

EP3472: Interstitial microenvironment in pulmonary disease including non-small cell carcinoma

EE Duhig^{1,2}, K Fong^{1,3}, E Stephens¹, A Goldsworthy¹, K Chee¹, A van Zwieten⁴, A Broomfield⁴, R Bowman³, D Godbolt⁴, M Davidson⁴, J Mackintosh³, P Hopkins³, D Chambers³, I Yang^{1,3}

Affiliations: University of Queensland Thoracic Research Centre at The Prince Charles Hospital¹, Sullivan Nicolaides Pathology², The Prince Charles Hospital⁴, Chermide, Qld, Australia³, and Pathology Queensland⁴

Correspondence: e.duhig@student.uq.edu.au

INTRODUCTION

The elastin fibre is critical for respiration and is found in all lung compartments. It is a complex fibre and provides recoil to the lung and is an important signalling molecule, being a reservoir for latent TGF β and BMP. A detailed survey of the microenvironment, including the elastin content, and the relationships with resident lung epithelium, has not been undertaken. A range of lung diseases, including malignancy, emphysema, interstitial fibrosis and inflammatory processes were examined to determine similarities and differences and elastin content.

METHODS

Design:

- 195 cases were retrieved from the UQTRC database
- Tissue microarrays were obtained
- Stained for an elastin marker (VVG)
- Immunohistochemistry markers:
 - Epithelial lineage (surfactant apoprotein A (SPA), CC10, FOXJ1, SOX2, CK5, p40 and MUC5AC)
 - Elastin related proteins (α v β 6-integrin, fibrillin1 (FBN1), fibrillin2 (FBN2), fibulin4.
- Elastin lengths manually annotated using QuPath, an open source bioimage analysis programme.
- AI was not used in this study.

DISCUSSION AND CONCLUSION

Not all tumours have a significant microenvironment
Repair of damaged lung elastin is critical to lung physiology.

- Type II pneumocytes contribute to the elastin fibre deposition and can express Fibulin4
- Elastin deposition $\neq$ collapse
- This relationship has implications for lung carcinogenesis, particularly elastin rich tumours
- Conversely, elastin damage was frequent in tumours. Breakdown products are a potential driver of repair, and malignant growth.

Future Direction for Research

- Further study is required to better characterise the pathways involved.

ACKNOWLEDGEMENTS

Funding kindly received from Australian Government Research Training Program Scholarship, The Foundation of the Royal College of Pathologists of Australasia, and Sullivan Nicolaides Pathology

Thanks to lung tissue donors who contribute tissue to the University of Queensland Thoracic Research Centre Bank

RESULTS

IEL: Interstitial elastin length
VEL: Vascular elastin length
ED: Elastin destruction

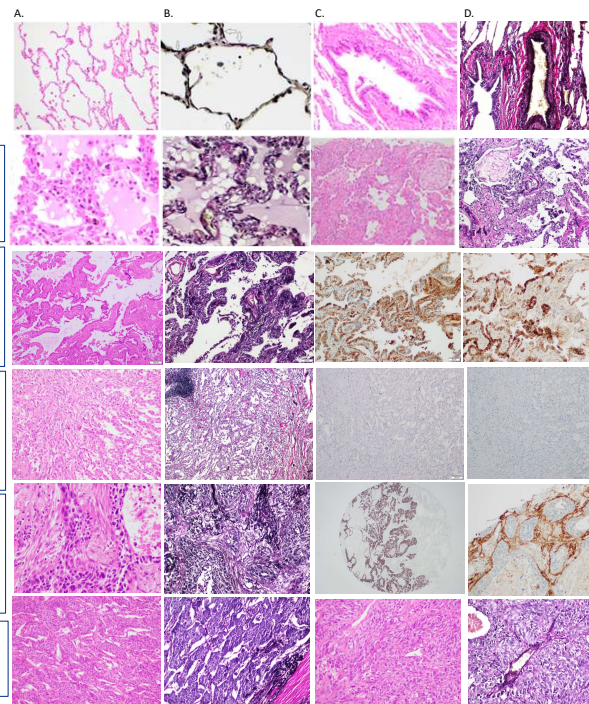
$\uparrow$ IEL
 $\downarrow$ VEL
(No) ED*
SPA+ II

$\uparrow\uparrow$ IEL
 $\uparrow\uparrow$ VEL
 $\downarrow$ ED
 $\uparrow$ SPA, FBN1, Fibulin4

$\downarrow$ IEL
 $\uparrow\uparrow$ VEL
 $\uparrow$ ED
Various IHC (MUC5AC)

$\downarrow$ IEL
 $\uparrow\uparrow$ VEL
 $\uparrow\uparrow$ ED
p40, CK5, SOX2, FBN2

$\downarrow$ IEL
 $\downarrow$ VEL
 $\uparrow$ ED



*ED not seen in uncomplicated pneumonitis but can be seen in abscesses and granulomas

