An FT-IR Approach to Human Granulosa Cells

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The widespread use of in-vitro fertilization (IVF) procedures has made ovarian granulosa cells more accessible to research. They surround the oocyte, establishing during oogenesis a bidirectional communication via paracrine factors. This exchange of information has a key role in folliculo genesis and is essential for an oocyte to gain competence to sustain fertilization and embryogenesis.[1] Even if these cells have already been morphologically, immunohistochemically and biochemically assessed, little is known about processes generating a developmentally competent oocyte. The expression levels of some genes in the granulosa cells can be used as markers for oocyte quality.[2] The aim of the present study is to analyse these cells by using FPA FT-IR Imaging Spectroscopy, in order to identify specific spectral markers related to these processes.[3] A consistent number of granulosa cells, achieved from idiopathic (n. 5 samples) and endometriotic (n. 7 samples) patients, was deposed on silicon supports for IR transmission analysis. For all the samples, the microphotographs were obtained, on which the chemical maps were acquired. All the spectral data were submitted to multivariate analysis, affording for each cluster to a representative spectrum. The vibrational analysis evidenced different spectral profiles for the two experimental groups, above all in the proteic pattern, in carbohydrate content and in nucleic acids composition.

[1] Matzuk MM, Burns KH, Viveiros MM, Eppig JJ., *Science* 96, 178 (2002).
[2] McKenzie LJ, Pangas SA, Carson SA, Kovanci E, et al., *Hum Reprod* 19, 2869 (2004).
[3] Carnevali O, Conti C, Ferraris P, Garavaglia MG, Gioacchini G, Giorgini E, Rubini C, Sabbatini S, Tosi G., *J Mol Struct* 938, 207 (2009).