Uptake of 18-fluorodeoxyglucose (FDG) as detected by Positron Emission Tomography (PET) is correlated to an increased expression of proteolytic enzymes in the wall of abdominal aortic aneurysms (AAA).

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A series of 190 patients presenting an AAA with mean diameter of 53 mm had a PET examination using FDG as tracer. Among them, 36% showed an uptake of FDG in a defined area of the aneurysmal wall suggesting an enhanced metabolic activity. Patients with a positive PET presented signs of instability such as recent acceleration of AAA growth, signs of fissuration or imminent rupture (Sakalihasan et al., *J Vasc & Endovasc Surg*, 2002). Moreover, in some cases, the specific location of FDG uptake proved to be the site of rupture and, more recently, an area of high wall stress (Xu et al., .*J Vasc & Endovasc Surg*, 2010). In order to validate PET as a relevant predictive diagnostic tool of AAA rupture, samples from the aneurysmal wall and the intraluminal thrombus were collected at the time of surgery at the identified site of FDG uptake and at a distant negative site from the same patient. Samples from patients with a negative PET were also collected. Tissue samples were handled for immunohistochemistry, transcriptomic and proteomic analyses after dissection of the adventitia, the media and the thrombus.

As a first approach, the expressions of a number of selected genes of the MMPs family were measured by QRT-PCR at both sites of the aneuryms. As compared to the PET-negative tissues, a significantly higher expression of MMP-13 (collagenase 3) was found in the PET-positive adventitia (x 9) and media (x 6) while the MMP14 (or MT1-MMP, one activator of MMP2) was significantly increased but only in the media (x 1.6). This was accompanied by an enhanced expression of TIMP-1 and PAI-1. This increased expression of notably MMP-13 mostly in the adventitia might contribute to the instability of the AAA wall and its rupture. Microarrays analyses are under way and should identify new candidates that contribute to the AAA progress towards rupture.