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**Title:** Comparison of different instruments to obtain nasal epithelial cells from human volunteers

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**Body:** Introduction Nasal epithelial cells have been shown to be good surrogate markers for bronchial epithelial cells. We aimed at comparing different brushing instruments allowing collection of nasal epithelial cells. Methods Nasal epithelial cells were obtained by brushing the inferior surface of the middle turbinate of both nostrils using three different instruments: a cytology brush, a flocked nasal swab and a nasal mucosal curette. Cell cultures were established by seeding the cells into medium. Cell count, cell viability, success rate in establishing cell cultures and the acceptability to subjects were compared between groups Results 60 human subjects (median [IQR] age: 34 [27-36] years) were brushed. Higher number of cells were obtained using brushes ( $9.8 [6.7-33.5] \times 10^5$  cells/mL) compared to swabs ( $2.5 [1.5-4.0] \times 10^5$  cells/mL,  $p < 0.0001$ ) and currettes ( $1.3 [1.0-2.1] \times 10^5$  cells/mL,  $p < 0.0001$ ). Viability was similar for cells obtained using brushes (42 [14-78] %), swabs (54 [15-71] %) and currettes (54 [25-69] %). Cells obtained by brushes reached confluence fastest (6 [6-10] d), followed by cells obtained by currettes (11 [9-15] d, n.s.) and swabs (19 [13-21] d,  $p = 0.0001$ ). Success rate in establishing primary cell cultures (~ 90% confluent cell layers within 21 days in a 12.5 cm<sup>2</sup> cell culture flask) was 90% with brushes, 65% with swabs and 85% with currettes. Pain intensity was similar for all instruments, brushes (3.0 [2.0-5.8] out of 10 on the pain scale), swabs (2.5 [1.0-4.0]) and currettes (3.0 [2.0-5.0]). Conclusion All three types of instruments allow collection and growth of human nasal epithelial cells, with good acceptability to subjects. The most efficient instrument is the nasal brush.