

Exfoliated epithelial cells, a source of information on clock genes expression by preterm infants to explore the onset of metabolic syndrome.

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Purpose: In translational research, ethics as well as legal reasons are limiting the use of biopsies in favor of non-invasive technology like the recovery of exfoliated cells from digestive fluids. Our major goal is to study the link between perinatal denutrition and the regulation of clock genes.

Methods: Gastric fluid aspirates were collected from preterm infants at day 1, 8, 15, 23 and 30 after birth and related to infants' growth and feeding. Exfoliated cells isolated according to Ped Res 2007 62: 564-569 in the frame of our Biocollection « Prémathèque », were enumerated and characterized by immunofluorescence and confocal imaging. In parallel experiments, time series analysed by TSA Cosinor were obtained from exfoliated buccal cells of human adult volunteer and from gastric mucosa of rat pups submitted to restricted/refeeding cycle to induce exfoliation.

Results: Gastric cells were quiescent epithelial cell phenotypes with rare figures of apoptosis. On typical samples of 50 cells, 30% were expressing H+/K+ ATPases, 7% Tryptophane Hydroxylases and 50% were positive for stem cell markers (Pou5F1 (Oct4) and Survivin). CLOCK and NPAS2 were found both at the cytoplasmic and nucleus sites. Expression levels and colocalization with DNA-fluorochromes were quantified by image analyses relatively to H+/K+ ATPases and survivin levels.

Conclusions: Our results are in favor of the expression of NPAS2 by gastric cells of preterm infants. As gastric fluids are collected every 3 hours in neonatal intensive care unit, the technique is relevant to explore the acquisition of circadian rhythmicity by the gastric epithelium of preterm infants.