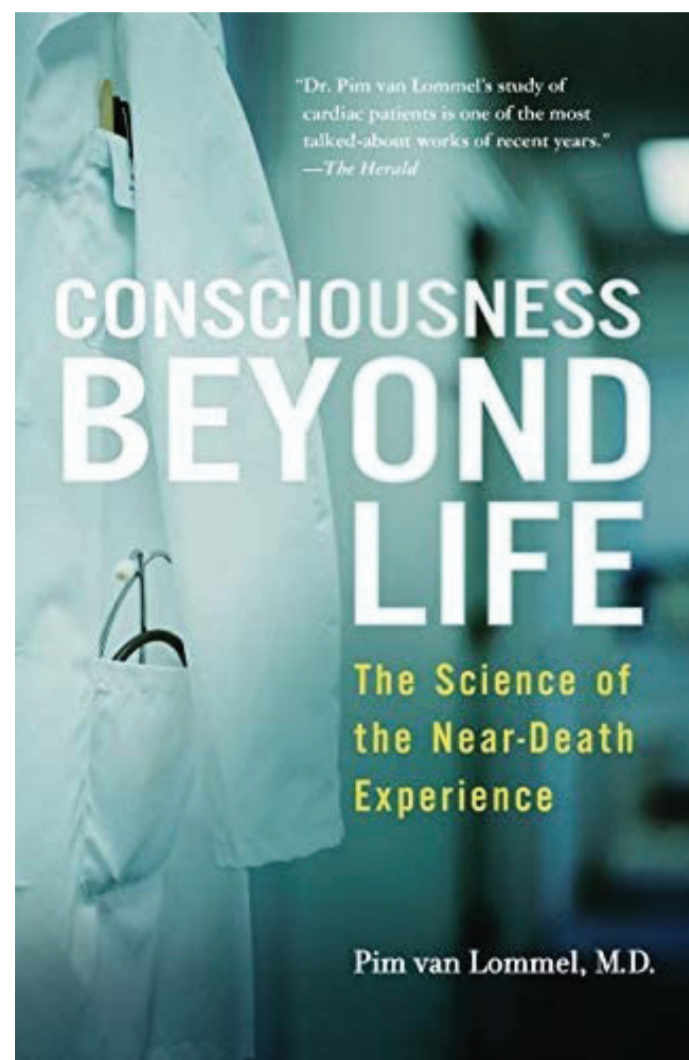


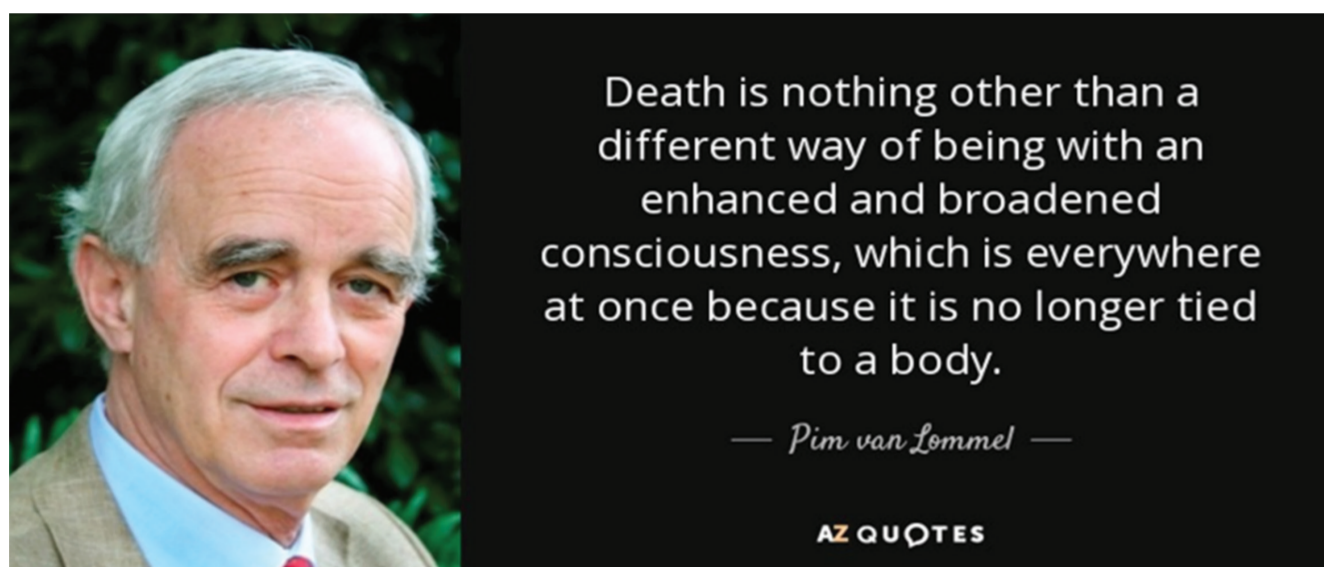
# Near death experiences (NDEs) in Patients with Refractory Cardiac Arrest Treated with Conventional and Extracorporeal Cardiopulmonary Resuscitation in light of further research

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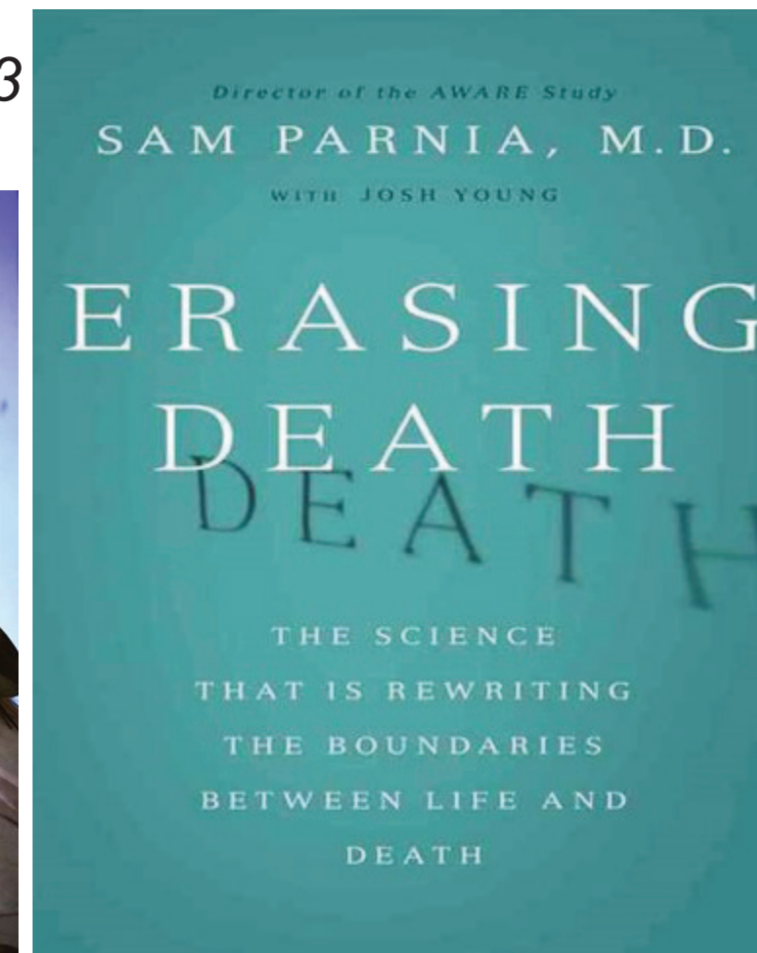
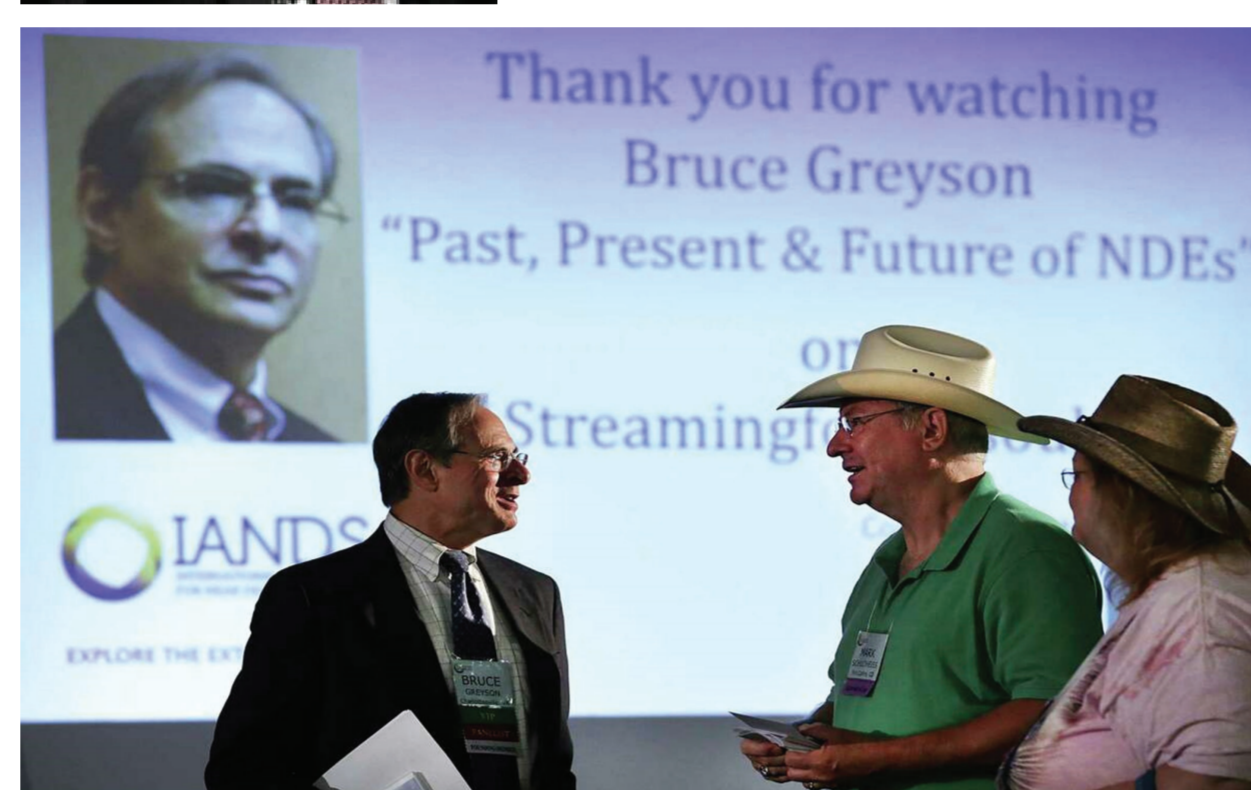


**Cardiology**  
Near-death experience in survivors of cardiac arrest: a prospective study in the Netherlands, *Lancet* 2001 (62 patients, 18% NDE, 12% core NDE)



**Anesthesiology & Psychiatry**

Aware study (Awareness during resuscitation)  
15 hospitals - USA, Austria, England 2008-2012  
2060 cardiac arrests, 140 survivors,  
101 interviewed  
9% NDE  
Aware II Resuscitation 2023



## What is it a Near Death Experience (NDE) ?

A specific cognitive experience occurring during a period of loss of consciousness related to a life-threatening event, including cardiac arrest<sup>1</sup>  
A special state of consciousness that occurs during an imminent or actual period of physical, psychological, or emotional death<sup>2</sup>  
Mislabelled NDE – a heterogeneous group of experiences that are unrelated to death or life-threatening illness and are mislabelled as NDE<sup>1</sup>  
Absence of memory does not mean absence of experience<sup>2</sup>

<sup>1</sup>Parnia, Post, Lee, Greyson, Fenwick et al. Guidelines and standards for the study of death and recalled experiences of death – a multidisciplinary consensus statement and proposed future directions. *Ann. N.Y. Acad. Sci.* (2022) 1-17

<sup>2</sup>Pim van Lommel: *Consciousness beyond life, The Science of the Near-Death Experience*, HarperCollins Publishers, NY10022, first edition published in 2011

## Introduction

Near-death experience (NDEs) occurs in one fifth of patients after refractory cardiac arrest, but the mechanism of their occurrence remains unknown. Our research builds on research into NDEs in patients after refractory cardiac arrest. This study assessed the presence of NDEs in patients from the Prague OHCA study, who had a mean time of cardiac arrest of 37.5 minutes, longer than in other studies on NDEs.

The description of NDEs is very similar to the experiences described after administration of the psychedelic substance N,N-dimethyltryptamine (DMT). DMT is also a very interesting compound with the potential to protect brain tissue via its action on sigma-1 receptors. DMT has already been experimentally detected in the mammalian brain, specifically in the visual cortex of rats after experimental cardiac arrest at concentrations comparable to known monoamine neurotransmitters. A number of studies have investigated the effects of DMT on the brain, and DMT is currently being discussed as a substance with potential for treating some severe neurological diseases such as depression, schizophrenia, Alzheimer's disease and addiction. DMT is referred to act as a psychoplastogen and neuroplastogen, and its effect on dendritic growth and proliferation of synaptic connections have also been demonstrated in vitro.

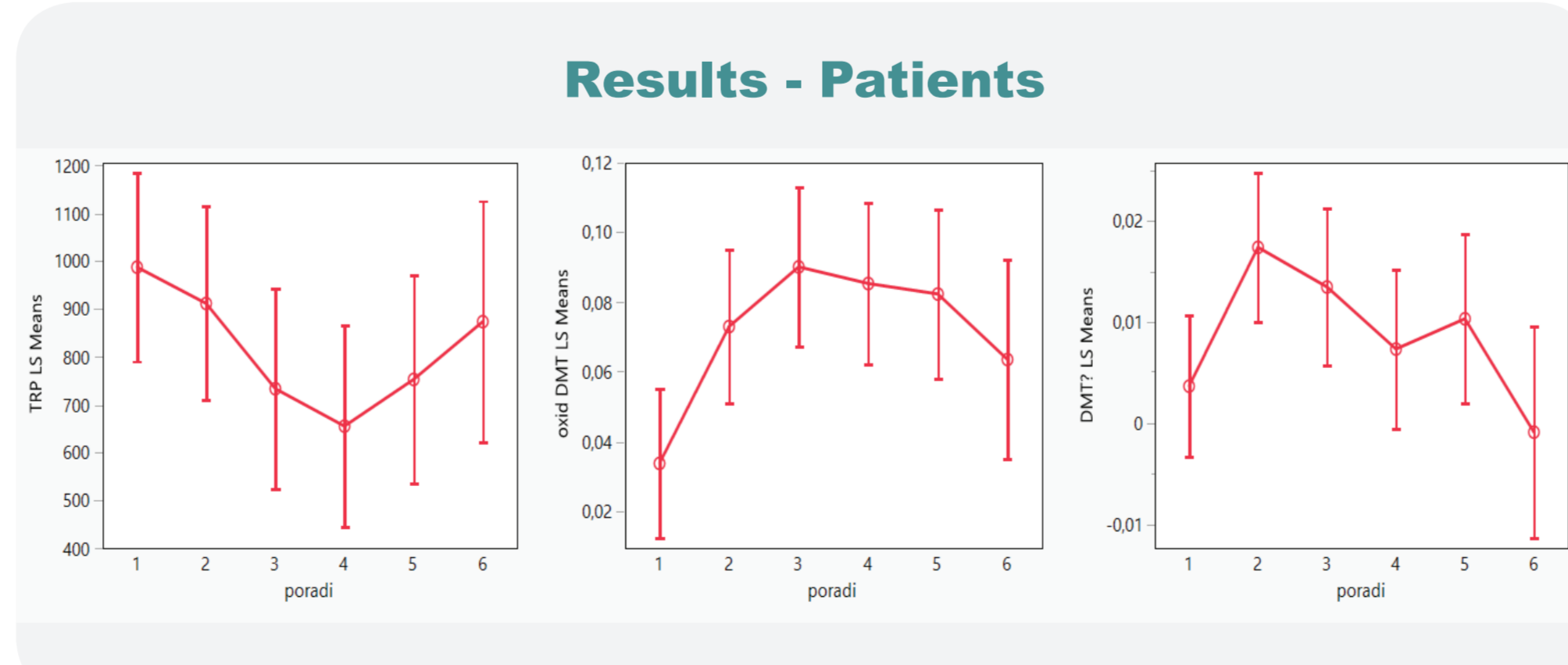
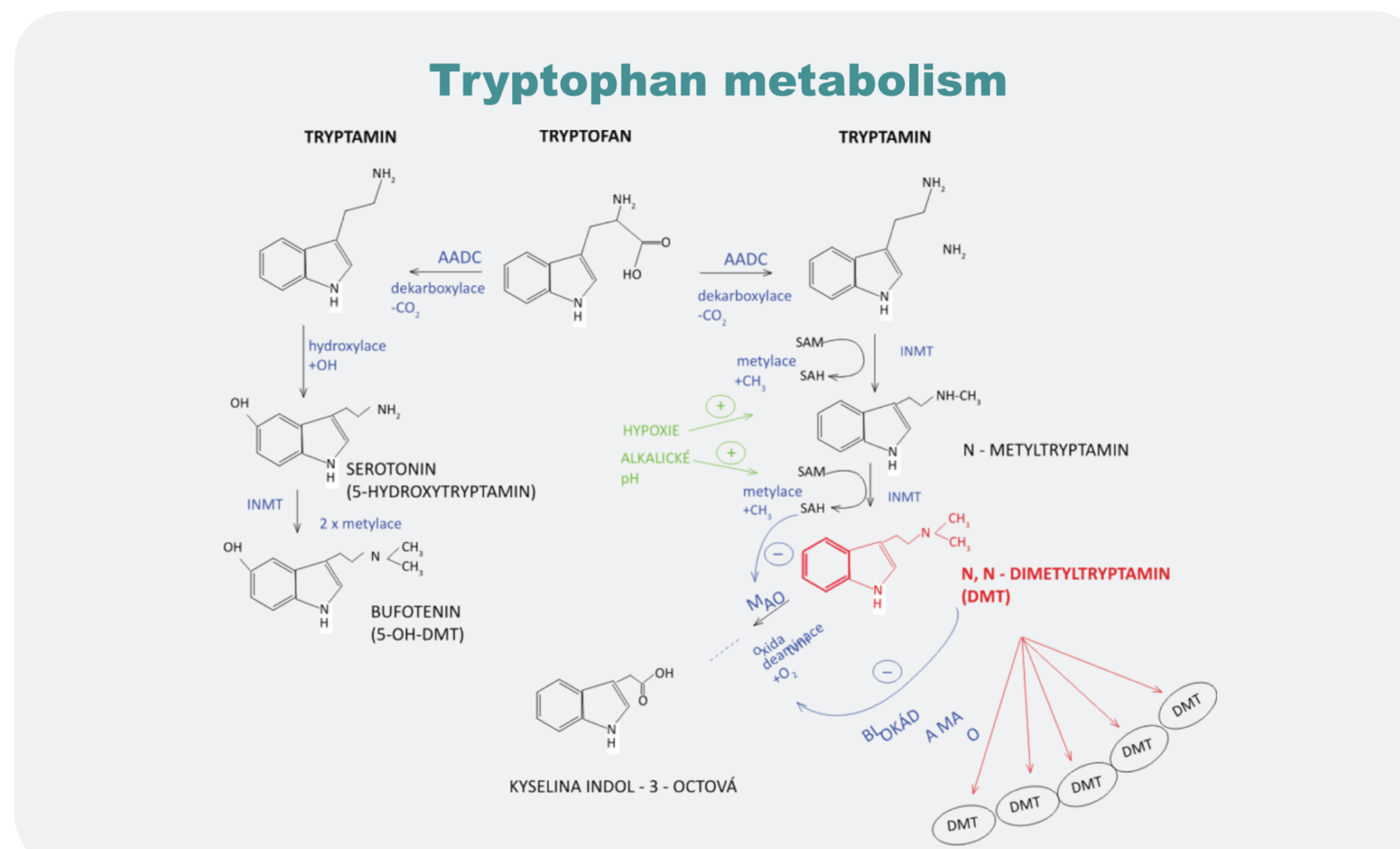
## Aim of study

To demonstrate that DMT can be produced in the body after cardiac arrest. We were aware of the difficulty of this task due to the expected low concentrations of a substance that appears to act at the neurotransmitter level and, moreover, a substance that is subject to extremely rapid metabolism, especially the effect of monoamine oxidase enzyme. We designed study to be first perform in pigs and then in humans. We also wanted to slow down rapid metabolism of this substance by the enzyme monoaminooxidase by added the inhibitor of the monoaminooxidase into the sampling tubes in part of the patients

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## Methods of analysis and results

High pressure liquid chromatography (HPLC) combined with mass spectrometry is powerful tool used for analyses of human plasma metabolites. Thanks to its high sensitivity, accuracy and speed, the method is also suitable for analyses of DMT and its metabolites. Recently, Luethi et al. optimized method for the bioanalysis of DMT and its metabolites DMT-N-oxide and indole-3-acetic acid in human plasma.



In pig serum samples from experimental cardiac arrest, these metabolites were measured: tryptophan, serotonin, tryptamine, DMT, 5-meo DMT, DMT-NO, 5-OH DMT (bufotenine), psilocine and 3-OH-IAA. However, measurable levels were observed only for serotonin, tryptophan, tryptamine (only for pig 1) and 3-OH-IAA. In addition, we detected an unknown substance XXX close to DMT with dynamics corresponding to DMT in the blood of a pig after experimental cardiac arrest. We gave it the working name Trantina, it is a substance with similar dynamics in blood as DMT but compared to DMT it has a retention time of 1 minute shorter and can cleave fragment 189 to 58 and is more polar than DMT.

## Discussion – pig model

- pig model was used for our experiment- experimentally induction of cardiac arrest is possible.
- DMT and some of its metabolites were **undetectable** due to low concentrations or high metabolization rates
- other known psychedelic substances -5-meo-DMT, 5-OH DMT and psilocine – **undetectable**
- new unknown substance XXX similar characteristics to DMT - dynamics that we would expect for DMT

## How to name the new substance similar to N,N-dimethyltryptamine?

Our „working name“ is

**TRANTIN**



## What we found in the blood of patients after cardiac arrest?

- Trantina is in the blood of the patients after cardiac arrest in the **statistically significantly higher level than in the pigs**
- In the blood of the patients is present DMT-NO – product of the metabolism of DMT – indirect proof of DMT
- In the tubes with the inhibitor MAO selegiline is statistically significantly higher level of the tryptamine, **level of Trantina does not differ**

## Conclusion

Our work has provided the first indirect evidence of the N,N-dimethyltryptamine metabolite DMT-NO in the blood of humans after cardiac arrest. It has also led to the discovery of an unknown dimethyltryptamine-like substance with the working name Trantina generated in the blood of pigs and humans after cardiac arrest. We have characterized this substance to the extent available scientific methods allow. Its identification and elucidation of a possible role in the pathophysiology of the brain after cardiac arrest will be the subject to further investigation.

*Respecting things that are difficult to measure rather than dismissing them as unreal is not rejecting science. It's embracing science.*

(Bruce Greyson)

