Abstract S46 Table 1 Values Δ AUC dose – response to ADP (0–10 μ M)

	Placebo	Fostair
p-selectin expression (%) baseline	–21.6, +140.6 ($p = 0.2$)	+5.8, +140.6 ($p = 0.03$)*
Platelet fibrinogen expression (%) baseline	–136.0, +169.1 ($p = 1.0$)	–52.5, +252.6 ($p = 0.3$)
PMA (%) baseline	–168.3, +92.4 ($p = 0.8$)	–116.7, +144.1 ($p = 1.0$)

Conclusion The effects of B/F in this study may represent delivery of corticosteroid to the peripheral airways ameliorating local injury and altering platelet activation. Bronchodilation may represent an effect on the small airways in IPF. Whether these effects are important in disease progression remains to be established.

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The breath of life: respiratory physiology

S47 NEURAL RESPIRATORY DRIVE RESPONSES TO INCREASES IN CONTINUOUS POSITIVE AIRWAY PRESSURE IN HEALTHY SUBJECTS

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Introduction Dynamic hyperinflation (DH) is characterised by an increase in end-expiratory lung volume (EELV) and contributes to exercise limitation in Chronic Obstructive Pulmonary Disease (COPD) patients. Neural respiratory drive (NRD) directly reflects the load-capacity relationship of the respiratory system and is therefore expected to increase with DH. However, there are limited data investigating the effects of isolated increases in EELV on NRD. We hypothesised that 1) increases in EELV induced by continuous positive airway pressure (CPAP) would increase NRD in healthy subjects and 2) with the change in lung volume, NRD to the parasternal intercostal muscles would increase to a greater extent than that to the diaphragm at higher levels of CPAP.

Method CPAP was applied to healthy subjects at 0, 4, 8, 12 and 16 cmH₂O in a random order and inspiratory capacity (IC) measured at each CPAP level as an indicator of EELV. Trans-diaphragmatic pressure swings (ΔP_{di}), tidal volume (V_T) and respiratory rate (RR) were measured. NRD was assessed with second intercostal space parasternal muscle electromyography (EMG_{para}) and diaphragm electromyography (EMG_{di}) using surface electrodes and a multipair oesophageal electrodes, respectively. EMG_{para}/EMG_{di} ratio was calculated.

Results 10 healthy subjects were recruited. Increasing levels of CPAP led to a reduction in IC ($p < 0.0001$, Table 1). Both EMG_{para} and EMG_{di} increased with progressive increases in CPAP (Table 1). Interestingly, respiratory rate and tidal volume

did not change with the increases in CPAP. Similarly, EMG_{para}/EMG_{di} ratio and ΔP_{di} remained unchanged.

Conclusion This detailed physiological study has demonstrated that escalating levels of CPAP increased EELV, shown by the reduction in IC, in healthy subjects. The increase in EELV was associated with an increase in NRD to both the parasternal intercostal muscles and to the diaphragm. However, contrary to the original hypothesis and observations in COPD patients (O'Donoghue *et al.*, Thorax 2001), NRD was not preferentially distributed to the parasternal intercostal muscles at higher lung volumes. These data indicate that the differential NRD to the parasternal and diaphragm in COPD patients is not solely a consequence of a rise in EELV and alternative mechanisms for the differential NRD should be sought.

Abstract S47 Table 1 Changes in neural respiratory drive and other physiological parameters during CPAP titration between 0 and 16 cmH₂O

	CPAP 0 cmH ₂ O	4 cmH ₂ O	8 cmH ₂ O	12 cmH ₂ O	16 cmH ₂ O	<i>p</i> value for trend
EMG _{para} (μ V)	5.82 (2.25)	6.07 (2.29)	6.97 (2.61)	7.90 (2.93)	10.3 (6.4)*	<0.001
EMG _{di} (μ V)	12.75 (5.03)	14.19 (5.04)	18.27 (8.57)	22.64 (10.33)*	33.2 (25.2)*	<0.001
EMG _{para} /EMG _{di} ratio	0.56 (0.38)	0.50 (0.27)	0.49 (0.28)	0.39 (0.16)	0.38 (0.23)	0.29
RR (/min)	14.9 (2.9)	13.5 (2.8)	12.3 (2.9)	14.4 (3.5)	14.9 (4.2)	0.95
IC (L)	2.50 (0.49)	2.38 (0.48)	2.13 (0.45)	1.79 (0.44)*	1.57 (0.71)*	<0.0001
IC %predicted	90.3 (14.3)	85.6 (11.6)	76.6 (12.5)	64.4 (11.0)*	55.2 (17.9)*	<0.0001
V_T (L)	0.57 (0.10)	0.58 (0.13)	0.62 (0.19)	0.61 (0.32)	0.59 (0.23)	0.95
ΔP_{di} (cmH ₂ O)	11.2 (4.4)	9.2 (2.4)	9.8 (4.2)	9.6 (4.2)	10.3 (3.8)	0.37
ΔP_{oes} (cmH ₂ O)	7.6 (2.5)	5.9 (1.5)	7.0 (1.5)	6.7 (2.1)	7.4 (1.6)	0.14

RR: respiratory rate, IC: inspiratory capacity, V_T : tidal volume, ΔP_{di} : transdiaphragmatic inspiratory pressure swing; ΔP_{oes} : oesophageal inspiratory pressure swing. * $p < 0.05$ compared with value at CPAP 0 cmH₂O.

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S48 CONTINUOUS POSITIVE AIRWAY PRESSURE TITRATION IN AWAKE OBESE SUBJECTS WITH OBSTRUCTIVE SLEEP APNOEA AND ITS IMPACT ON NEURAL RESPIRATORY DRIVE AND BREATHLESSNESS

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Background Continuous positive airway pressure (CPAP) is an effective treatment for obstructive sleep apnoea (OSA). We assessed neural respiratory drive (NRD), as measured by the surface electromyogram of the parasternal intercostals (sEMG_{para}),