The results of this experiment are just accepted for publication in biophysical journal.

We analyzed amyloid laden tissue using a scanning mode of the microdiffraction set up on ID13. Our objectives were to characterize the structure of amyloid fibrils grown up inside a tissue cut-up from a human patient with amyloidosis. This diffraction study is the first one ever done on an *ex vivo* tissue while numerous others have analyzed the amyloid structure either from *in vitro* or tissue-extracted fibers. Three main conclusions have been extracted from our experiment:

1) Looking at the 4.7 Å diffraction feature, which is well admitted as the amyloid fingerprint of amyloid molecular structure, we show it to be at the same position in the ex vivo as in the in vitro formed structures. This demonstrates the identity on the in vitro and in vivo formed amyloids. This property allows to follow the details of the amyloid distribution within a given tissue as shown in the figure below.
2) We reveal the existence of a "natural" preferential orientation of the amyloid molecules inside the tissue cut. This is a promising property which would help understanding the fibrillogenesis process in correlation with the in vivo tissue conditions.
3) An important conclusion of the study is to prove the possibility of analyzing tissue cuts treated with the classical medical protocols such as paraffin embedding, opening new perspectives in structural characterization of amyloids depending on various tissues or various precursor proteins.

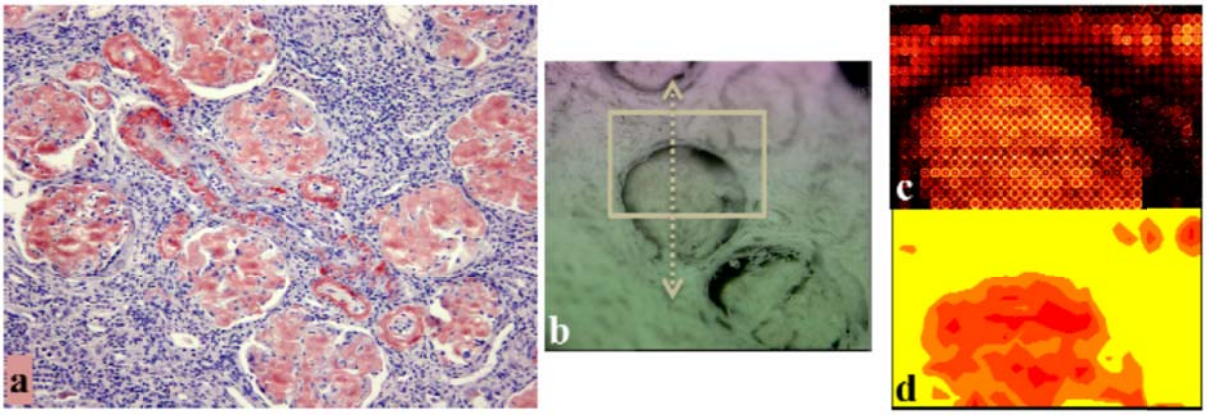

Figure showing a correlation between amyloid distribution in a tissue stained with congo red and the amyloid molecules revealed by microdiffraction:
(a) Massive renal AA amyloidosis clearly predominant in glomeruli (Congo red staining, original magnification x 100). An X-ray diffracting zone is approximately indicated in (b) with the whole produced diffraction patterns (c). Amyloid fibres distribution based on the diffraction intensity of the 4.7 Å reflexion arising from cross-β folded molecules within the kidney tissue is imaged in (d).