Editorial ‘Supplement DIZZYNET 2017’

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Over the last three decades, several international meetings on the vestibular and ocular motor system have been held in honor of the most influential researchers in the field, such as David A. Robinson, Volker Henn, Robert W. Baloh, Ulrich Büttner, David Zee, Thomas Brandt, Jean Büttner-Ennever and Daniele Nuti. The contributions to these meetings have been collected in books and special issues, which have become important collections of the state of knowledge and the progress made on vestibular and ocular motor disorders (Fig. 1).

The current volume entitled ‘*The vestibular system: sensory, motor and cognitive functions*’ follows this tradition. It is based on talks and posters presented at a conference in Hohenkammer, Bavaria, Germany, on October 20–22, 2016. The considerable advances recently made in the field provided a wealth of new information, such as: better understanding of the influence of magnetic field stimulation and microgravity on the vestibular system; new insights into the

pathophysiology of the room tilt illusion; evidence for the dominance of vestibular projections already at the brainstem level; effects of active and passive movements on gaze stability; the role of vestibular-sympathetic reflexes in motion sickness; and the pathophysiology of syncope in patients with Menière’s disease. The conference was attended by 140 scientists and clinicians from different professional backgrounds, especially from neurology, ENT, neurophysiology, basic neuroscience, biology, and engineering. The meeting was organized jointly with the European DIZZYNET, which was established in 2014 and serves as a platform for collaboration and exchange among scientists, physicians, technicians, and physiotherapists in the field of vertigo and balance research. We are particularly grateful for the financial support provided by the German Ministry for Education and Research (BMBF).

A specific aspect of the meeting was to honor Marianne Dieterich in recognition of her outstanding scientific and clinical contributions to the field. Marianne’s enthusiasm for basic and clinical research on vestibular disorders over the last decades has resulted in several pioneering findings, which have significantly enriched our understanding of vertigo and balance disorders and inspired several generations of clinicians and scientists.

Her scientific breakthrough began with publications on clinical eye–head synkinesis, the ocular tilt reaction, and their components skew deviation and tilt of the subjective visual vertical. Based on the correlation of strategic cerebral lesions with clinical signs of an ocular tilt reaction, Marianne established the topographical organization of central graviceptive pathways in the human brain (Fig. 2a). She is an excellent example of how a clinician, who carefully analyzes signs and symptoms in patients, can shed light on basic neuroanatomical principles and mechanisms of diseases. The ocular tilt reaction today is recognized as the most sensitive

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Fig. 1 Selection of books and special issues from previous international meetings in honor of the most influential researchers in the field of vestibular and ocular motor research

Fig. 2 Collection of seminal findings from Marianne Dieterich's work. **a** Description of the tonic ocular tilt reaction as a sensitive sign of lesions of central graviceptive pathways (adapted from Dieterich and Brandt [3]); **b** characterization of vestibular paroxysmia as

a vestibular neurovascular cross-compression disorder (adapted from Brandt and Dieterich [2]); **c** finding of dominance of the vestibular network depending on handedness (adapted from Dieterich et al. [4])

sign in acute unilateral brainstem dysfunctions, which allows to reliably differentiate pontomedullary from ponto-mesencephalic lesions simply by the direction of tilts of the eye, head and visual vertical.

Marianne Dieterich has made significant contributions to the clinical classification of vestibular disorders. She analyzed and named the medical condition “vestibular migraine” together with Thomas Brandt in 1999, which today is an established diagnosis and recognized as the

most frequent cause of recurrent spontaneous vertigo. They coined the term “vestibular paroxysmia” caused by neurovascular cross-compression of the vestibular nerve in 1994 (Fig. 2b), which is now commonly accepted in a consensus document of the Barany Society. A further pioneering finding of the two was their seminal description of “phobic postural vertigo” in 1986, the most frequent functional “vestibular” disorder [1].

Marianne is the pioneer and leading researcher in the field of multimodal imaging of the central vestibular system. Her seminal MRI and PET studies revealed the human homologue of the vestibular cortex, the parieto-insular vestibular cortex, which was first identified by Grüsser and Guldin in monkeys. She was the first to describe the dominance of vestibular cortical function ipsilateral to handedness (Fig. 2c). In a PET study Marianne and Thomas first formulated the principle of reciprocal inhibitory visuo–vestibular interaction. In view of Marianne Dieterich's continued productivity and innovations, we congratulate and dedicate this volume to her.

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Compliance with ethical standards

Conflicts of interest The authors declare no competing financial interests.

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