

# Nucleotide receptors as targets in the pharmacological enhancement of dermal wound healing

[Edyta Gendaszewska-Darmach](#) and [Marta Kucharska](#)

## Abstract

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With a growing interest of the involvement of extracellular nucleotides in both normal physiology and pathology, it has become evident that P2 receptor agonists and antagonists may have therapeutic potential. The P2Y2 receptor agonists (diquafosol tetrasodium and denufosol tetrasodium) are in the phase 3 of clinical trials for dry eye and cystic fibrosis, respectively. The thienopyridine derivatives clopidogrel and ticlopidine (antagonists of the platelet P2Y12 receptor) have been used in cardiovascular medicine for nearly a decade. Purines and pyrimidines may be of therapeutic potential also in wound healing since ATP and UTP have been shown to have many hallmarks of wound healing factors. Recent studies have demonstrated that extracellular nucleotides take part in all phases of wound repair: hemostasis, inflammation, tissue formation, and tissue remodeling. This review is focused on the potent purines and pyrimidines which regulate many physiological processes important for wound healing.

# Dietary Nucleotide Supplements to Promote Wound Healing and Recovery

## **Challenge**

Extended injury or recovery from surgery has a tremendous financial impact on both patients and their employers. Productivity loss is equally severe: while the comprehensive are difficult to estimate, one study estimated that the state of Washington alone lost over 28,017 years of worker productivity to injury and recovery in 2003 alone, with associated lost economic output totaling \$260 billion nationwide. Therapies capable of inducing wound healing and improving recovery times would help alleviate some of this burden, in addition to providing better health outcomes for patients.

## **Solution**

The present invention is a new application for dietary nucleotides. Dietary additions of pyrimidines and purines were demonstrated to reduce healing time, in addition to reducing rates of sepsis and infection after injury. Patients would receive either parenteral or enteral doses of nucleotides before or after surgical procedures and after injuries.

## **Benefits and features**

- Low-cost intervention
- No likely side effects

## **Market Potential / Applications**

This invention is applicable to any injury or surgery requiring tissue repair or presenting the possibility of infection. Dietary nucleotides could be marketed to hospitals looking to reduce recovery time to free space for patients, injured patients and patients scheduled to undergo surgery, and healthy individuals looking for preventative supplements.

## **Rice Researcher**

Fred Rudolph was the Ralph and Dorothy Looney Professor of Biochemistry and Cell Biology at Rice University and Department Chair from 1995 until 2003. His research helped uncover the role of dietary nucleotides in immunity, prompting permanent changes in the composition of infant formula.