

Revolutionising Patient Data Management: Introducing *AutoHis*

An AI Solution for Efficient Medical History Extraction

Christopher Farag

BACKGROUND

Electronic medical records (EMR) have generated vast quantities of medical data from routinely collected medical information.

PROBLEM

Data processing from EMR is manual; slow, error-prone and labour-intensive.

AutoHis

METHODS

2700 EMR records were used to develop 3 AI programs

- 1) Vector-based model pre-trained on English plain language
- 2) Vector-based model pre-trained on English medical language
- 3) Transformer model based on RoBERTa (1)

RESULTS

The transformer model demonstrated reasonable proficiency at identifying past medical history items (F-score=0.59) with moderate recall (0.58) and precision (0.60). The transformer-based model outperformed both vector-based models (F-score=0.44).

CONCLUSIONS

The transformer model shows promise at performing clinically useful tasks. AutoHis is comparable in performance to larger models such as GPT 4.0 on standard benchmark tests (2). Further refinement of the model with more documents and synthetic datasets may improve performance further.

1. Liu Y, Qin M, Goyal N, Du J, Joshi M, Chen D, et al. RoBERTa: A Robustly Optimized BERT Pretraining Approach [Internet]. arXiv; 2019 [cited 2024 May 14]. Available from: <http://arxiv.org/abs/1907.11952>

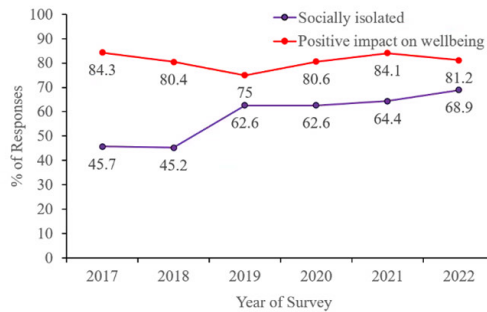
2. Hu Y, Chen Q, Du J, Peng X, Keloth VK, Zuo X, et al. Improving large language models for clinical named entity recognition via prompt engineering. J Am Med Inform Assoc. 2024;e000000.

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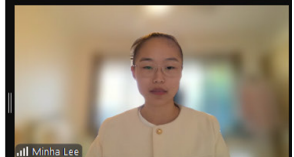
Longitudinal Assessment of Medical Students' Perceptions of Social Isolation and Wellbeing: A 5-Year Analysis of FRAME Surveys (2017-2022)

Minha Lee



Q17. Please rate your agreement with the following statements

	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree
1 Overall, my RCS placement impacted positively on my wellbeing					
2 I felt socially isolated during my RCS placement					



FIRST RUNNER UP

Minha Lee

Extra! Extra!

"Opioid Crisis Reaching New Heights, Demands New Approach

Could Continuous Wound Infiltration (CWI) be the Answer?

A Proposition:

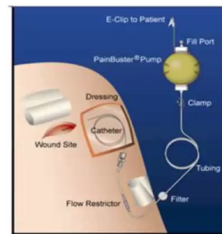
Adequate Pain Control with local agent CWI

Reduced Intra and Post-Operative Opioid Use

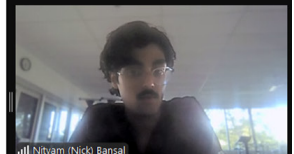
Lowered opioid dependence in the population

"Comparable pain relief with lower risks? Sign me up!"
- Local Patient

"Part of something bigger..."
- Anaesthesiologists suggest



1. Photo courtesy of Royal Children's Hospital, Melbourne



SECOND RUNNER UP

Nityam Bansal

Heat therapy as a non-pharmacological treatment for Alzheimer's disease

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Background

Current pharmacological treatments for Alzheimer's disease (AD) have severe side effects, with little improvement of symptoms¹. Heat treatment (sauna) frequency is inversely correlated with risk of developing AD and dementia in humans². Current heat protocols are not translatable to humans due to the use of anaesthetics³.

Aim

Assess the efficacy of heat therapy in increasing HSP70 in wildtype-like adult mice, while developing a heat therapy protocol that could be clinically relevant.

Methods

C57BL/6 wildtype-like male mice (5 months old, control group n=5 and heat therapy group n=5) Mice subcutaneous temperature recorded during treatment using PIT tag



Results (protocol 3)

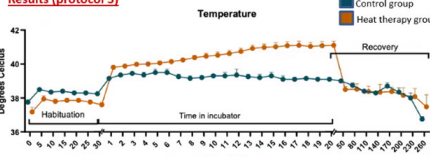


Fig. 1 Subcutaneous temperature 5-minutely during incubation (time from animal arrival in testing room to start of incubator exposure), minute by minute during heat shock (HS) or room temperature exposure for the same time (CTR), and 30-minutely during recovery (time from end of incubator exposure to euthanasia).

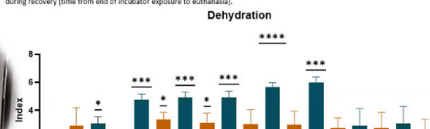


Fig. 2 Dehydration index at the start of the experiment and every 30 minutes thereafter (before body weight - after body weight)/before body weight $\times 100$. One sample t-test was used against index of 1 (**p<0.05, ***p<0.01, ****p<0.001, *****p<0.0001).

We developed a new sauna protocol that was able to induce HSP70 in tissues relevant to neurodegenerative diseases, without the use of anaesthetics, with no side effects and easily translatable to humans.

Behaviours

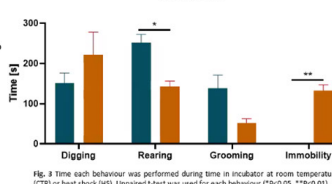


Fig. 3 Time each behaviour was performed during time in incubator at room temperature (CTR) or heat shock (HS). Unpaired t-test was used for each behaviour (*p<0.05, **p<0.01).

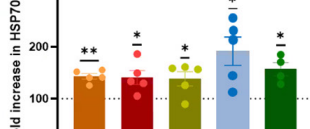


Fig. 4 Fold increase in HSP70 in the prefrontal cortex (PFC), hippocampus (HPC), liver, gastrocnemius (Gastro) and soleus muscle (Soleus) as percentage of control. One sample t-test was used against 100 (ns = not significant; *p<0.05, **p<0.01).

References

1. Kumar A et al. Alzheimer Disease. StatPearls. 2024
2. Laakkonen T et al. Sauna bathing is inversely associated with dementia and Alzheimer's disease in middle-aged Finnish men. Aging. 2017; 40(2):245-249
3. Cory M et al. Constant temperature monitoring: a study of temperature patterns in the postanaesthesia care unit. J Perioperative Nurs. 1999;13:292-300.



PEOPLE'S CHOICE

Orla Solier



Experimental design

Protocol 1: incubator at 40.8°C 20 min of temperature exposure

Protocol 2: incubator at 40.8°C 30 min of temperature exposure

Protocol 3: incubator at 42°C 20 min of temperature exposure

4h

Euthanasia and tissue collection

