

Actinomyces oris, and *Candida albicans*. The Shannon index was 2.614 in controls and 2.969 in the study group. Simpson dominance was 0.083 and 0.055, while Simpson diversity was 0.917 and 0.945, respectively. These values indicate a larger number of detected taxa, a more even frequency distribution, and weaker dominance in children with gastritis or gastro-duodenitis. Bray-Curtis dissimilarity was 0.685; thus, the microbial profiles differed by 68.5 %, with a similarity of 31.5 %. These comparisons are descriptive because the statistical significance of between-group differences in diversity indices was not tested.

Catalase-positive phenotypes were recorded among *Neisseria spp.*, *Rothia spp.*, *Staphylococcus spp.*, and *Candida albicans*, whereas the isolated streptococci were catalase-negative. Catalase-positive members of a mixed biofilm may contribute to hydrogen peroxide decomposition and collective protection against oxidative stress, potentially supporting persistence of the microbial community. This functional interpretation should be confirmed in further studies.

In conclusion, children with gastritis or gastroduodenitis and multiple caries displayed a richer, more even, and compositionally distinct oral-fluid microbiome than controls. The presence of additional opportunistic taxa and catalase-positive microorganisms may reflect restructuring of oral microbial interactions. Larger studies controlling for age, oral hygiene, diet, dental status, and treatment are required to establish statistical and causal relationships.

References

1. Marsh, P. D. (2006). Dental plaque as a biofilm and a microbial community: Implications for health and disease. BMC Oral Health, 6(Suppl 1), S14. <https://doi.org/10.1186/1472-6831-6-S1-S14>
2. Takahashi, N., & Nyvad, B. (2011). The role of bacteria in the caries process: Ecological perspectives. Journal of Dental Research, 90(3), 294-303. <https://doi.org/10.1177/0022034510379602>

<https://doi.org/10.30970/apmicro.2026.72>

Melnyk O., Verhun A., Pavliy S., Verhun O., Kovalenko I.

THE ROLE OF *ARCANOBACTERIUM HAEMOLYTICUM* IN THE DEVELOPMENT OF A PURULENT-NECROTIC LESION: A CLINICAL AND MICROBIOLOGICAL CASE REPORT

State Non-Profit Enterprise "Danylo Halytsky Lviv National Medical University",
69 Pekarska St., Lviv, 79010, Ukraine
e-mail: viruszet8@gmail.com

Abstract. *Arcanobacterium haemolyticum* is an under-recognised opportunistic pathogen that may contribute to skin and soft-tissue infections, particularly in patients with malignancy, tissue necrosis, impaired local blood supply, and immune dysfunction. This clinical and microbiological case report aimed to determine the significance of *A. haemolyticum* isolated from a purulent-necrotic lesion in a patient with recurrent basal cell carcinoma of the anterior chest wall. A male patient born in 1948 presented with an extensive malignant wound following repeated surgical interventions and radiotherapy, accompanied by sternal osteomyelitis, a pathological fracture, cachexia, and severe functional impairment. Bacteriological examination of an intraoperatively collected specimen from the deep area of the lesion yielded *A. haemolyticum* at a concentration of 10^5 CFU/mL, and species identification was confirmed by MALDI-TOF mass spectrometry. The clinically significant microbial load and pronounced local signs of infection suggest that the isolate was not merely a surface coloniser but a potential aetiological agent contributing to the persistence

of the inflammatory and necrotic process. This case highlights the importance of species-level identification and quantitative assessment of coryneform bacteria isolated from chronic malignant wounds to support individualised management of oncology and palliative care patients.

Keywords: *Arcanobacterium haemolyticum*; basal cell carcinoma; malignant wound; purulent-necrotic lesion; skin and soft-tissue infection; opportunistic infection; palliative care.

Background. Chronic ulcerative-necrotic lesions associated with malignant skin neoplasms create favourable conditions for colonisation and proliferation by opportunistic microorganisms, while impaired blood supply, tissue necrosis, a prolonged wound course, previous radiotherapy and surgical interventions, and the patient's poor general condition increase the risk of secondary bacterial infection.

One of the insufficiently investigated causative agents of skin and soft-tissue infections is *Arcanobacterium haemolyticum*. It is a Gram-positive, catalase-negative, facultatively anaerobic, coryneform bacterium predominantly associated with pharyngitis and skin and soft-tissue infections. Because of its slow growth, distinctive haemolytic properties, and morphological similarity to other coryneform bacteria, this microorganism may be misinterpreted as a component of the commensal microbiota. However, in patients with disrupted skin integrity, immune dysfunction, malignancy, cachexia, and limited mobility, *A. haemolyticum* may become clinically significant and contribute to the development of deep purulent-necrotic lesions.

Aim. To determine the clinical and microbiological significance of *Arcanobacterium haemolyticum* isolated from a purulent-necrotic lesion of the skin and soft tissues in a patient with recurrent basal cell carcinoma of the anterior chest wall.

Materials and Methods. Medical records and clinical and microbiological findings were analysed for a male patient born in 1948 with recurrent basal cell carcinoma of the anterior chest wall, previously treated surgically in 2004 and 2009 and with radiotherapy in 2022, who developed an extensive ulcerative-necrotic defect, putrefactive tissue necrosis, and sternal osteomyelitis with a pathological fracture. Clinical assessment included wound characteristics, signs of inflammation and necrosis, and functional status according to the Karnofsky, ECOG, and Barthel scales; treatment at the Fourth Hospital of the Second Medical Association of Lviv comprised repeated necrectomies and sequestrectomies, stabilisation of the sternal fragments, and correction of comorbidities. Intraoperative specimens collected aseptically from deep areas of the purulent-necrotic lesion were cultured to determine microbial load and isolate characteristics, followed by species-level identification using matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF MS).

Results. At the time of examination, the patient's general condition was severe and was determined by progression of the malignant neoplasm, the presence of an extensive ulcerative-necrotic defect, and marked functional impairment. A wound defect measuring approximately 15 × 15 cm and up to 1.5 cm in depth was identified on the anterior chest wall, and its bed was covered with fibrin and necrotic tissue. Irregular, infiltrated wound margins, purulent discharge, and a foul odour were observed, indicating secondary infection of the malignant wound. The patient's functional status was characterised by a substantial reduction in daily activity: the Karnofsky Performance Status score was approximately 30 %, the ECOG Performance Status score was 4, and the Barthel Index was below 25 points. The patient was highly dependent on assistance from others and required continuous care and palliative support.

Bacteriological examination of material obtained from the purulent-necrotic lesion yielded *Arcanobacterium haemolyticum* at a concentration of 10⁵ CFU/mL, and the species-level identity of the isolate was confirmed by MALDI-TOF MS.

The detection of *A. haemolyticum* at a clinically significant concentration in a specimen obtained directly from the pathological lesion was accompanied by pronounced local signs of infection, including purulent discharge, necrosis, fibrinous deposits, and a foul odour.

These findings support the interpretation of the isolated microorganism not merely as a surface coloniser but as a potential aetiological agent contributing to the persistence of the inflammatory and necrotic process.

Considering the patient's clinical history, the pathogenic potential of the bacterium may have been facilitated by disruption of the skin barrier, the presence of necrotic tissue, impaired blood supply to the malignant wound, previous radiotherapy, repeated surgical interventions, progression of the malignancy, severe functional impairment, and weakened local and systemic antimicrobial defence mechanisms. The pathogenicity of *A. haemolyticum* is primarily associated with the production of phospholipase D, which damages cell membranes, increases tissue permeability, and facilitates bacterial dissemination. Haemolytic activity, neuraminidase production, adhesion capacity, and the ability to form persistent microbial communities within chronic wound tissues may also contribute to its pathogenicity.

The patient had a long-term history of malignancy and had previously received specific anticancer treatment. Progression of the underlying disease was accompanied by impaired nutritional status, cachexia, reduced functional activity, and prolonged immobilisation. Against this background, an extensive purulent-necrotic soft-tissue lesion developed.

Conclusions. The isolation of *A. haemolyticum* at a concentration of 10^5 CFU/mL from a deep area of the wound defect, together with the presence of purulent discharge, necrosis, and fibrinous deposits, supports its involvement in the persistence of the infectious process. Progression of basal cell carcinoma, repeated surgical interventions, previous radiotherapy, impaired local blood supply, and the patient's poor general condition created favourable circumstances for the expression of the microorganism's pathogenic potential. Coryneform bacteria isolated from chronic and malignant wounds should not automatically be regarded as contaminants without species-level identification and quantitative assessment of the microbial load. Microbiological examination of malignant wounds should constitute an integral component of the comprehensive management of oncology and palliative care patients and should inform the development of an individualised therapeutic strategy.

<https://doi.org/10.30970/apmicro.2026.73>

Motyka O.¹, Zvir G.², Kapustiak K.³, Mazhak K.¹, Slesarchuk O.¹, Bonchuzhna-Stepanian M.¹

IN VITRO EFFECT OF COLISTIN IN COMBINATION WITH MEROPENEM, RIFAMPICIN, TIGECYCLIN AND AMPICILLINE-SULBACTAME ON BIOFILM FORMATION IN EXTENSIVELY DRUG-RESISTANT *ACINETOBACTER BAUMANNII* ISOLATES

¹Lviv Research Institute of Epidemiology and Hygiene Danylo Halytskyi Lviv National Medical University, 12, Zelena St., Lviv, 79005, Ukraine

²Ivan Franko National University of Lviv, 4, Hrushevsky St., Lviv, 79005, Ukraine

³Institute of Cell Biology of the National Academy of Sciences of Ukraine, 14/16 Drahomanova St., Lviv, 79005, Ukraine
e-mail: difteriandi@gmail.com

Abstract. The effect of colistin combinations with meropenem, rifampicin, tigecyclin and ampicilline-sulbactame on *Acinetobacter baumannii* was studied (17 clinical isolates with XDR phenotype, two of this colistin resistance). For colistin-susceptible isolates the combination of