



STP 44TH ANNUAL SYMPOSIUM

Toxicologic Neuropathology:
Basics and Beyond

Chicago, Illinois, June 22–25, 2025



SUNDAY, JUNE 22

DTT Satellite Symposium: Pathology Potpourri

9:00 AM–12:00 Noon

Co-Chairs: Michelle C. Cora, DVM, DACVP, NIEHS/DTT and Mark F. Cesta, DVM, PhD, DACVP, NIEHS/DTT

The objective of this interactive symposium is to provide continuing education on interpreting pathology slides and data, to generate lively and productive conversation, and to have a good time. During each talk, the speakers will project a series of images of lesions on one screen with a choice of diagnoses/answers on a separate screen. The members of the audience will then vote, and the results will be displayed on the screen. Time is allowed for discussion after each voting session.

CE1

1:30 PM–5:00 PM

Multi-Modality Investigative Pathology: Leveraging the Full Potential of Spatial Pathobiology in Pharmaceutical Therapeutic Discovery and Development

Co-Chairs: Vinicius S. Carreira, DVM, PhD, DACVP, DABT, Johnson & Johnson Innovative Medicine; Ingrid Cornax, DVM, PhD, MS, DACVP, Altos Labs; Elizabeth Clark, DVM, PhD, DACVP, Boehringer Ingelheim; Saravanan Kaliyaperumal, BVSc&AH, MPH, PhD, DACVP, DABT, Johnson & Johnson Innovative Medicine; and Anoop M. Kavirayani, BVSc, DACVP, St. Jude Children's Research Hospital

The last decade has seen many exciting advances in the field of molecular pathology and its applications. Immunohistochemistry, immunofluorescence, in situ hybridization, highly multiplex assays, digital spatial profiling, and complementary methods such as spatial transcriptomics, proteomics, and animal-free assays are being more routinely applied for the purpose of target selection and validation, and to understand pathologic mechanisms of drug toxicity. The innovative nature of the technologies, the dimension of the resulting datasets, and the required infrastructure (from information technology to multidisciplinary teams) are key considerations for assuring the quality, reproducibility and value-added of these data. Toxicologic Pathologists and Molecular Pathology Scientists working in industrial, academic, and government settings, are ideally placed to guide the growth of this field as they collaborate closely to realize the full potential of these innovative technologies. This session will highlight the current and forthcoming states of the Investigative Pathobiology “lab of the future,” provide an overview of spatial transcriptomics in drug development, and present practical examples for application of these tools for specific therapeutic areas/mechanisms, modalities, and investigative issue resolution.

1:30 PM–2:20 PM

The Pathology Lab of the Future—Past, Present, and Future in Molecular Pathology

Anoop M. Kavirayani, BVSc, DACVP, St. Jude Children's Research Hospital and Silvia Siso, DVM, MSc, PhD, AbbVie

2:20 PM–3:10 PM

Deriving Translational Insights in the Tumor Microenvironment from Digital Pathology

Brandon W. Higgs, PhD, Genmab

3:10 PM–3:40 PM

Break

3:40 PM–4:20 PM

What Can Molecular Pathology Do for You? ADCs or CD3-Ab Redirector

Nathaniel Roscoe, MS, Johnson & Johnson Innovative Medicine

4:20 PM–5:00 PM

Transformative Potential of Spatial Omics in Investigative Pathology

Chandra Saravanan, DVM, MS, PhD, Novartis Institute for Biomedical Research

Welcome Reception

5:30 PM–7:00 PM

STP 44TH ANNUAL SYMPOSIUM

MONDAY, JUNE 23

STP 44th Annual Symposium Welcome

8:00 AM–8:10 AM

Keynote Presentation

8:10 AM–9:00 AM

Rudolph J. Castellani Jr, MD, Northwestern University

Session 1

9:00 AM–12:00 Noon

Fundamentals of Neuropathology

Co-Chairs: Deepa B. Rao, BVSc, MS, PhD, DABT, DACVP, FIATP, Greenfield Pathology Services, Inc.; James P. Morrison, DVM, DACVP, Charles River Laboratories; and Xavier Palazzi, DVM, DESV, DECVP, DABT, AstraZeneca

The opening scientific session for the symposium is designed to begin with the foundational prerequisites necessary for the practice of toxicologic neuropathology. For well-conducted neuropathology evaluations, pathologists benefit from understanding the inherent complexities of the nervous system impacting neurotoxicity assessments. With this perspective, our first presentation will include some core concepts discussed via examples underscoring sampling, topographical analysis, integrated assessments, and challenges as we improve safety assessment in toxicology studies. The next presentation will be a spotlight on the cerebellum. The cerebellum will be discussed in context of its exquisite neuroanatomical framework relevant to specific pathological diseases since identification of select neuroanatomic structures can inversely inform pathologists about the underlying neuroanatomic basis for disease. The next presentation will be on a critical finding, namely, neuronal cell death where key morphologic features in the context of potential artifacts will be discussed. Following this, a discussion on autolysis will be presented via systematic examples of microscopic changes following delayed fixation in the rat brain. The final presentation will focus on a neglected sensory system in toxicologic pathology, namely, gustation. The physiology of gustation, the histologic evaluation of taste buds as applied to the preclinical evaluation, and pathology of dysgeusia will conclude this session.

9:00 AM–9:40 AM

Core Concepts in Neuropathology

Deepa B. Rao, BVSc, MS, PhD, DABT, DACVP, FIATP, Greenfield Pathology Services, Inc.

9:40 AM–10:30 AM

Functional Neuroanatomy—Cerebellum

Jeffrey T. Joseph, MD, PhD, University of Calgary

10:30 AM–11:00 AM

Break

11:00 AM–11:20 AM

Neuronal Cell Death

Debra A. Tokarz, DVM, PhD, DACVP, EPL, Inc.

11:20 AM–11:40 AM

Temporal Evaluation—Autolysis

Ricardo de Miguel, DVM, MScRes, PhD, DECVP, AnaPath Services GmbH

11:40 AM–12:00 Noon

Gustation and Dysgeusia

Smitha PS Pillai, BVSc, MVSc, PhD, DACVP, Pfizer, Inc.

Session 2

1:30 PM–5:00 PM

Neurodegenerative Diseases—Translation

Co-Chairs: Caroline J. Zeiss, BVSc, PhD, DACVP, ACLAM, Yale University; LuAnn McKinney, DVM, DACVP, US FDA; and Diethilde Theil, DVM, PhD, Roche

Over the last decade, considerable progress has been made in developing disease-modifying therapeutics for neurodegenerative disease. This journey has had many twists and turns as investigators navigate the complexity of multiple, often interrelated biological processes, overcoming the blood brain barrier (BBB) to achieve sufficient target engagement, and assessing human relevance of non-clinical toxicologic profiles. In this session, we will focus on clinical testing of multiple biologic therapeutic strategies aimed at lowering amyloid-beta in the brain and discuss the spectrum of neuropathologic comorbidities that may complicate both diagnosis and therapy of Alzheimer's disease and related dementias. Speakers will also describe the preclinical development of Brain shuttle™ CD20, a brain-targeted B-cell-depleting mAb for the treatment of multiple sclerosis (MS), as well as the remarkable development journey for risdiplam, the first approved small molecule RNA splice modifier for treatment of spinal muscular atrophy. Because its target, the SMN2 gene, is human-specific, non-clinical toxicologic studies have focused on elucidation of secondary splice targets and the human relevance of such off-target effects.

TOXICOLOGIC NEUROPATHOLOGY: BASICS AND BEYOND

1:30 PM–1:40 PM	Introduction
1:40 PM–2:10 PM	Neuropathologic Comorbidities in Alzheimer's Disease and Related Dementias <i>Anita Huttner, MD, Yale University</i>
2:10 PM–2:40 PM	Alzheimer's Disease Biologic Therapeutics: In Perspective and Lessons Learned <i>Reina N. Fuji, VMD, PhD, Genentech</i>
2:40 PM–3:00 PM	Student Speaker
3:00 PM–3:30 PM	Break
3:30 PM–4:00 PM	Brain Shuttle CD20 Project <i>Vanessa Schumacher, DVM, MS, DACVP, DABT, Roche</i>
4:00 PM–4:30 PM	The Preclinical Development of Risdiplam for Spinal Muscular Atrophy <i>Lutz Müller, PhD, Roche</i>
4:30 PM–5:00 PM	Panel Discussion

Annual Business Meeting and Town Hall

5:30 PM–7:00 PM

TUESDAY, JUNE 24

Session 3

8:00 AM–12:00 Noon

Neurobiomarkers

Co-Chairs: *Ingrid DR Pardo, DVM, MS, DACVP, FIATP, Biogen; Félix Goulet, DMV, MSc, DACVP, Charles River Laboratories; and Madhu Sirivelu, BVSc, PhD, DACVP, Novartis*

This session will feature six lectures covering various aspects of neurobiomarkers and their use in nonclinical and clinical safety assessment. The objective of this session is to provide an overview of existing biomarkers and highlight the critical need for novel biomarkers to detect and/or predict nervous system changes in preclinical species and humans. These biomarkers can also help evaluate the efficacy of new drugs, monitor neurological diseases, and better characterize neuropathology findings. The lectures in this session will feature distinguished experts in their respective scientific disciplines. This four-hour session will begin with an introductory presentation, followed by lectures on electrophysiology, molecular pathology tools to characterize pathology lesions in the visual pathways, fluid-based biomarkers, and the use of MRI imaging to deliver test articles to the brains of monkeys. Additional lectures will cover quantifying DRG changes using techniques like stereology, micro-CT, and nano-CT, and a discussion on regulatory considerations for neurobiomarkers. The session will conclude with a 25-minute panel discussion during which attendees can ask questions and interact with the speakers.

8:00 AM–8:10 AM	Session Introduction <i>Félix Goulet, DMV, MSc, DACVP, Charles River Laboratories</i>
8:10 AM–8:35 AM	Electrophysiology <i>Nataliya Sadekova, MSc, DSP, Charles River Laboratories</i>
8:35 AM–8:55 AM	Beyond Local Eye Changes in Ocular Toxicity Studies: Tracing Test Item and Lesions Throughout the Nervous Visual Pathways by H&E, IHC, and ISH <i>Typhaine Lejeune, DVM, DESV, DECVP, Charles River Laboratories</i>
8:55 AM–9:30 AM	Fluid-Based Biomarkers <i>Madhu Sirivelu, BVSc, PhD, DACVP, Novartis</i>
9:30 AM–10:00 AM	MRI Imaging <i>Christen Simon-Anderson, PhD, Northern Biomedical Research</i>
10:00 AM–10:30 AM	Break
10:30 AM–10:45 AM	Student Speaker
10:45 AM–11:05 AM	Quantification of DRG Changes: Stereology, Micro CT, Nano CT <i>Klaus Weber, DVM, MSBiol, PhD, AnaPath Services GmbH</i>

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11:05 AM–11:35 AM **Regulatory Considerations for Neurobiomarkers**
Jeffrey Siegel, MD, US FDA

11:35 AM–12:00 Noon **Panel Discussion**

Committee Social

12:00 Noon–1:30 PM

Mystery Slide Session: Toxicologic Neuropathology

1:30 PM–3:00 PM

Co-Chairs: *Caroline J. Zeiss, BVSc, PhD, DACVP, ACLAM, Yale University and Jerrold M. Ward, DVM, PhD, DACVP, FIATP, Global VetPathology*

This year's Mystery Slide Session will present central and peripheral nervous pathology across a range of species. In keeping with the translational nature of the meeting, cases will be described in context of human disease or therapeutics. Slide preview will be available via the Meeting Materials webpage. Audience participation during the session is encouraged.

WEDNESDAY, JUNE 25

Keynote Presentation

8:00 AM–9:00 AM

Jeffrey A. Loeb, MD, PhD, University of Illinois Chicago

Session 4

9:00 AM–12:00 Noon

Neuro-Omics

Co-Chairs: *Dinesh Bangari, BVSc, MVSc, MS, PhD, DACVP, Sanofi; Elizabeth L. Buza, DVM, DACVP, Gemma Biotherapeutics Inc.; and Alok K. Sharma, BVSc, MVSc, MS, PhD, DACVP, DABT, Labcorp*

The basis for current and future neurologic disease research and therapeutics is rooted in the understanding of genetic, transcriptional, and molecular expression profiles of cells and spatial relationships in an anatomical context. Neuro-omics aim to analyze all conceivable molecular and morphological variations within the nervous system using specific methods such as genomics, transcriptomics, proteomics, metabolomics, and pathomics (i.e., radiology and histology). In this session, applications of some of the emerging omics technology will be illustrated as applied to target discovery, preclinical credentialing, and mechanistic investigations. Spanning both human biology, such as Alzheimer's disease, and animal models, session speakers will share their insights on the promises and pitfalls of the omics workflow in nonclinical drug development laboratories. This session will be a great opportunity gain a greater understanding of various transcriptomic techniques, including genetic and phenotypic cellular expression profiles in the nervous system and how these technologies further crucial insights for debilitating neurological disease research. The speakers for this session, with diverse experience in research and biotherapeutics, will provide background on these techniques as well as their application in the treatment of neurological diseases and related conditions.

9:00 AM–9:30 AM **Multi-Modal Application of Spatial Molecular Pathology Techniques for Mechanistic Studies in Neuroscience Therapeutic Area**
Saravanan Kaliyaperumal, BVSc&AH, MPH, PhD, DACVP, DABT, Johnson & Johnson Innovative Medicine and Mathieu Marella, PhD, Johnson & Johnson Innovative Medicine

9:30 AM–10:00 AM **Building a Spatial Transcriptomic Atlas of Alzheimer's Disease**
Oded Foreman, DVM, PhD, DACVP, Genentech

10:00 AM–10:30 AM **Break**

10:30 AM–11:00 AM **Unveiling CNS Drug Response through Spatial Transcriptomics**
Kerstin Hahn, DVM, PhD, DACVP, Roche

11:00 AM–11:30 AM **Use of Transcriptomics to Inform on Sensory Pathology and Pain**
LaTasha Crawford, DVM, PhD, DACVP, University of Wisconsin-Madison

11:30 AM–12:00 Noon **Panel Discussion**

TOXICOLOGIC NEUROPATHOLOGY: BASICS AND BEYOND

Session 5

1:30 PM–5:00 PM

Hot Topics, Challenges, Future Directions

Co-Chairs: *Alys Bradley, BSc, BVSc, MAnimSc, DipRCPath, FRIPH, FSA(Scot), FRCVS, FRCPath, FIATP, Charles River Laboratories; Lisa Lanigan, DVM, PhD, DACVP, Charles River Laboratories; and Elizabeth Galbreath, DVM, PhD*

In this half-day session, we will present hot topics, future directions, and challenges faced in toxicologic neuropathology. The first lecture will focus on the difficulties faced in digital pathology of the nervous system and how these challenges can be addressed. Additionally, there will be a discussion on what new applications are available in toxicologic neuropathology and beyond. The second and third presentations will focus on the challenges and advancements of intraparenchymal injection and CSF delivery of test articles as well as co-development of medical devices and issues surrounding immune responses related to neurotherapeutics. In our final presentation, we will learn that even today, there is still new information regarding comparative anatomy with a discussion on variations in cervical dorsal root ganglia between species, particularly between human and non-human primate species.

1:30 PM–1:40 PM	Introduction
1:40 PM–2:20 PM	Challenges and Opportunities of Digital Pathology in the Nervous System <i>Aleksandra Zuraw, DVM, PhD, DACVP, Charles River Laboratories</i>
2:20 PM–3:00 PM	Challenges of Intraparenchymal vs. CSF Delivery—Co-Development of Medical Device, Mirror the Clinic, Immune Response, Part 1 <i>Jimmy Tran, BVSc, DACVP, Biogen</i>
3:00 PM–3:30 PM	Break
3:30 PM–4:10 PM	Challenges of Intraparenchymal vs. CSF Delivery—Co-Development of Medical Device, Mirror the Clinic, Immune Response, Part 2 <i>Elizabeth Galbreath, DVM, PhD</i>
4:10 PM–4:30 PM	DRG C1 Comparative Anatomy <i>Félix Goulet, DMV, MSc, DACVP, Charles River Laboratories</i>
4:30 PM–5:00 PM	Panel Discussion

Awards and Recognition Ceremony

5:30 PM–6:30 PM

President’s Reception

7:00 PM–9:00 PM