Positive prostate 68GaPSMA-PET/CT correlates with detection of CD45-/PSMA+ non-sperm epithelial cells obtained by liquid biopsy of seminal fluid in patients with prostate cancer

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Background
Prostate Specific Membrane Antigen (PSMA) presents high expression in PCa cells and has been considered an attractive target for molecular imaging. 68GaPSMA-PET/CT showed high detection rate of nodal and bone metastases and, recently, was tested for diagnosis of primary PCa. Seminal fluid (SF) might contain prostate-derived PSMA positive tumour cells in men with PCa and serve as diagnosis.

Aim
To investigate the clinical reliability of 68GaPSMA-PET/CT for identification of primary PCa we tested the hypothesis that it correlates with detection of CD45-/PSMA+ non-sperm epithelial cells obtained by liquid biopsy of SF in patients with PCa.

Results
Seven patients over 59, who had received a diagnosis of PCa by 68GaPSMA-PET/CT software assisted fusion biopsy and were scheduled for radical prostatectomy (RP), collected their SF. The FACS procedure sorted non-sperm epithelial cells and CD45-/PSMA+ cell, as well, in SF of all those PSMA PET positive patients. The same patients presented PSMA+ cells in SF and in post-ejaculatory urine (Fig. 2 and 3a-b).

Conclusion
Our findings, by the first, showed a potential correlation between the 68GaPSMA-PET/CT, PCa and cancer-specific markers detected by SF liquid biopsy. These findings may represent the proof-of-concept to improve the role of 68GaPSMA-PET/CT for primary PCa diagnosis in a selected population and to further investigate the prostate cancer tumor elements by liquid biopsy of the SF.

Material and Methods
The current analysis results from combining data of two observational, longitudinal, prospective studies. Patients with primary PCa detected by 68GaPSMA-PET/CT software assisted fusion biopsy (Protocol ICH/382/2016), who received an indication to radical prostatectomy (RP) (Fig 1), had a sample of SF one month after the biopsy and just before the RP (Protocol ICH/1791/2017). SF samples were processed according to previously described method (Lazzeri et al., The Journal of Urology, Vol. 199, Issue 4, e155) and the following reagents were used: Syto-16 (nuclear staining), CD45 (leucocyte antigen), PSMA (prostate specific antigen), and EpCAM (epithelial specific antigen). The primary endpoint was to determine the relationship between 68GaPSMA-PET/CT results, PCa and detection of CD45-/PSMA+ non-sperm epithelial cells in SF.