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Commentary

A Comprehensive Study on Lung Carcinoid Tumours

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DESCRIPTION

Lung Carcinoid Tumours, also known as pulmonary neuroendocrine tumours, are cancers of the lungs. Carcinoids are rare lung tumours that have a better prognosis than other kinds of lung cancer. Even so, some individuals have relapse and metastatic expansion, and there is no consensus treatment for metastasized carcinoids. A number of recent single-cell investigations have shed light on the cellular heterogeneity of more prevalent lung malignancies such adeno- and squamous cell carcinoma. The properties of lung carcinoids at the single-cell level, on the other hand, are yet unknown. We used single-cell RNA sequencing on three lung carcinoid tumour samples and normal lung tissue to investigate the cellular makeup and single-cell gene expression levels in lung carcinoids. We present the first comprehensive analysis of the cellular composition and single-cell gene expression profiles in lung carcinoids, demonstrating the tumour microenvironment's non-inflammatory and vessel-rich nature and highlighting relevant intercellular interactions that could serve as future therapeutic targets. Lung cancer is a complex disease with numerous histological subgroups. Aside from adenocarcinomas and squamous cell carcinomas, the 2015 WHO classification added pulmonary Neuroendocrine Tumours to the list (NETs). Small Cell Lung Cancer (SCLC) and Large Cell Neuroendocrine Carcinoma (LCNEC) are high-grade subtypes of this group, as are low- and intermediate-grade NETs of the lung, often known as typical and atypical carcinoids, respectively. Lung carcinoids are responsible for 1% of lung cancer incidences and have been on the rise in recent decades. Lung carcinoids have a better prognosis than traditional lung malignancies. Typical carcinoids and atypical carcinoids, the latter of which are distinguished by a greater mitotic rate or the presence of tumour necrosis, have 5-year survival rates of about 90% and 70%, respectively. Carcinoid patients with regional lymph node metastases account for about 10% of all cases. Recurrent illness and lymphonodal and systemic metastatic dissemination are more common in atypical carcinoids. However, there is no agreement on a defined systemic treatment for metastasized lung carcinoids. Adenocarcinomas and squamous cell carcinomas, the most prevalent subtypes of lung cancer, are linked to smoking and characterized by a high tumour mutational burden. Lung carcinoids, on the other hand, affect younger patients and non-smokers, have a smaller mutational load, and have a different range of oncogenic mutations. As a result, novel targeted and immunological therapies that have improved outcomes in lung adeno- and squamous cell carcinomas are unlikely to be easily applied to lung carcinoids. Furthermore, intratumoral heterogeneity, where tumours may include primary resistant tumour cell subclones, as well as the complex tumour microenvironment, which modulates immune responses against the tumour, makes forecasting the efficacy of modern targeted and immunological therapies difficult. Single cell gene expression analysis has already provided vital insights into the cellular heterogeneity of lung adenocarcinomas, allowing researchers to circumvent this constraint. We used single-cell RNA sequencing to examine the cellular composition of lung carcinoids in three carcinoid tumour and normal lung tissue samples in this work. We show that single-cell gene expression profiles of carcinoid tumour cells mirror clinicopathological characteristics and can be assigned to molecular clusters that have recently been identified. We also discovered that the tumour microenvironment was distinguished by non-inflammatory monocyte-derived myeloid cells, tumor-associated endothelial cells, a spectrum of vascular smooth muscle cells and pericytes, and cancer-associated fibroblast-like myofibroblasts. Our findings pave the way for more research into the microenvironment of lung carcinoid tumours, as well as possible prognostic, predictive biomarkers and novel treatment targets.

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