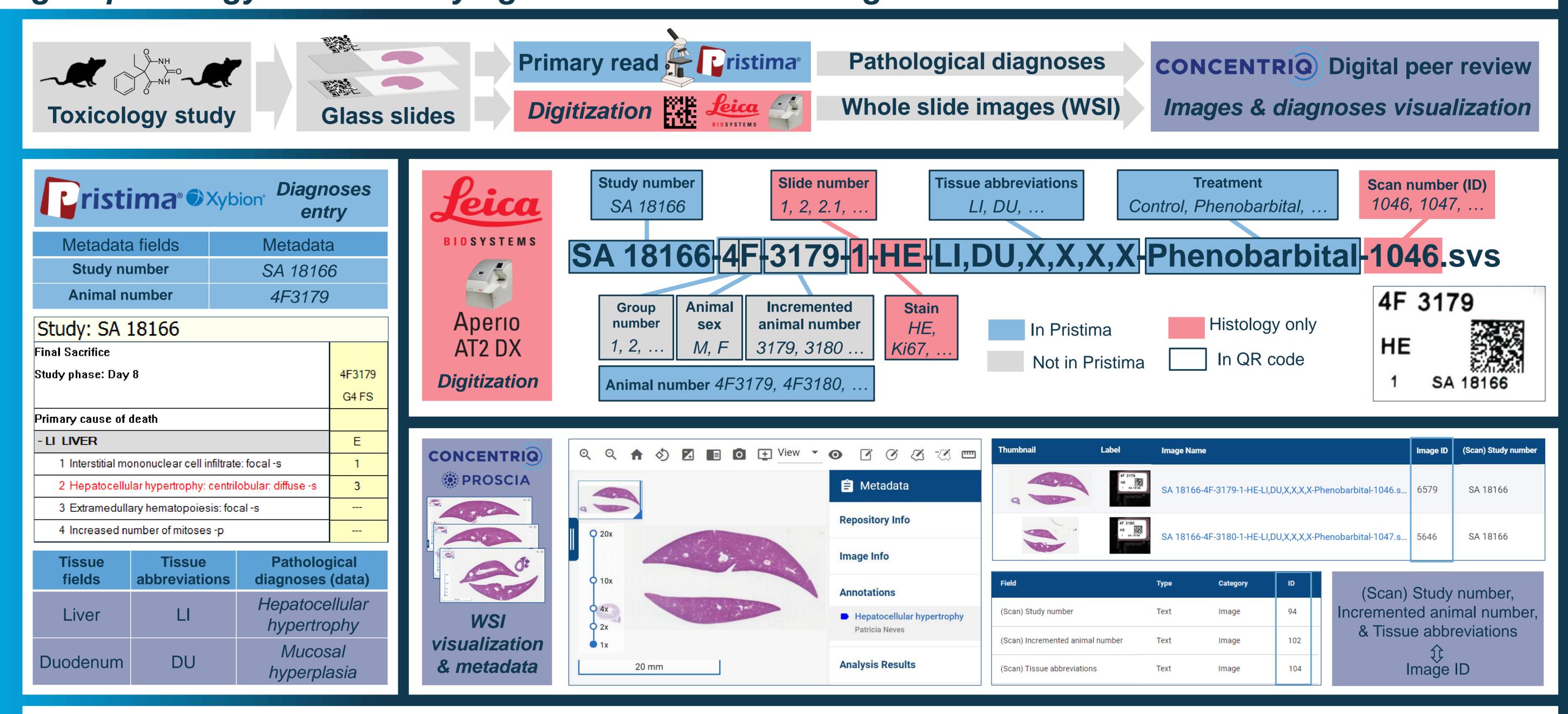


Real-time messaging of pathological diagnoses from toxicology laboratory information management system to cloud-based digital pathology web application

Pierre-Maxence Vaysse¹, Patricia Neves¹, Moritz Radbruch², Hervé Lormeau³, Fabien Lopez³, Matthieu Bouillé⁴, Frédéric Schorsch¹

¹Mechanistic Toxicology & Pathology, Bayer Crop Science, Sophia Antipolis, France ² Pathology & Clinical Pathology, Bayer Pharmaceuticals, Wuppertal, Germany ³Toxicology Data Science, Bayer Crop Science, Sophia Antipolis, France ⁴Digital Transformation & Information Technology, Bayer Crop Science, Lyon, France

A digital pathology interface relying on an established image metadata identification convention

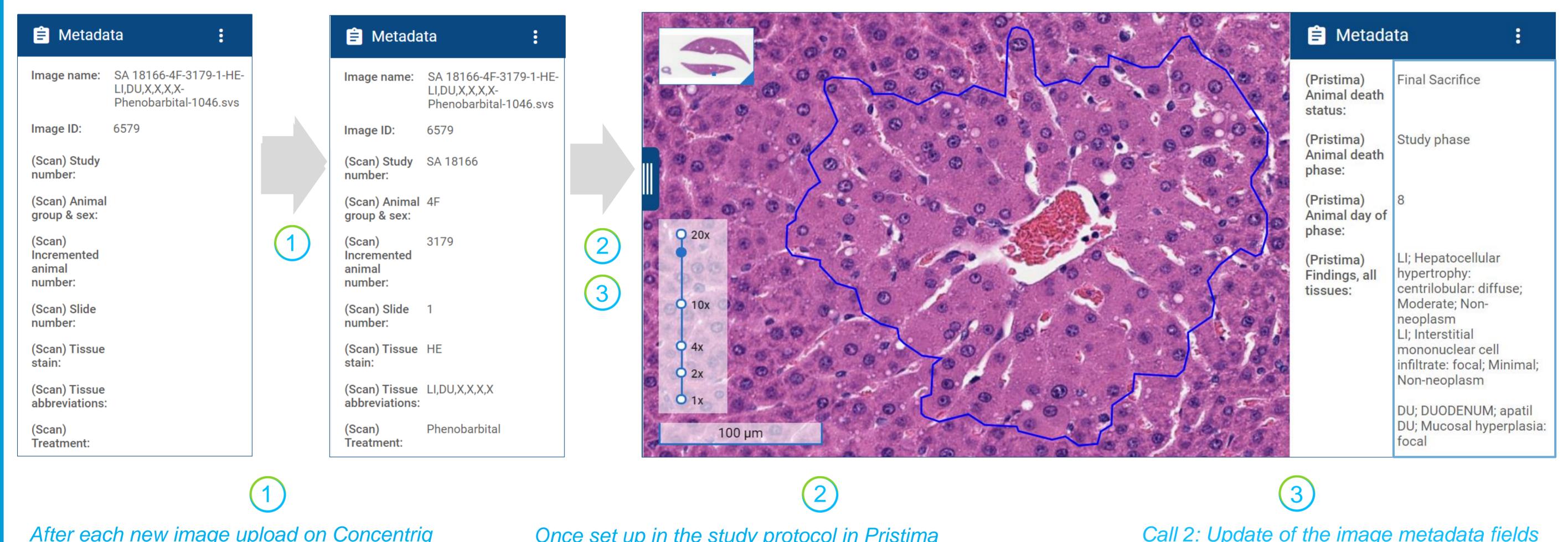


In-house toxicology laboratory information management system (LIMS, Pristima) and glass & digitized slide naming convention (QR code – NiceLabel, scanner -Leica) use the same study number and tissue abbreviations and contain the same information related to animal number.

An image ID number is attributed to each new image uploaded to Concentriq. Image metadata fields can be created and are associated to a field ID.

The combination of study number, animal number & tissue abbreviations IDs is associated to one or several image ID(s) only.

A toxicology laboratory information management system /digital pathology platform interface: 3 steps



After each new image upload on Concentriq Step independent from Pristima

Parsing image identification metadata by splitting the unmodifiable filename property value (by opposition to the editable filename)

& population of image metadata fields

Once set up in the study protocol in Pristima Call 1: Which image(s) should receive the diagnoses?

Query from Pristima to Concentriq API GetImages

- & response with an array of images that includes:
- Study number/Animal number/Tissues to do the matching
- Image ID (to know where to send the diagnoses)

Call 2: Update of the image metadata fields

Request from Pristima to Concentriq API *UpdateMetadataValues*

Sending of a text file including metadata field ID, Image ID and text content

- The choice of the unmodifiable filename property value to populate metadata fields is led by a strategy of future validation of digital pathology peer review process.
- Uploads of WSI from other formats (e.g. .ndpi) lead to the population of metadata fields by splitting the editable filename.
- Edition of diagnoses in Pristima leads to immediate update of the Concentriq image metadata fields dedicated to diagnosis text content.
- Diagnosis data include modifiers, macroscopy correlation, finding type, neoplasm type if applicable and finding comment.
- In addition to diagnosis data, animal metadata (death status, death phase, day of phase and comment) are also sent to Concentriq.

Automated update of image pathological diagnoses on a web digital pathology platform

Recent years have made the visualization of whole slide images easily accessible to pathologists and colleagues around the world.

Here, we present the automated upload of pathological diagnoses from the laboratory information management system (LIMS) next to images on a digital pathology platform. This is expected to improve peer review processes, in particular for contemporary peer review thanks to its immediate update after edition in the LIMS.

This should support the creation of an informed image database beneficial for research on image analysis and on molecular pathology.