



DE-KA
Medizinprodukte
GmbH & Co. KG

Living without Pain.

DE-KA TITAN – The
intelligent Pain Reliever





Some Words to Pain

- Pain conditions are one of the most frequent and burdensome forms of sickness.

- **Pain influences the quality of life**

Basics

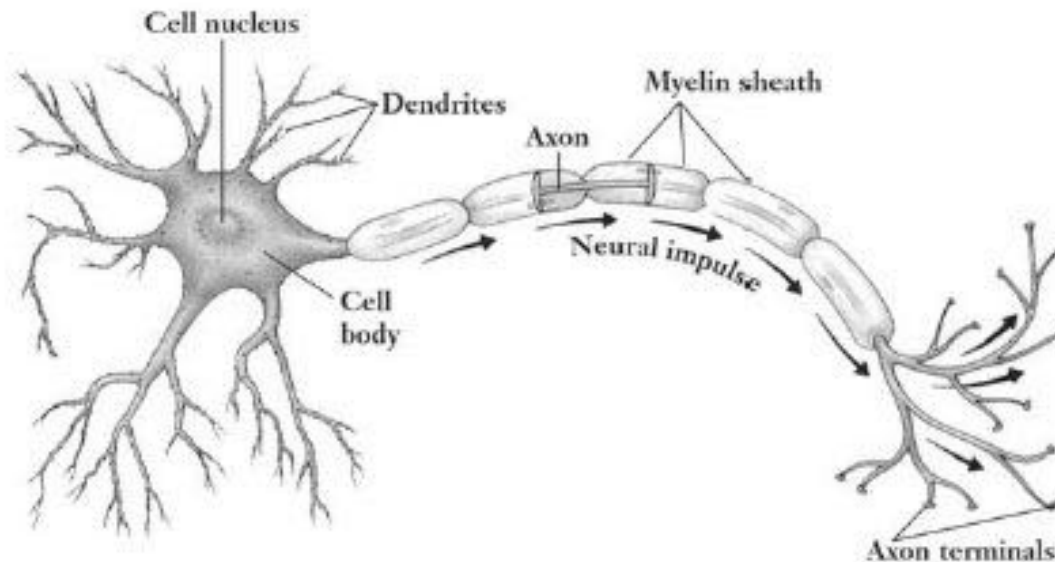
DE-KA TITAN – The Intelligent Pain Reliever

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Basic information on pain transmission

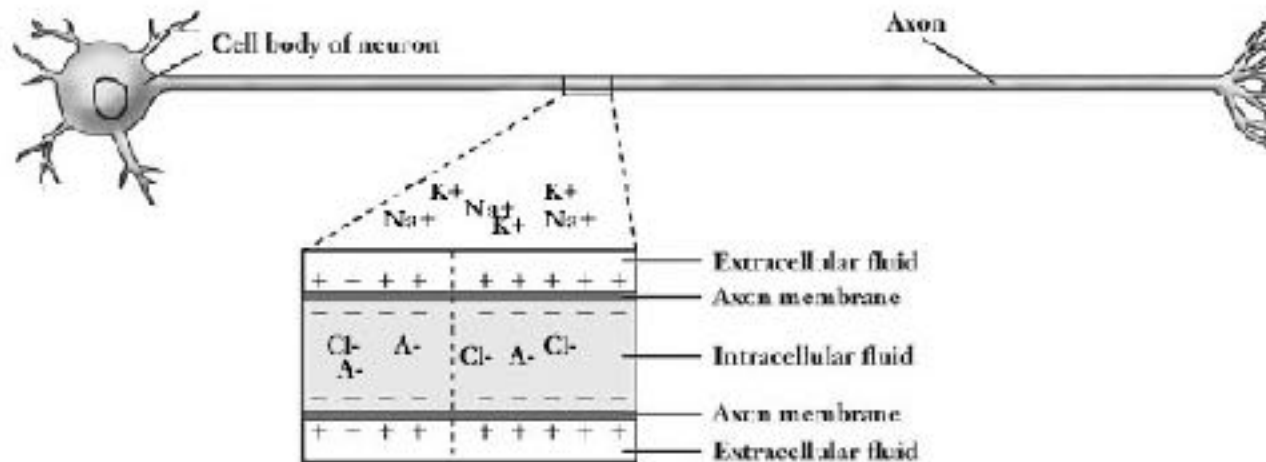
- Pain is transmitted by an electrical Signal, which is called Action Potential.
- This signal is sent by Axon to brain in order to transform or translate the pain level.





Basic information on pain transmission

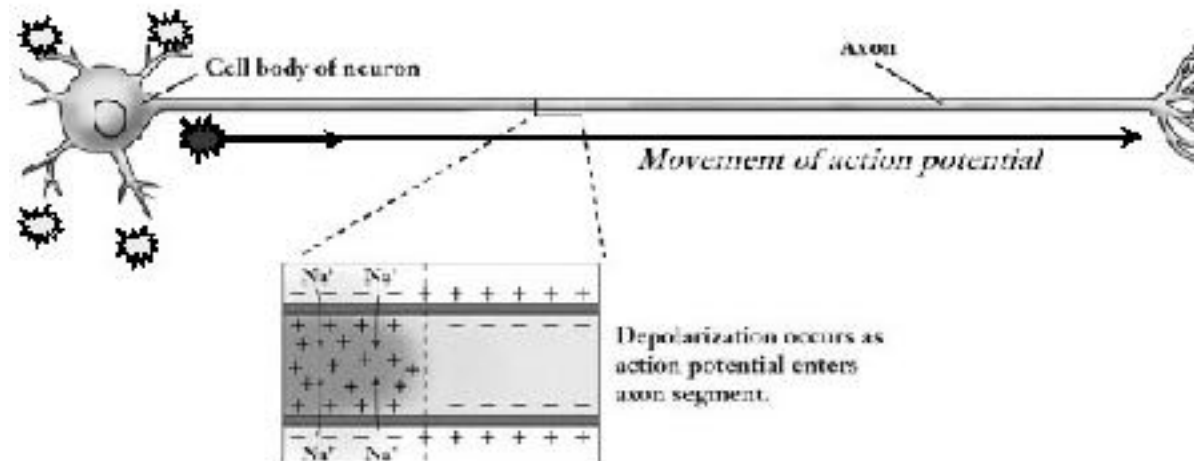
- Excitable cells, nociceptors possess a rest potential.
- The interior of an excitable cell in the rest state is at a negative potential between -60 to -100 mV to the external surface of the Axon tissue. This is caused by the different distribution of the ions in the two spaces.





Basic information on pain transmission

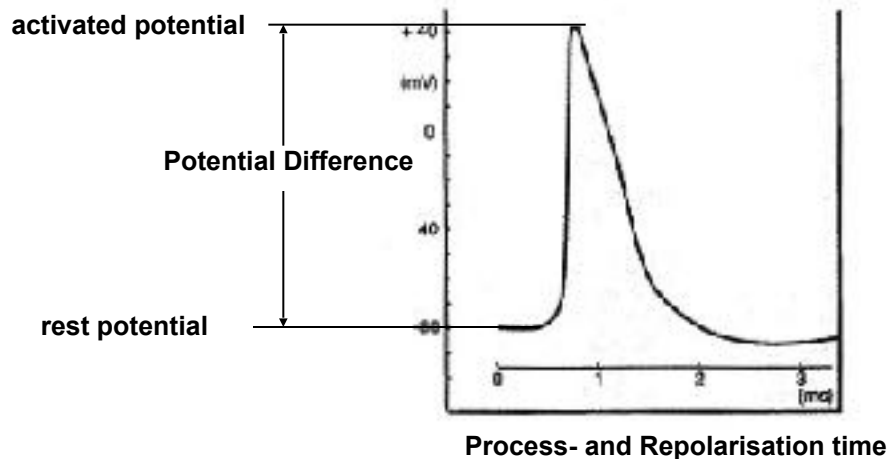
- A stimulus causes an exceeded threshold potential. Induced by a briefly (< 1 ms) opening of the membrane channels for the small sodium ions. The membrane potential suddenly reduces, the nerve interior even becomes temporarily positive.





Basic information on pain transmission

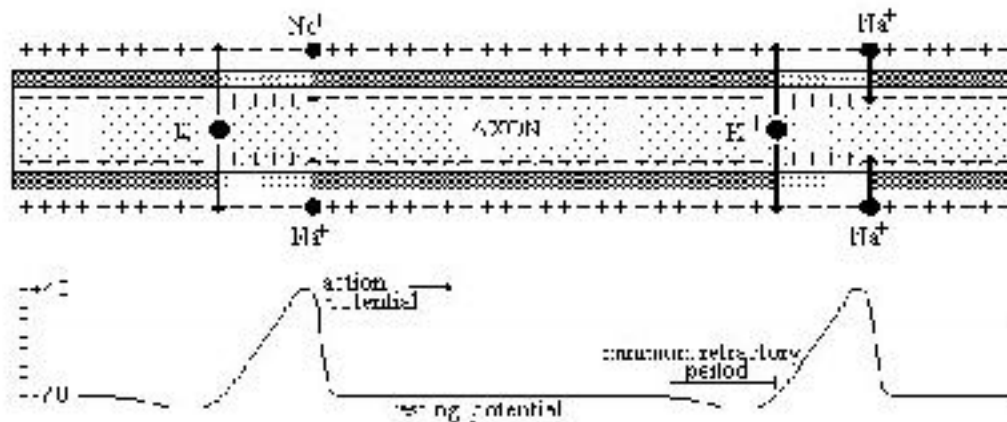
- After this „Relaxation-Time“ for repolarisation the cell has reached its ground potential (-60 to -100 mV) and a subsequent process begins again
- The stimulus process of a receptor cell (noziceptor) centralized:





Stimulus and Transmission

- The nerve fibre is excitable at the earliest after 2 ms. So the pain stimulus is transmitted by potential waves.
- The maximum frequency action potentials can be triggered and conducted over the nerve fibres is 500 1/s.





Gate control theory

- The calculated maximum possible frequency at which action potentials can be triggered of 500 1/s does not comply with realistic in vivo-systems.
- *Explanation:*
- In addition to the upstream pain-initiating system, a downstream pain-inhibiting system exists, whose fibres originate from various levels of the central nervous system and which regulates the flow of noziceptive stimuli.
- As the upstream pulse current is controlled by the pain-inhibiting system – like passing through a gate, this is also referred to as the **gate control theory**.
Endorphines and enkephalines have been identified as physiological activators of the pain-inhibiting system.



Résumé

- The basis of any feeling of pain is a stimulus.
- The stimulus is converted to pain signals, receptor potentials.
- The pulse current, generated by rapid repetition of those potential differences is transmitted to the brain via the nerves.
- The higher the frequency of potential differences the higher the pulse current.



Idea and Solution

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The Idea

- As pharmaceutical products use the downstream pain-inhibiting system of the Gate Control Theory (Endorphines and enkephalines as physiological activators).
- The pulsating DC voltage from this system can be measured in the peripheral nerve lines externally, i.e. through the skin and tissue.
- ***So the questions were:***
- Why not using the upstream pain-initiating system.
- Why it shouldn't be possible to smoothen these potentials from external so that only a reduced level of pain or no pain at all is reported to the brain?



The Solution

- Like a RC element in an electrical circuit, a special capacitor circuit placed on the skin makes it possible to smoothen the potential differences leading to a attenuation of the signal current of a pain to the brain by nerves.



Medical Tests

- Scientific tests conducted by recognized and neutral institutions proved the effectiveness of the DE-KA Titan.
- Tests conducted by a German University
Result: Significant reduction of pain duration
- Pain Clinic
Just placing the sensor housing against the forearm veins produced a test success rate of of 54 % after only 30 minutes
- Cang An Hospital, Xian
Test period 2 months; 75% have experienced pain relief
- Own experiences with patients led to a success rate of over 80%



Product and Application

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The Product

- The De-Ka Titan is a purely passive medical product to relieve pain.
- Intelligent - The absorption of pain is reached by a large capacitance of an electrical capacitor contained in the DE-KA Titan. The greater the pain stimulus, the greater the absorption.
- The effect of this device can be extended to the whole body via large vessels close to the skin.



Application

- The DE-KA Titan Pain Reliever is basically suitable for handling any kind of pain.
A definite pain pulse is important for stimulating the Pain Reliever.
- Good results have been achieved for:
Headache, migraine, trigeminal neuralgia, toothache, painful joints, tennis elbow, sciatica and back pain, general muscle pain and muscle cramp, rheumatism, post-operative pain and weather sensitivity.



Using the DE-KA Titan

- The DE-KA Titan is usually worn on the left wrist with the flat side of the housing in contact with the inside of the wrist. The wriststrap should not be too loose.
- For severe pain in the lower extremities, it is advisable to attach an adhesive electrode in the area of the lumbar vertebrae, and for severe back pain or general pain an electrode should be attached as an alternative to the uppermost cervical vertebra.

Features and Advantages

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Advantages of the DE-KA Titan

- Suitable for immediate use – any time, anywhere
 - Needs no power supply
 - Small and handy – European Design
- Effective
 - Without side effects
- Simple to use
 - Worn like a wristwatch
 - Direct, discreet connection to position of pain via electrodes
- Low cost
 - Many years of use for the whole family
 - No battery, no power supply

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Thank you for your attention



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