

reader to the American Diabetes Association and recommendations of the Department of Health and Human Services. The author traces the ancient history of diabetes to the early twentieth-century discovery of insulin and the contributions of the atomic age in the middle and latter part of the twentieth century. These include the Yalow-Berson contribution of the radioimmunoassay of insulin and its clinical application for diagnosing the disease and monitoring its treatment. The evolution of the diabetes experience for patients and professionals is presented in a clear and straightforward manner, highlighted by a focus on the evolution of such issues as “what is normal” for a fasting insulin, hypo- and hyperinsulinemia, gestational diabetes, cardiovascular function, insulin resistance, and the recent metabolic syndrome.

The second part is a presentation of the 14,384 oral glucose tolerance tests with insulin assays. The data presented support the author’s postulate, “Whenever increased insulins of type 2 diabetes were associated with normal blood sugars, ‘occult or prediabetes’ was identified.”

The clinical translation of this experience to the specialty of otolaryngology and the subspecialties of otology and neurotology has been reported for control of balance, tinnitus symptoms, and maintenance of hearing. The author has accomplished his goal to alert the professional and patient communities of the significance of his experience with the oral glucose tolerance test with insulin assays for the early diagnosis of diabetes.

Dr. Kraft’s book is recommended as a source of information to professionals and patients of all ages interested in the maintenance of good health. All join with the author in attempting to influence and limit the clinical progression of the “diabetes epidemic.” This volume is a step forward for achieving the author’s ultimate goal: “the prevention of the pathology of diabetes mellitus and cardiovascular disease.”

Abraham Shulman, MD, FACS

This is a wonderful text both for the public and for our profession because of the tremendous amount of knowledge that reflects what we do know and what can occur later. There is no question that the body’s biochemistry and neural mechanisms rely on our intake of food or exposure to other chemicals. Therefore, as diabetes affects these entities, they also affect our body in relation to all other illnesses. This is a superb textbook that should be read by the public, by members of our profession while in training, and by those who are in practice so that they will begin to understand and expect what is occurring biochemically. It is a book both for the present and for the future, and it deserves great commendations.

Wallace Rubin, MD

### ***Tinnitus: Pathophysiology and Treatment Volume 166 (Progress in Brain Research)***

Berthold Langguth, Goran Hajak, Tobias Kleinjung, Anthony Cacace, and Aage R. Moller, Editors

Netherlands: Elsevier, 2007. Hardcover. ISBN: 978-0444531674

The book *Tinnitus: Pathophysiology and Treatment, Volume 166 (Progress in Brain Research)* is an excellent contribution to the tinnitus literature. It reflects significant advances in the discipline of tinnitology for tinnitus theory, basic science, and clinical translation for diagnosis and treatment, which ultimately benefits tinnitus patients. Tinnitology is a multidiscipline of professionals dedicated to the study of tinnitus and to the integration of clinical otology with the behavioral and basic sciences. In the varied sections of this commendable book, the contributors recognize that the pathophysiology of tinnitus is a work in progress, reflecting what is known and not known of the auditory system and brain function. (These contributors in the main were participants in a conference in Regensburg, Germany, in 2006, sponsored by the Tinnitus Research Initiative.)

The book focuses on the pathophysiology of tinnitus as identified, theorized, and clinically manifest at this time. The work is divided into six sections: Introduction, Pathophysiology, Epidemiology, Diagnosis and Evaluation of Tinnitus, Treatment, and Assessment of Results. The introduction presents a review of the past and a projection for the future.

The pathophysiology section integrates existing theories of the origin and generation of the tinnitus signal by investigating the animal model. It highlights clinical insights into the role of neural plasticity; tinnitus and pain; relevance of spontaneous activity for the coding of the tinnitus sensation; and clinical reports of tinnitus patient investigations using nuclear medicine imaging and functional imaging of chronic tinnitus with brain positron emission tomography. Especially relevant is the report of magnetic resonance spectroscopy and its potential for increasing accuracy in tinnitus diagnosis and providing a basis for new pharmacological protocols for treating clinical types of tinnitus. The section contains interesting theories of tinnitus that review some current thinking about the role of the dorsal cochlear nucleus, the neural mechanisms of tinnitus, and tinnitus models. A valuable consideration for future volumes would be discussion of the integrated tinnitus dyssynchrony-synchrony theory, which has been reported to have significant clinical translation for tinnitus diagnosis and treatment and correlation with objective measurements of brain activity in tinnitus patients.

The chapters in the epidemiology section focus on single epidemiological issues of genetics, hyperacusis,

and children but do not cover the broad issue of tinnitus epidemiology in Germany. For the future, the editors should consider including such significant information as the special characteristics of tinnitus in Germany, its clinical course, tinnitus demographics, parameters of identification of tinnitus as compared to reports from other countries (e.g., the United States, the United Kingdom), and the clinical problems confronting tinnitus patients and professionals attempting its diagnosis and treatment. The chapter on the genetics of chronic tinnitus presents reliable information on the association of monogenic disorders associated with secondary chronic tinnitus and a summary of the literature of strategies attempting to identify the genetic basis for tinnitus. One strategy is to identify biomarkers (e.g., serotonin) associated with tinnitus. Another is an attempt to reveal a common genetic background of factors associated with tinnitus. Such information would provide a basis for the investigation of the genetic predisposition of patients to tinnitus (i.e., the endophenotype approach).

This topic is critically significant for future diagnosis and treatment of tinnitus (i.e., a molecular genetic identification of clinical types of tinnitus and its translation for personalized tinnitus treatment). Future editors would do well to include in meetings and transactions of tinnitus meetings in Germany the reported identification of the gamma-aminobutyric acid type A receptor (GABA-A) as a biochemical marker for a predominantly central-type tinnitus; its translation for treatment (i.e., a receptor-targeted therapy targeting the GABA-A receptor); and objective evidence that supports the hypothesis of a benzodiazepine deficiency syndrome.

The chapters in the section on diagnosing and evaluating tinnitus include a focus on single diagnostic clinical types of tinnitus and what can be considered factors influencing the clinical course of tinnitus—somatosensory tinnitus, myofascial trigger points, temporomandibular joint, cervical spine, and significant associated conditions of altered affect (i.e., depression and sleep). Although the information presented is excellent, tinnitus is not a unitary symptom; clinically different types of tinnitus have been identified. The chapter on tinnitus severity, depression, and the big five personality traits is significant. This report demonstrates the role of those five traits—neuroticism, extraversion, openness, agreeableness, and conscientiousness—in affecting scores on the Tinnitus Handicap Inventory (THI) and the tinnitus questionnaire. The established roles of anxiety and depression were confirmed. Low agreeableness was identified as a novel predictor of tinnitus severity on the THI. The report gains in significance particularly in the evaluation of treatment studies attempting tinnitus relief. Readers would be interested, in general, in being informed of the diagnostics that are applied by the Regensburg group for identifying

different clinical types of tinnitus—specifically how the excellent chapters on the pathophysiology of tinnitus have been translated for tinnitus diagnosis and evaluation.

The chapters in the treatment section, which represent significant advances for attempting tinnitus relief, present existing modalities for attempting tinnitus relief: pharmacology, instrumentation, and surgery. Individual chapter topics include drug treatment, hearing devices, electrical and magnetic stimulation, surgical treatment, and cognitive behavior. The chapter on the use of transcranial magnetic stimulation (TMS) for tinnitus relief contains an excellent summary of the Regensburg group's original investigations. The authors are to be congratulated for their originality in using TMS for tinnitus relief and for the clinical translation of TMS to tinnitus theory, diagnosis, and treatment.

The chapter on surgical treatment is a look into the future. Especially interesting are the chapters that attempt to translate tinnitus pathophysiology using (1) electrical stimulation of auditory and somatosensory cortices for treatment and pain and (2) a surgical approach (i.e., microvascular decompression of the eighth nerve and the auditory brainstem response). The chapters on cognitive behavioral therapy are equally significant, providing useful sources of reference and reports of relief by tinnitus patients. Future inclusions should be reports of identifying in the ear or brain (or both) treatment factors that influence the clinical course of tinnitus and result in significant tinnitus relief. Also desirable would be reports of clinical experience documenting increased efficacy of tinnitus relief through combining medication and instrumentation.

The chapters covering the assessments of treatment skillfully review issues related to clinical trials attempting tinnitus relief. These chapters call for a consensus to measure the characteristics of tinnitus and results of treatment. Specifically, that consensus would highlight (1) the need for identifying the study population and study design; (2) clinical differentiation between different types of tinnitus; (3) selection and measurement of variables to be considered in the study; and (4) designation of the target of a particular therapy through the components of the tinnitus: sensory, affect, and psychomotor. Support is presented for inclusion of the Tinnitus Handicap Questionnaire (THQ) as a measure of the reaction to tinnitus. Data analysis is recommended to emphasize individuals, not groups. Effect sizes are recommended as an estimate of the ability of questionnaires to measure changes associated with treatment.

The appendix, "Consensus for Tinnitus Patient Assessment and Treatment Outcome Measurement, Tinnitus Research Initiative Meeting, Regensburg, July 2006," is most useful for both tinnitus patients and professionals. Questionnaires (e.g., the THI, the THQ, or the Tinnitus

Reaction Questionnaire) are an essential part of tinnitus assessment and as outcome measures. The THI is recommended as a measure of tinnitus severity. Assessment of tinnitus-related disorders (e.g., anxiety, depression) can be obtained with specific validated instruments, such as the Beck Depression Inventory, and quality-of-life issues can be addressed with the World Health Organization's Disability Assessment Scale. None of the participants considered clinical application of objective measures of electrophysiology and neuroimaging as an established diagnostic tool. The reviewer considers this lack most unfortunate for tinnitus patients and inconsistent with the excellent reports included in this volume.

The work from the Regensburg group is a timely addition to the tinnitus literature. We recommend it for the multiple disciplines involved in the new discipline of tinnitology and for basic scientists, neuroscientists, physicians, dentists, audiologists, psychologists, and all tinnitus patients. We congratulate the authors on their effort to report significant advances that have been achieved for tinnitus diagnosis and treatment for the ultimate benefit of tinnitus patients. We anticipate a future textbook of tinnitus from the Regensburg group, one that will reflect the international efforts of professionals in tinnitology.

Abraham Shulman, MD, FACS