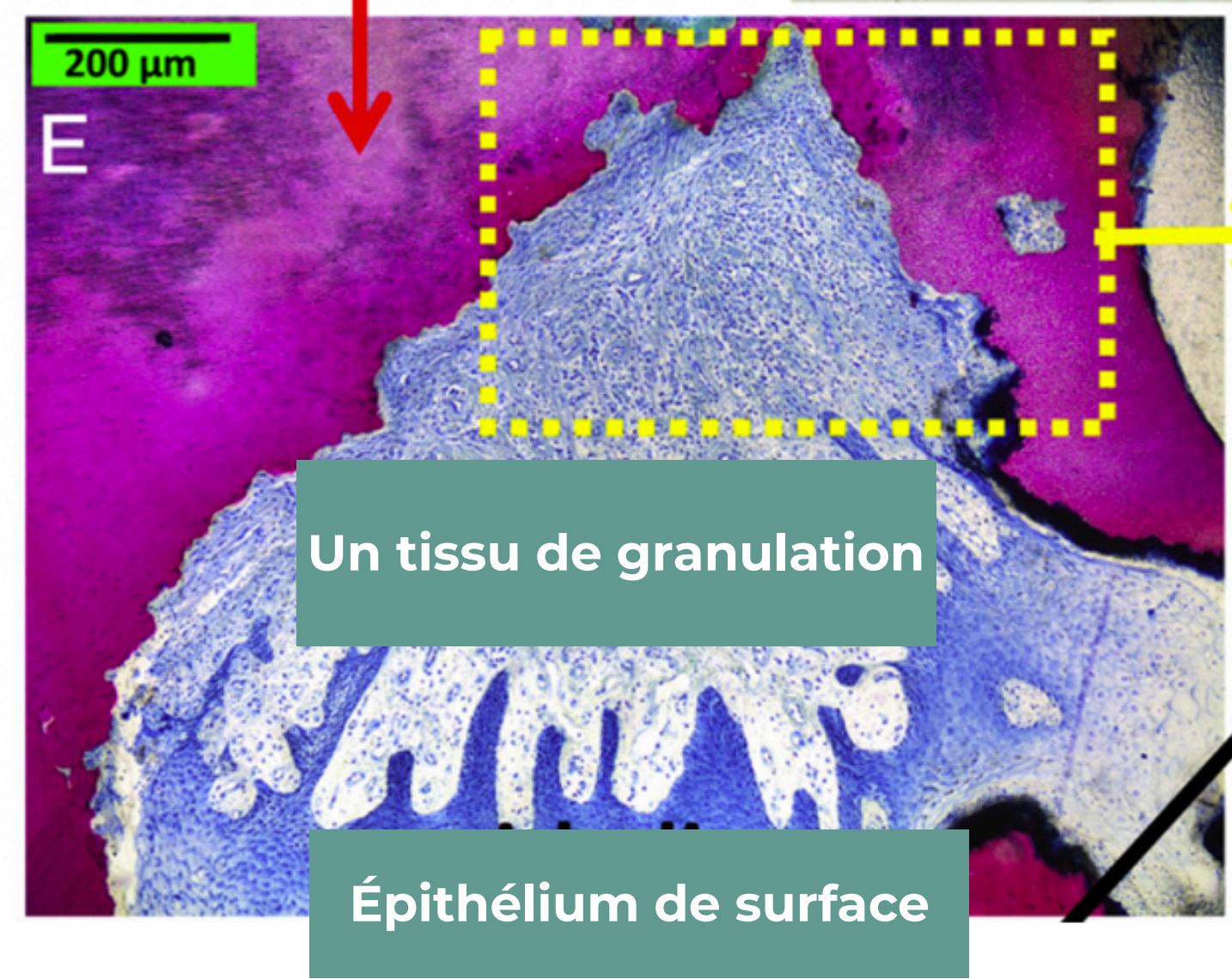
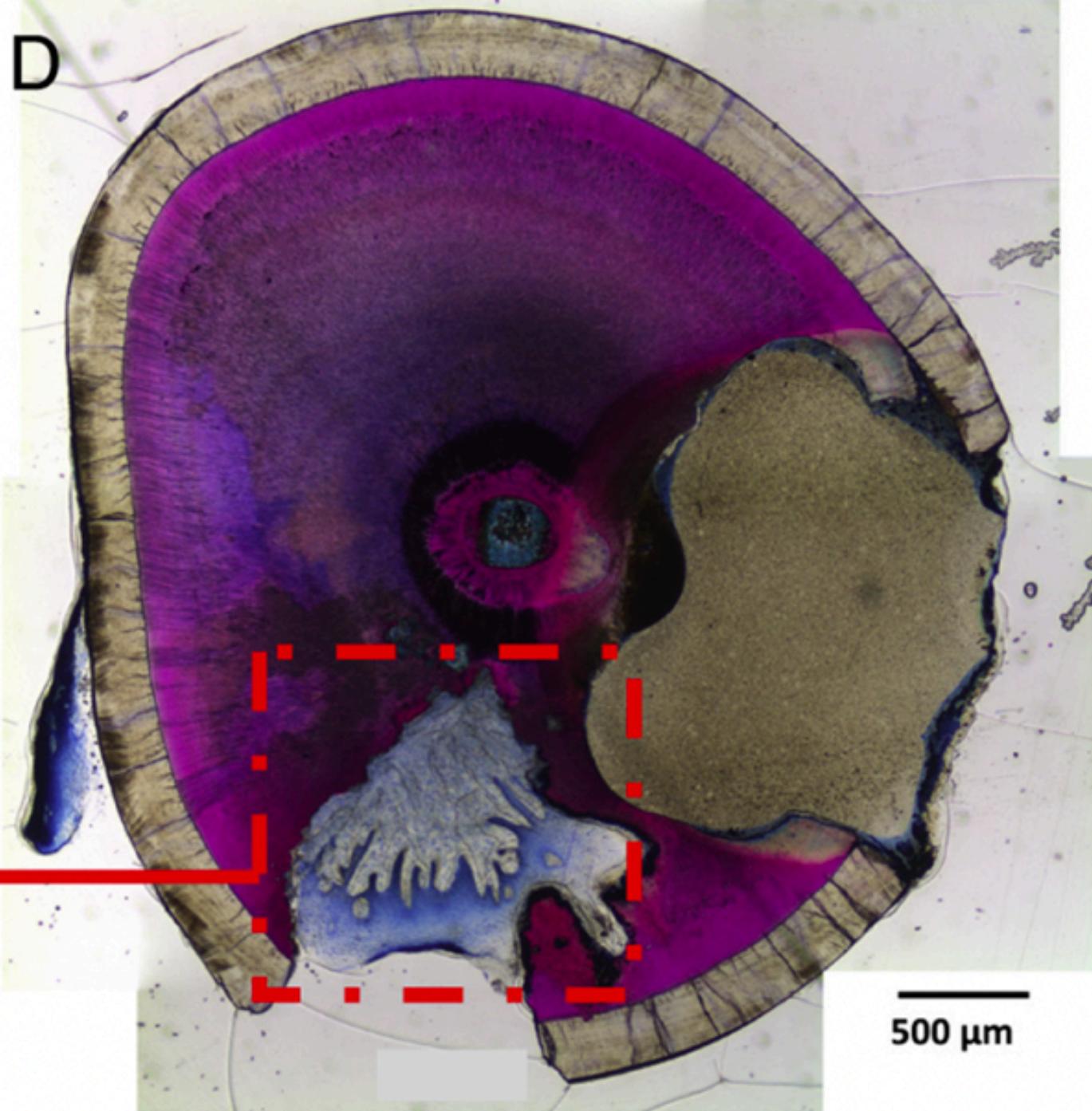
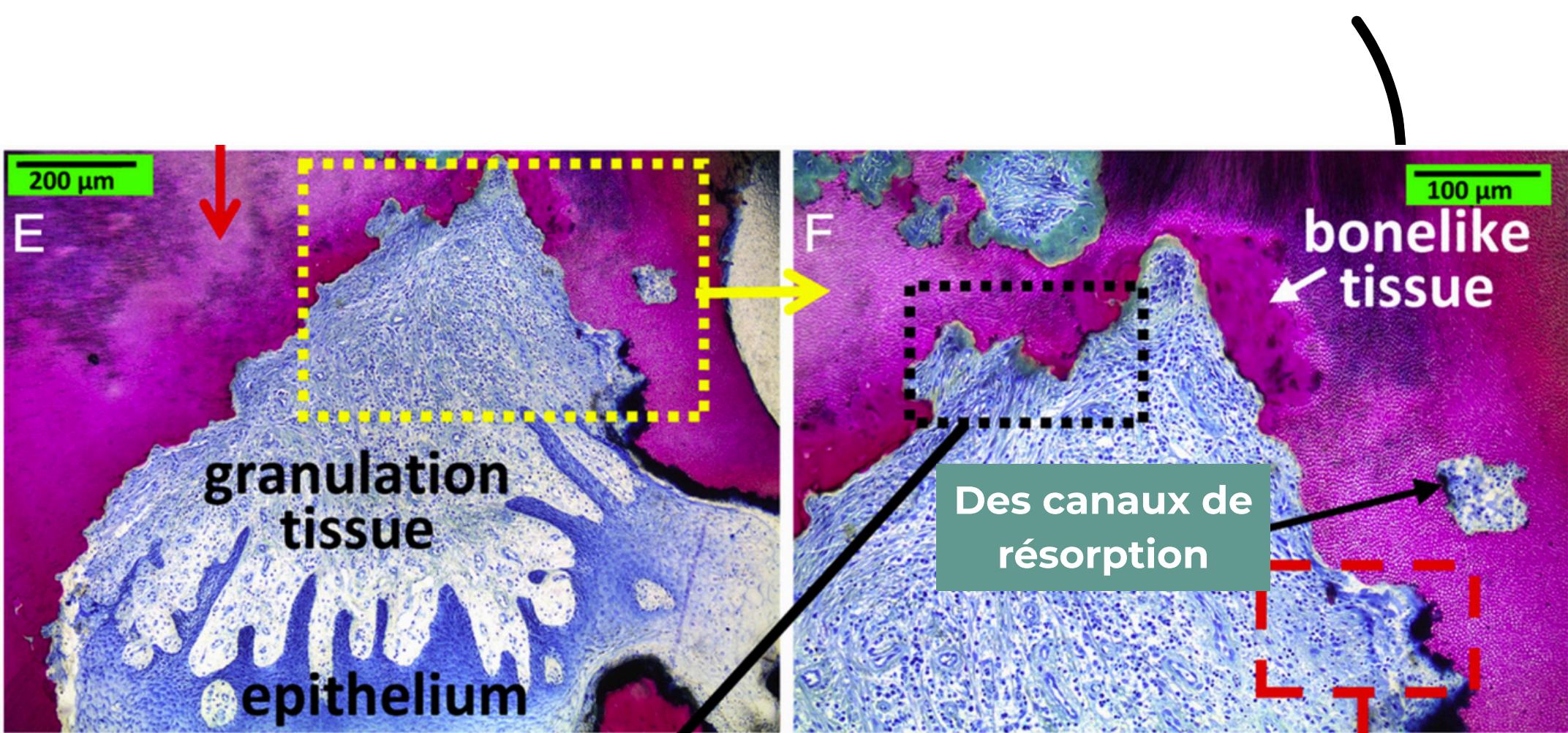
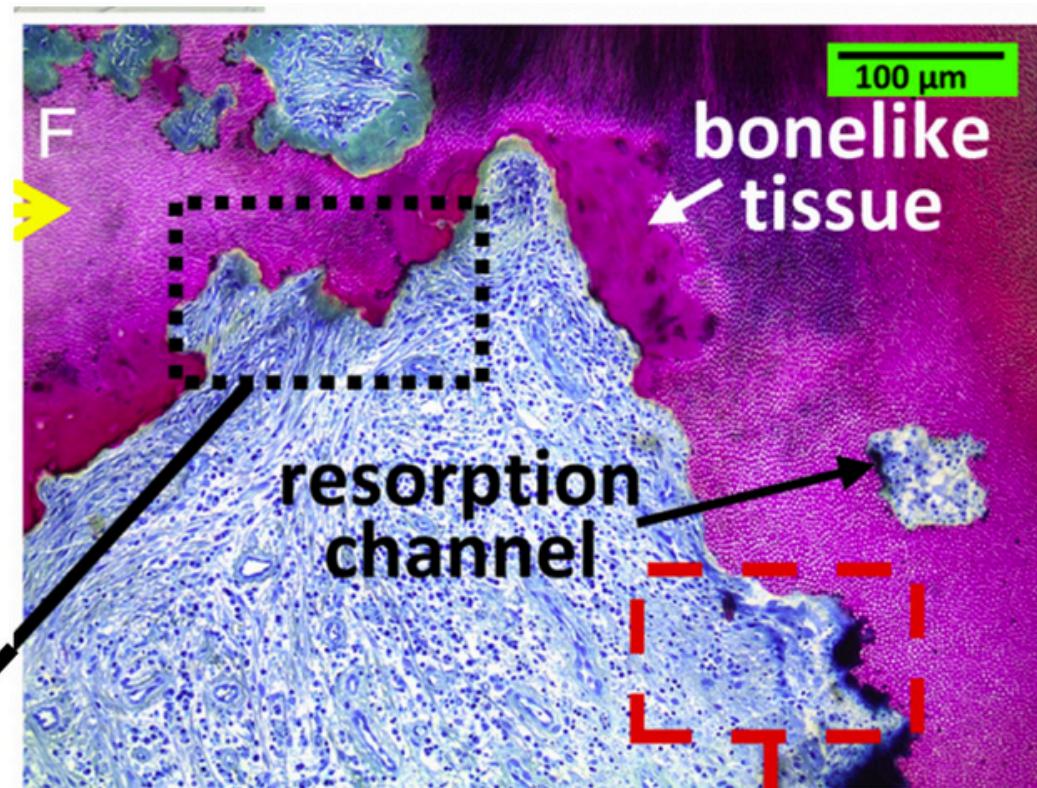
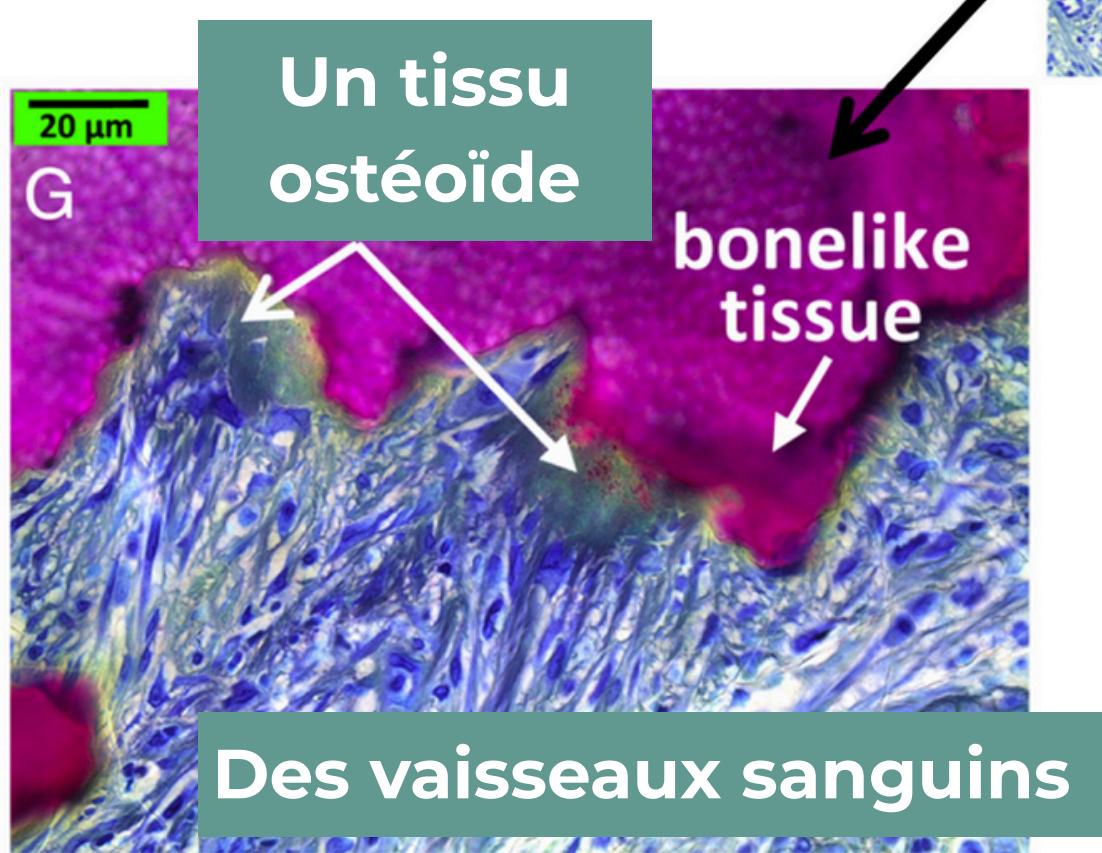


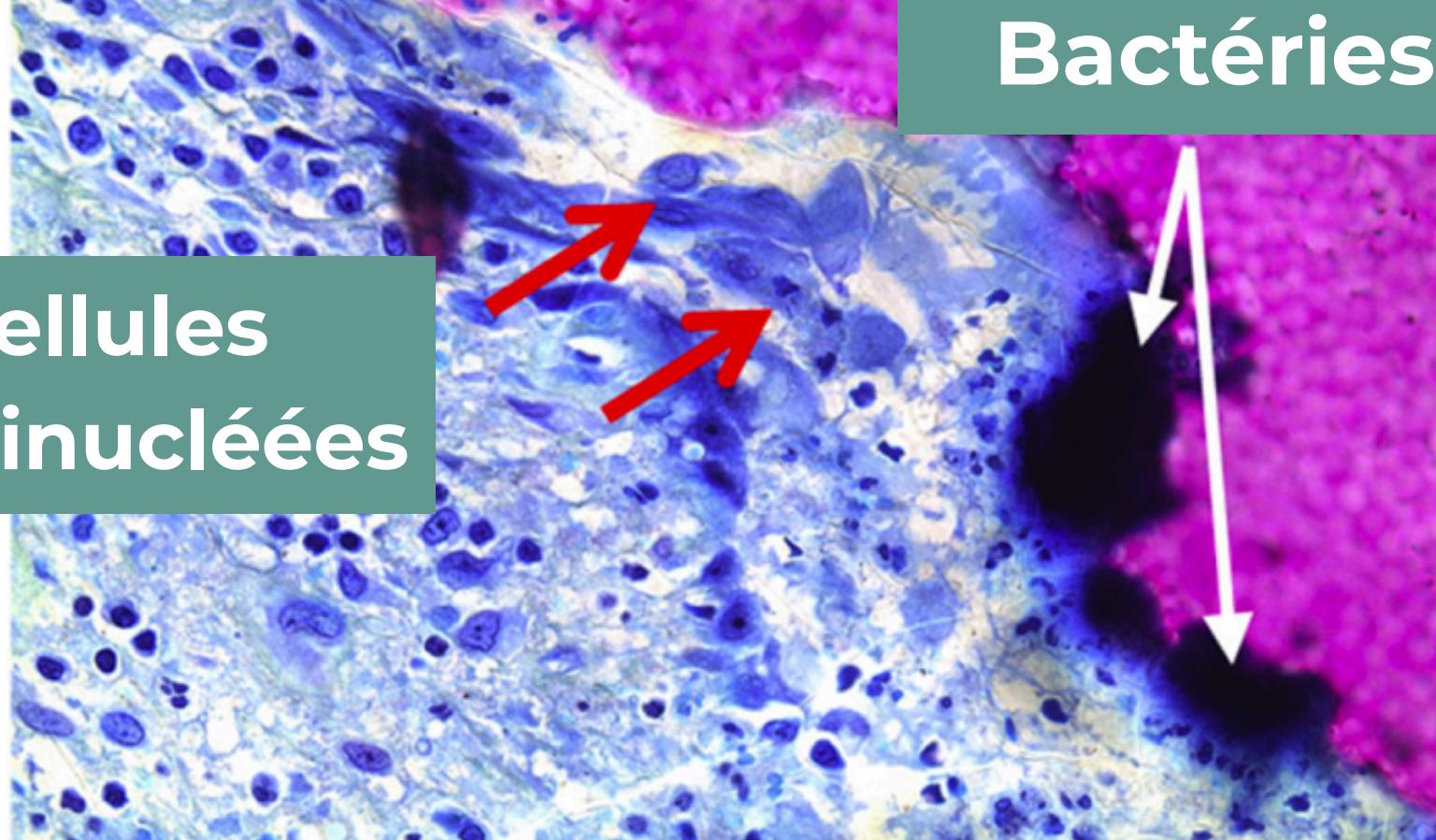
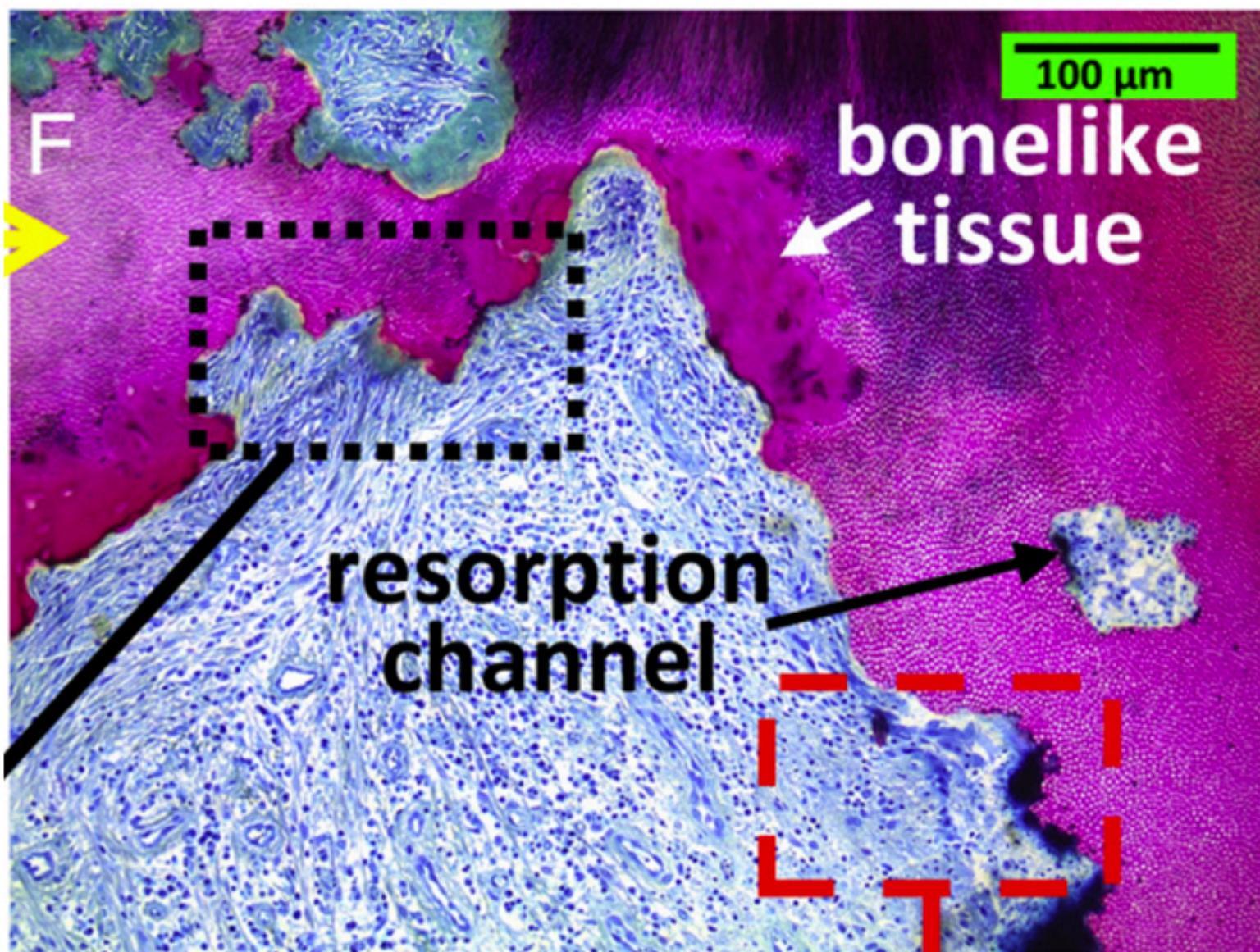
Que peut-on retrouver histologiquement au niveau de la résorption radiculaire cervicale externe de cette canine ?











Dr Brice Riera
endodontiste

Clinical Research

Understanding External Cervical Resorption in Vital Teeth

CrossMark

*Atbina M. Mavridou, DDS, MSc, *† Esther Hauben, MD, PbD, ‡ Martine Wevers, PbD, ‡
Evert Scbepers, DDS, PbD, * Lars Bergmans, DDS, MSc, PbD, * and Paul Lambrechts, DDS, PbD**

Abstract
Introduction: The aim of this study was to investigate the 3-dimensional (3D) structure and the cellular and tissue characteristics of external cervical resorption (ECR) in vital teeth and to understand the phenomenon of ECR by combining histomorphological and radiographic findings. Methods: Twenty-seven cases of vital permanent teeth displaying ECR were investigated. ECR diagnosis was based on clinical and radiographic examination with cone-beam computed tomographic imaging. The extracted teeth were further analyzed by using nanofocus computed tomographic imaging, hard tissue histology, and scanning electron microscopy. Results: All examined teeth showed some common characteristics. Based on the clinical and experimental findings, a 3-stage mechanism of ECR was proposed. At the first stage (ie, the initiation stage), ECR was initiated at the cementum below the gingival epithelial attachment. At the second stage (ie, the resorption stage), the resorption invaded the tooth structure 3-dimensionally toward the pulp space. However, it did not penetrate the pulp space because of the presence of a pericanalicular resorption-resistant sheet. This layer was observed to consist of predentin, dentin, and occasionally reparative mineralized (bonelike) tissue, having a fluctuating thickness averaging 210 μ m. At the last advanced stage (ie, the repair stage), repair took place by an ingrowth and apposition of bonelike tissue into the resorption cavity. During the reparative stage, repair and remodeling phenomena evolve simultaneously, whereas both resorption and reparative stages progress in parallel at different areas of the tooth. Conclusions: ECR is a dynamic and complex condition that involves periodontal and endodontic tissues. Using clinical, histologic, radiographic, and scanning microscopic analysis, a better understanding of the evolution of ECR is possible. Based on the experimental findings, a 3-stage mechanism for the initiation and growth of ECR is proposed. (*J Endod* 2016;42:1737–1751)

Key Words
Cone-beam computed tomography, external cervical resorption, hypoxia, nanofocus computed tomography, reparative mineralized tissue

Significance
This work helps in exploring the evolving phenomena of ECR in vital teeth. By understanding the 3D nature and repair mechanisms, which are underestimated because of radiographic limitations and lack of know-how, a more adequate treatment decision will be achieved.

From the *Department of Oral Health Sciences, BIOMAT Research Cluster, KU Leuven and University Hospitals Leuven, Leuven, Belgium; †Private Practice, Endo Rotterdam, Rotterdam, The Netherlands; ‡Department of Imaging and Pathology, KU Leuven and University Hospitals Leuven, Leuven, Belgium; and [‡]Department of Materials Engineering (MTM), KU Leuven, Leuven, Belgium.
Address requests for reprints to Dr Athina M. Mavridou, Department of Oral Health Sciences, BIOMAT Research Cluster, Kapucijnenvoer 33, 3000 Leuven, Belgium.
E-mail address: athimavridou@gmail.com
0099-2399/\$ - see front matter
Copyright © 2016 American Association of Endodontists.
<http://dx.doi.org/10.1016/j.joen.2016.06.007>

External Cervical Resorption in Vital Teeth 1737

JOE — Volume 42, Number 12, December 2016

Mavridou 2016