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PhD in Medical Sciences
2014-2015

INVITATION to the Public defence of

Marijke DE COUCK

To obtain the academic degree of '**DOCTOR IN MEDICAL SCIENCES**'

The role of the vagus nerve in cancer**Tuesday 21 April 2015**

Auditorium **P. Brouwer**, 17:00

Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:

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Vrije Universiteit Brussel

Summary of the dissertation

This thesis examined the role of the vagus nerve in several types of cancer. Following analysis of existing literature, we hypothesized that the vagus nerve may slow down tumor progression, via three mechanisms (reduced oxidative stress, sympathetic activity and inflammation).

In agreement with existing literature, our historical-prospective studies found an inverse relation between vagal nerve activity (measured via heart rate variability (HRV)) and tumor burden in prostate cancer and a positive correlation between vagal nerve activity and overall survival in non-small cell lung cancer and pancreatic cancer. Concerning the hypothesis, we have preliminary support showing that reduced inflammation (CRP) is the mediator between vagal nerve activity and overall survival in pancreatic cancer patients.

Our data suggest that vagal nerve activity is prognostic, especially in metastatic cancer patients. In addition, the level of HRV in cancer patients is significantly lower than in healthy people, which could propose the bidirectional link between vagal nerve activity and cancer prognosis. Furthermore, we found that SDNN of 20 ms was a reliable cut-off dividing patients with high and low HRV across multiple cancers. Using that cut-off, we showed that when cancer patients have a high level of HRV, their tumor stage may no longer be predictive of tumor burden. These results support vagal nerve protection in various cancers, and propose that the mechanism may involve neuroimmunomodulation.

Future studies need to address the limitations of these studies and experimentally test, in animals and humans, whether vagal nerve activation could reduce tumor progression and the underlying mechanisms.

Curriculum Vitae

Marijke De Couck obtained her Master degree in Environment, Health and Safety Management cum laude at KULeuven in 2010. Afterwards, she started her research as a PhD student in Psychoneuroimmunology under supervision of Prof. Yori Gidron. In these four years, she conducted research on the role of the vagus nerve in cancer and performed many studies (historical prospective, experimental, animal and clinical) trying to identify a possible new adjuvant treatment against cancer. She has been working very closely with several hospitals (UZ Brussel, Erasme hospital, UZ Gent) and has worked with scholars from many countries and disciplines. She also published several articles in various scientific journals, and has presented her findings at international conferences.