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Reply Letter
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Smoking May Contribute to an Increase of miR-21 and a Worse Outcome in Pulmonary Hypertension

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Author's response:

We appreciate the comment on the role of microRNA-21 (miR-21) in smoking and its predictive value of COPD development. Indeed, previous studies reported that microRNAs could serve as mediators for cigarette smoking induced atherosclerosis, non-small-cell lung cancer and oral squamous cell carcinoma.[1-3] Among them, miR-21 expression is not only a novel biomarker in the lung cancer but increases IL-8 in airway epithelial cells.[3,4] In our study, we identified 28 pulmonary hypertension (PH) patients with a history of smoking, including ex-smokers (Table 1).[5] Compared with PH patients free from smoking, those with *smoking* are prone to be male and have higher levels of hemoglobin and circulating miR-21. Otherwise, there was no significant differences between ages, NT-proBNP and underlying diseases, including diabetes and hypertension. As we know, it has been reported that hemoglobin concentrations are higher in smokers than in non-smokers.[6] Despite a slightly higher prevalence of malignancy in PH patients with smoking, the small number of patients may contribute to the insignificances between groups. Collectively, in patients with hypoxia induced PH smoking could be a potential contributor to the increased expression of circulating miR-21 and the subsequently worse outcomes.

Table 1. Clinical characteristics between smokers and non-smokers in patients with hypoxia induced pulmonary hypertension (PH)

	PH without smoking (n = 13)	PH with Smoking (n = 28)	p value
Age (years)	53.3 ± 15.9	54.5 ± 11.6	0.24
Male (%)	6 (46.1)	21 (75)	0.03
Diabetes mellitus (%)	4 (30.7)	7 (25)	0.48
Hypertension (%)	3 (23)	6 (21.4)	0.52
Malignancy (%)	1 (7.6)	3 (10.7)	0.64
NT-proBNP (pg/ml)	1454.5 ± 3133.0	1109.1 ± 1669.7	0.48
Hemoglobin (g/dl)	12.2 ± 1.8	15.2 ± 3.3	0.04
miR-21 expression	3.7 ± 2.9	39.7 ± 59.2	0.04

Data are expressed as mean ± standard deviation.
NT-proBNP, N-terminal prohormone of brain natriuretic peptide, PH, pulmonary hypertension.

DECLARATION OF CONFLICT OF INTEREST

All the authors declare no conflict of interest.

REFERENCES

1. Yokoyama Y, Mise N, Suzuki Y, et al. MicroRNAs as potential mediators for cigarette smoking induced atherosclerosis. *Int J Mol Sci* 2018;19:1097.
2. Advani J, Subbannayya Y, Patel K, et al. Long-term cigarette smoke exposure and changes in MiRNA expression and proteome in non-small-cell lung cancer. *OMICS* 2017;21:390-403.
3. Singh P, Srivastava AN, Sharma R, et al. Circulating microRNA-21 expression as a novel serum biomarker for oral sub-mucous fibrosis and oral squamous cell carcinoma. *Asian Pac J Cancer Prev* 2018;19:1053-7.
4. Pace E, Di Vincenzo S, Di Salvo E, et al. Cigarette smoke upregulating the expression of miR 21 increases IL-8 in airway epithelial cells. *Eur Respir J* 2018;52:PA21711.
5. Chang WT, Hsu CH, Huang TL, et al. MicroRNA-21 is associated with the severity of right ventricular dysfunction in patients with hypoxia-induced pulmonary hypertension. *Acta Cardiol Sin* 2018;34:511-7.
6. Milman N, Pedersen AN. Blood haemoglobin concentrations are higher in smokers and heavy alcohol consumers than in non-smokers and abstainers: should we adjust the reference range? *Ann Hematol* 2009;88:687-94.

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