First approach to diagnosis of skin diseases by using SAXS

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This work is a new approach to an application of small angle X ray scattering (SAXS) on diagnosis of skin pathologies by using the diffraction pattern of collagen. During the last 4 years M. Fernandez et al (1, 2, 3) developed a new strategy in the preventive diagnosis of breast cancer by using diffraction enhanced imaging (DEI) and SAXS of collagen from breast connective tissue.

On the other hand, O. Lopez et al. have been carrying out different SAXS studies on the characterization of different cutaneous components and the supramolecular arrangement of skin layers (SC, epidermis and dermis). Since both previous works we started a study in the BM16 of the ESRF on the characterization of cutaneous collagen by means of SAXS.

Well diagnosed skin biopsies, from the Dermatology service of Clínic Hospital of Barcelona, were used in order to introduce objective values on the diagnosis of different skin pathologies.

On this first assays we established the working parameters of the skin samples; size, thickness and storage methodologies (freeze or paraffin embedded samples) For these experiments the distance sample- detector can be set in a range from 1,5 to 5,0 m.

At a distance of 5 m we compared different skin collagen diffraction peaks in paraffin embedded samples with no embedded samples and non significant differences were found.

The first pathologic samples that we studied, were biopsies of diagnosed melanoma in different storage conditions, frozen and paraffin. Capton windows were used in all experiments. All melanoma samples showed a clear loss of the typical collagen diffraction pattern.

At a 5 m distance (detector- sample) we mapped the different diffraction patterns of collagen from the same skin biopsy of a patient affected of melanoma, we appreciated significative changes, between the skin invaded areas compared to the healthy ones.

However will be essential to follow this work comparing if such changes take place for other pathologies or for non pathological cutaneous malformations.

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