizer for 30 minutes and then irradiated by red light (630 nm, 30 min, 60 mw / cm²).

Results: We prepared a highly efficient nano-photosensitizer hexyl-aminolevulinate ethosome (HAL-ES). Using highly drug-resistant *C. albicans* biofilms and clinical strains of *Candida glabrata*, we demonstrated that HAL-ES-aPDT reverses azole resistance and treats infection by inhibiting biofilm formation and down-regulating multidrug-resistant efflux pump expression. Further study showed that zinc homeostasis is the target of antifungal action of HAL-ES-aPDT, and intracellular zinc deficiency triggers ribosome remodeling as a new strategy to reverse azole resistance of *Candida*.

Conclusions: HAL-ES-aPDT reverses azole resistance by triggering intracellular ribosome remodeling

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325 Poster

Photodynamic therapy combined with metal stent improve palliative malignant gastric outlet obstruction through regulating immune microenvironment and intestinal flora: a real-world retrospective study

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Background and Aim: Malignant gastric outlet obstruction (MGOO) is managed through jejunal nutrition tubes, endoluminal stents, or gastrojejunostomy. Photodynamic therapy (PDT) offers rapid tumor reduction with minimal side effects but remains underexplored for MGOO. This study evaluated the efficacy and safety of PDT combined with stenting for MGOO and explored its mechanisms.

Methods: Peripheral blood, tumor tissues, and fecal samples were collected before and 48 hours after PDT for flow cytometry, immunohistochemistry, RNA sequencing, and fecal 16S sequencing.

Results: Among 49 patients (28 Stent+PDT, 21 Stent), the Stent+PDT group showed improved survival (11 vs. 5 months, $P=0.004$), better GOOSS and KPS scores ($P<0.001$), and enhanced tumor reduction ($P=0.049$). PDT boosted immune function, induced M1 macrophage polarization, and altered gene expression and gut microbiota, including increased bifidobacteria.

Conclusion: PDT combined with stenting is safe, enhances immune responses, modulates gene expression, and improves outcomes in MGOO patients.

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Photodynamic Therapy Combined with Surgical Treatment for Actinic Keratosis with Regional Carcinoma Transformation

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Objective: To explore the clinical application of photodynamic therapy combined with surgery in the treatment of actinic keratosis with regional carcinogenesis. A total of 50 patients with actinic keratosis with regional carcinogenesis treated with photodynamic therapy combined with surgery in Yan'an People's Hospital were. All patients underwent histopathological examination, and the pathological diagnosis was actinic keratosis with regional carcinogenesis.

Results: Forty-eight patients had good healing without tumor metastasis. One case of actinic keratosis recurred, and one case of regional carcinogenesis followed up for half a year developed metastasis. The treatment has a high cure rate and a low recurrence rate; it also has the effects of skin rejuvenation and anti-photoaging, and can achieve good clinical aesthetic effects.

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Effect of Photodynamic therapy on the Expression Toll-like receptors 2/3/4/8 in the HPV-related cervical lesions

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Significance: The first obstacle to human papillomavirus (HPV) is Toll-like receptors (TLRs). Research has revealed that TLR signaling demonstrating both tumor-suppressive and tumor-promoting effects

Approach: 2-ddCt value of m RNA TLR2, 3, 4 and 8 expressions after PDT in 121 women with HPV-related cervical lesions.

Results: TLR8 showed the most consistent reduction across all groups with the strongest suppression in cervical cancer cases.

Conclusions: TLR8 has the potential to serve as a novel earlier molecular immunological marker for the progression of HPV infection. TLR4 may represent an additional marker due to its reduced expression after PDT in cervical cancer.

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Can aPDT Provide Decontamination and Remineralization of Caries-Affected Dentin?

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Significance: The affected caries, like dentin, should be preserved. Therefore, alternative techniques for removing and decontaminating dentin, such as aPDT, should be explored.

Approach: Bovine dentin specimens (n=159) were obtained. MIC and MBC of curcumin (1.25-320 μ M) were determined and caries lesions induced by *Streptococcus mutans*/*Actinomyces naeslundii*. A spherical bur (SB), dentin excavator (DE) and ultrasound (US) were used to remove the infected dentin. Disinfection was performed using chlorhexidine (0.2%) and aPDT (320 μ M, 5 min incubation, LED, 460 nm, 15, 60, and 100 J/cm², 22 mW/cm²). Cross-sectional hardness, Raman, confocal images and bond strength were performed.

Results: CSH increased with depth ($p < 0.05$) and was unaffected by aPDT ($p > 0.05$). aPDT decreased the carbonate/phosphate ratio ($p < 0.05$) and effectively inactivated bacteria on both the surface and within the dentin tubules, without altering bond strength.

Conclusions: aPDT may serve as a vital tool for decontaminating and remineralizing affected dentin without compromising bond strength.

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Efficacy of ALA-PDT combined with the pretreatment of air jet metronidazole injection in the treatment of mild to moderate acne vulgaris

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Significance: 5-aminolevulinic photodynamic therapy (ALA-PDT) is one of the important methods for the treatment of moderate to severe acne. This study explores the therapeutic efficacy of ALA-PDT combined with air jet metronidazole injection for mild to moderate acne vulgaris.

Approach: A total of 48 patients with mild to moderate acne vulgaris were randomly divided into treatment group (ALA-PDT combined with the pretreatment of air jet metronidazole injection) and control group (ALA-PDT alone). The efficacy index was assessed before and after the treatments.

Results: the treatment group had a significant curative effect (effective rate was 87.5% in the treatment group and 67.5% in the control group), and the onset time of effect was significantly earlier than that of the control group.

Conclusions: ALA-PDT combined with the pretreatment of metronidazole injection is safe and effective in the treatment of mild to moderate acne vulgaris with early onset and high patient satisfaction.

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Photodynamic Therapy for Perifolliculitis capitis abscedens et suffodiens: A Case Series Demonstrating Long-Term Efficacy

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Significance: Perifolliculitis capitis abscedens et suffodiens (PCAS) is a challenging chronic inflammatory dermatosis with limited treatment options. This case series explores the efficacy of photodynamic therapy in managing recalcitrant PCAS, providing valuable insights into its long-term benefits.

Approach: Four young male patients with severe, treatment-resistant PCAS underwent a series of Photodynamic therapy treatments (PDT) using 5-aminolevulinic acid as a photosensitizer and a 635 nm light source. Patients received 4-6 weekly treatments, followed by two-year follow-up.

Results: All patients demonstrated significant improvement, including reduced active lesions, inflammation, and hair regrowth.

Conclusions: PDT appears to be an effective and well-tolerated treatment for PCAS, offering sustained benefits, including long-term remission and hair regrowth. Further studies are needed to establish optimal treatment protocols.

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Analysis of the Results of intravesical perfusion Therapy Combined with Immediate or non-immediate hematoporphyrin intravesical perfusion photodynamic therapy after TURBT for Non-muscle-invasive Bladder Cancer

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Objective: To understand whether there are differences in the prevention of bladder cancer recurrence between intravesical perfusion therapy combined with immediate or non-immediate photodynamic therapy (PDT) with hematoporphyrin for NMIBC.

Methods: In addition to the routine intravesical perfusion therapy, intravesical PDT was added for NMIBC. Immediate intravesical hematoporphyrin intravesical perfusion photodynamic therapy (imPDT) or non-imPDT. The primary end point was RFS within 24 months.

Result: A total of 86 patients were included in the analysis. 33 patients received im-PDT and 53 patients received non-imPDT. There were no differences in Basic characteristics between the two groups. The median follow-up was 51.4 months. The 24-month recurrence rates of cancer in the imPDT group and non-imPDT group were no statistically significant differences.

Conclusion: There was no statistically significant difference in the recurrence rate of cancer within 24 months for NMIBC between imPDT group and non-imPDT group

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Photodynamic Therapy Combined with Localized Sclerotherapy Successfully Treated Perineal Hemangioma

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Significance: Perineal hemangioma is a rare and challenging vascular tumor due to its sensitive location and potential complications, such as ulceration and infection. This case highlights the successful treatment of a perineal hemangioma in a 5-year-old child using combined photodynamic therapy (PDT) and localized sclerotherapy.

Approach: The patient underwent three sessions of PDT, with noticeable improvement observed after the third session. Localized sclerotherapy was then performed, resulting in partial improvement. One month later, the lesion worsening prompted two additional PDT sessions, leading to significant progress and complete lesion resolution.

Results: The combination of localized sclerotherapy and PDT led to a significant reduction in lesion color and normalization of surrounding skin. No recurrence was observed during a three-month follow-up period.