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MEDICAL IMAGING WITH DEEP LEARNING AT EUROIMMUN

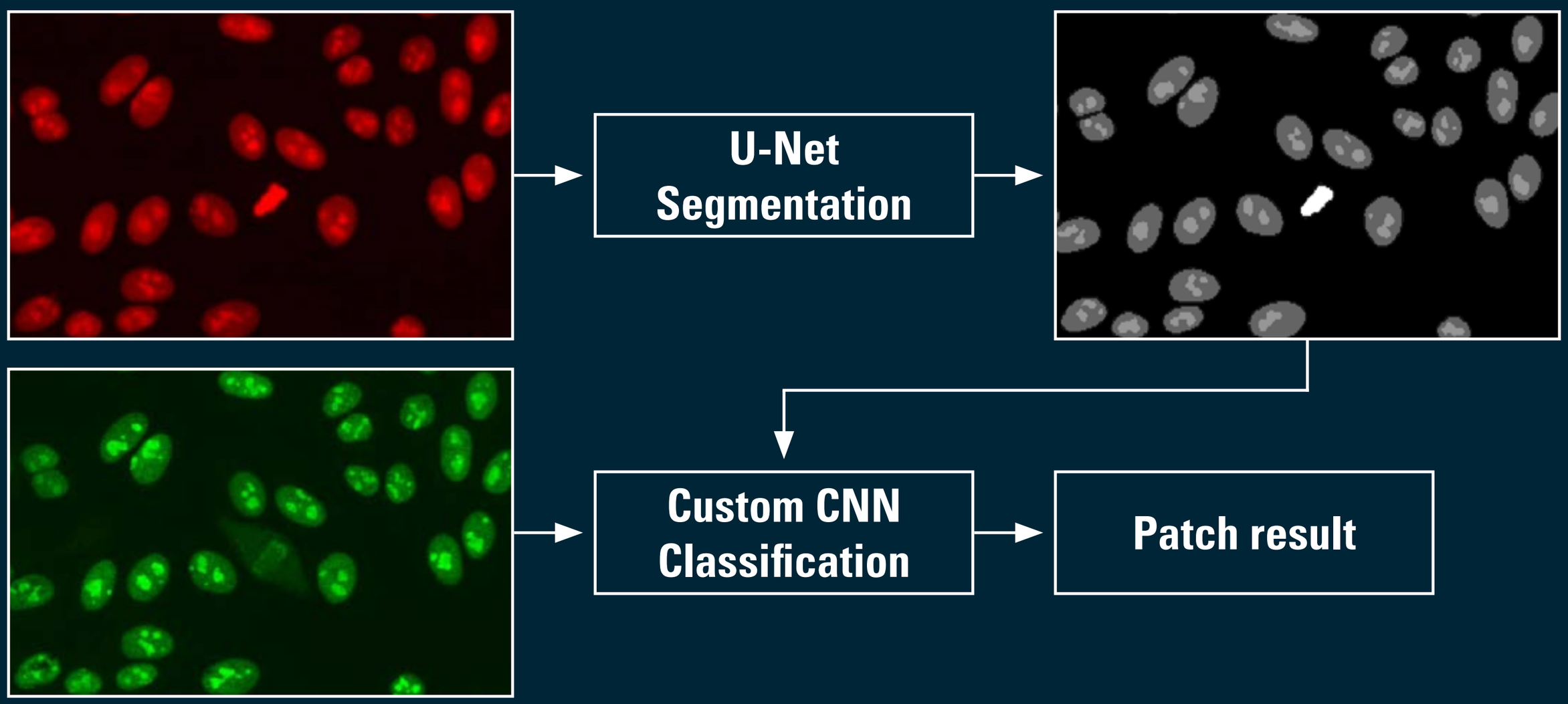
ANTINUCLEAR ANTIBODIES IN INDIRECT IMMUNOFLUORESCENCE

Antinuclear antibodies (ANA) can generate 30 different fluorescence patterns with diverse combinations on human epithelial cells (HEp).

CLASSIFICATION PROCESS:

- Segmentation via U-Net: Cell separation, cell state identification
- Classification via custom CNN: Pattern probabilities given per image patch
- Currently support for nine major ANA patterns possible
- Overall agreement between manual and software-based image evaluation: 97.7 %

The classifier is applied in our automated microscopes EUROPattern and EUROPattern Microscope Live.



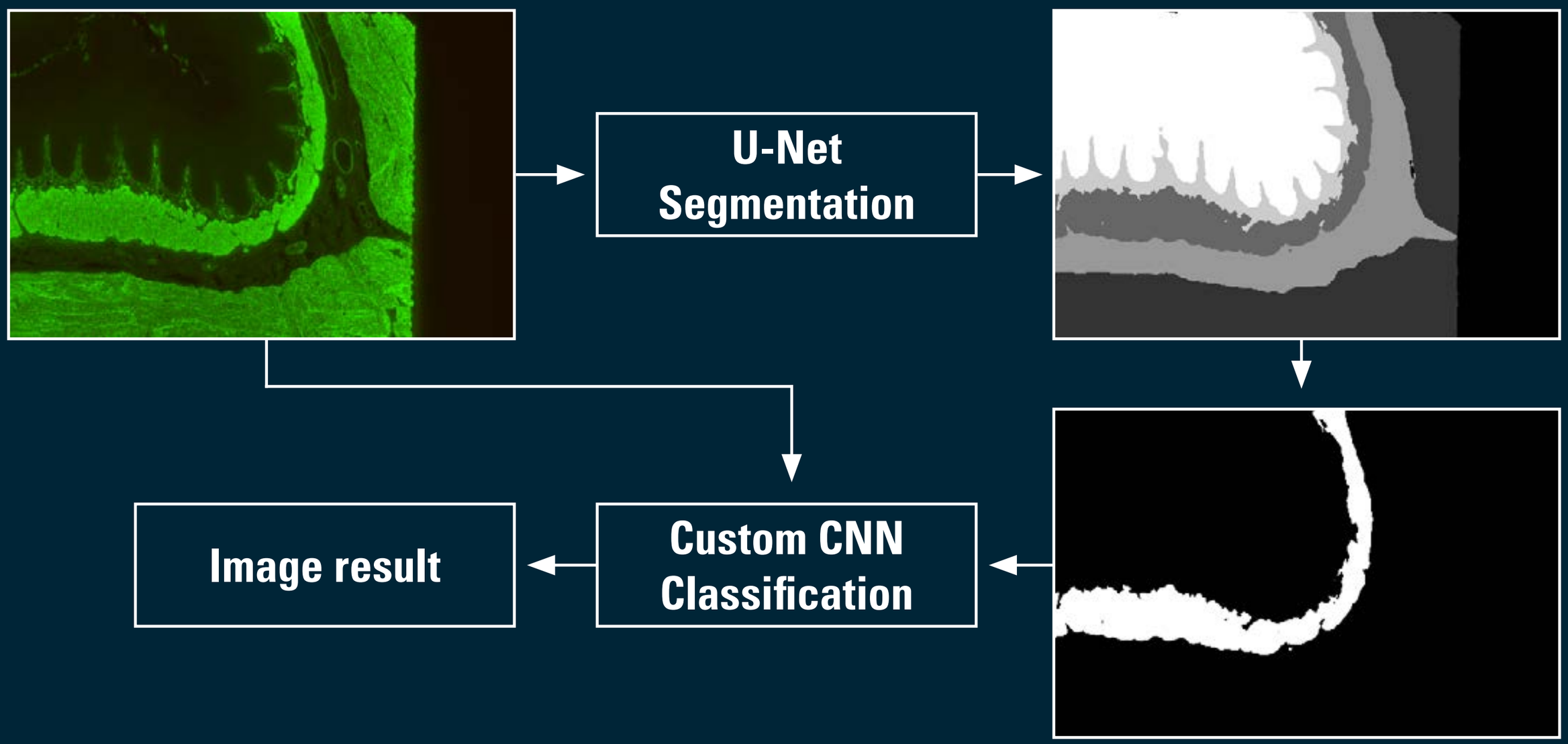
ENDOMYSIAL ANTIBODIES IN INDIRECT IMMUNOFLUORESCENCE

Primate esophagus shows 5 different tissues, but endomysial antibodies (EmA) are reacting specifically with only one

CLASSIFICATION PROCESS:

- Segmentation via U-Net: Separation of tissues, extraction of region of interest
- Classification via custom CNN: Positive/negative discrimination with probability given per image
- Overall agreement between manual and software-based image evaluation: 94.9 %

The classificator is currently under development



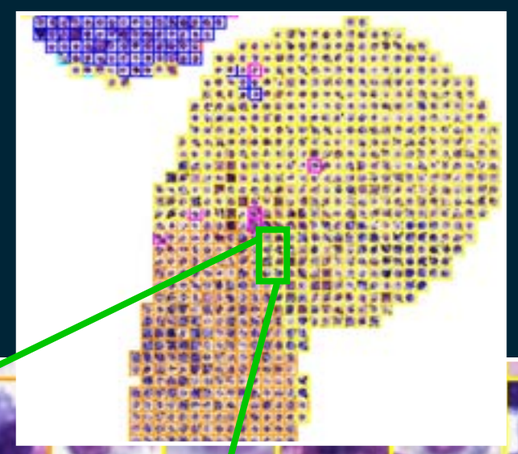
VETERINARY LUNG DISEASES IN DIGITAL PATHOLOGY

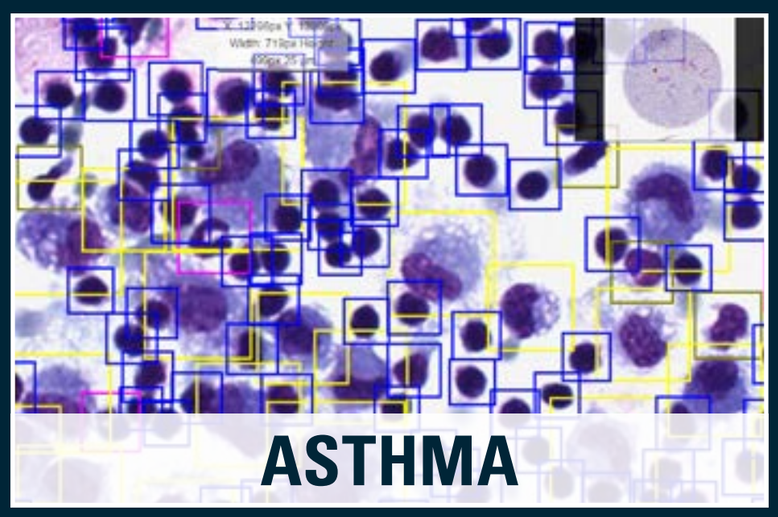
Cytology of bronchoalveolar lavage is a sensitive method supporting diagnostics of asthma and pulmonary hemorrhage (PHEM), respectively.

- Asthma: Assessing 5 relevant types of inflammatory cells (see coloured frames)
- PHEM: Assessing hemosiderophages at 5 degrees of severity (see coloured frames)

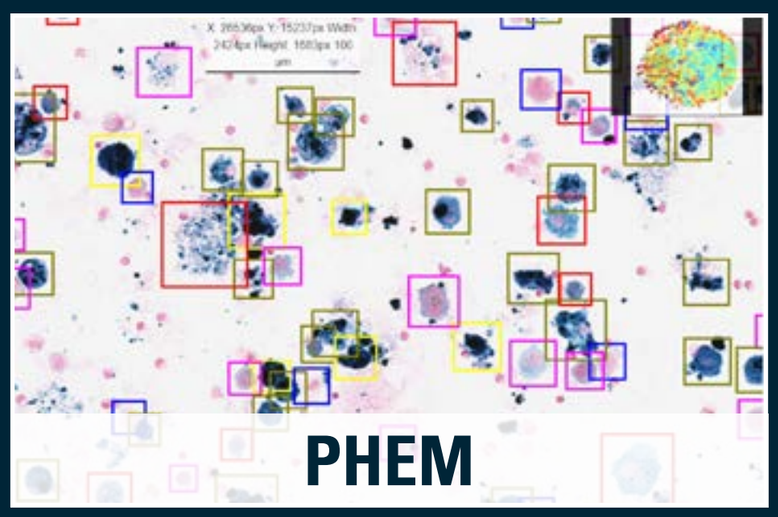
DETECTION OF RELEVANT CELLS ON WHOLE-SLIDE IMAGES:

- Detection via customized RetinaNet
- Innovative clustering for validation

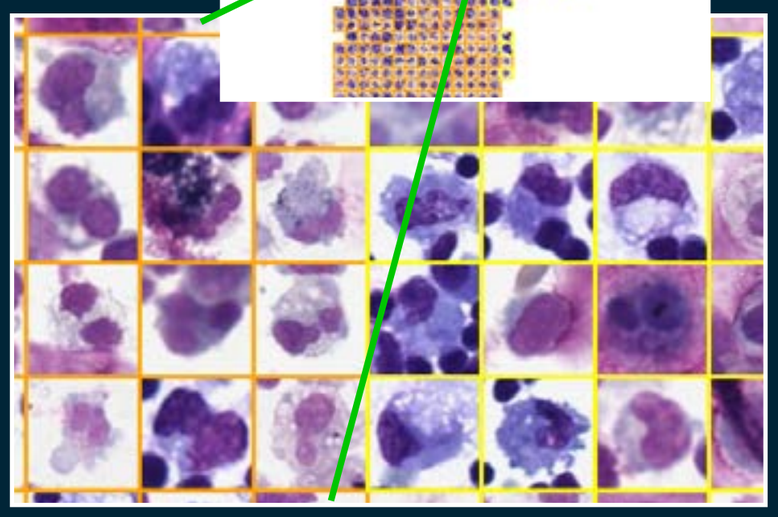




ASTHMA



PHEM



RESEARCH PROJECT
JOIN THE DETAILED TALK AT 10.30 A.M.

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EUROIMMUN Medizinische Labordiagnostika AG · Seekamp 31 · 23560 Lübeck (Germany) · Phone: +49 451 2032-0 · info@euroimmun.de · www.euroimmun.com