

# MODIFIED BNC FOR CHIP CARDS AND MEDICINE

Reference No. B76007

## CHALLENGE

Bacterial nanocellulose (BNC) is a **renewable, environmentally friendly material** that has many advantageous properties, like a pure fiber network structure, a high degree of polymerization, a high mechanical strength, a great water holding capacity and biocompatibility. Therefore BNC attracts attention in **various application fields**. Here a BNC, which was **modified with light-gated DNA-Polymerases**, other **light gated-proteins** and **DNA** is described, which can be applied in two fields:

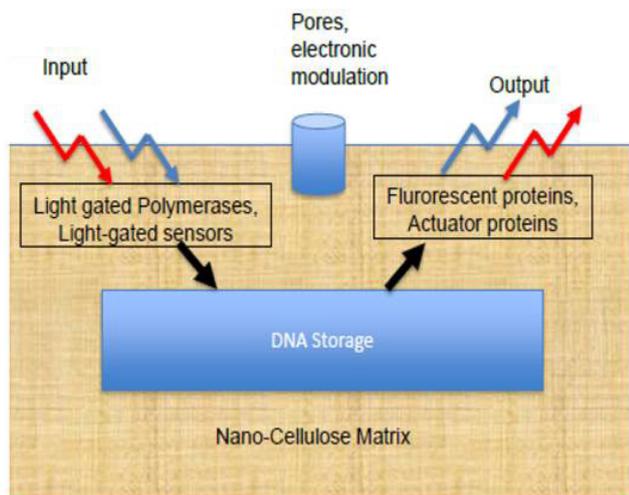
- modified BNC as a nanocellulose chip technology for data storage (Nanocellulose Chip)
- modified BNC as a optoelectronic device for wound monitoring and tissue engineering

## INNOVATION

### Modified BNC as a nanocellulose chip technology for data storage

The emerging technology uses nanocellulose as a matrix for the new chip. Thereby text, image and sound information are **encoded into DNA** using **light-gated polymerases**. The **read-out** uses **fluorescent exonucleases**. Light allows **ultrafast substrate change** (for read-in) and **specific addressing of information** stored in the nanocellulose chip matrix, while light-gated proteins, specific promotor and terminator sequences enhance storage and processing further. Light-sensitive nano-pores control electronic properties. Further interfaces to silicon computers use fluorescent proteins. The technology has many advantages:

- the potential of ultrahigh density data storage (Billions of Gigabyte) embedding DNA
- ultrafast (million times faster than conventional computer chip) information processing of the nanocellulose embedded DNA
- use of light and light-gated proteins instead of electronics
- safe data storage for many thousands of years.



### Modified BNC as a optoelectronic wearable for wound monitoring

The emerging technology uses nanocellulose as a matrix for a tissue repair plaster. Light-gated proteins are embedded and can **display the wound condition**. Light-induced **release of growth-factors** or **pharmaceuticals** can support and accelerate wound healing.

## COMMERCIAL OPPORTUNITIES

The novel chip technology can be used as a novel data storage system, as a computer chip or a wearable for wound healing.

## DEVELOPMENT STATUS

Proof of concept (nanocellulose laboratory demonstrator with light gated constructs).



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