

PIWI-interacting RNA and small nucleolar RNA signatures of smokers and non-smokers in lung adenocarcinoma

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Lung cancer is one of the most frequent type of cancer worldwide. However, the majority of the cases are diagnosed when the disease is clinically advanced, leading to poor prognosis. PIWI-interacting RNAs (piRNAs) and small nucleolar RNAs (snoRNA) are two classes of small non-coding RNAs which expression was reported altered in several types of cancer. We investigated differentially and constitutively expressed piRNAs and snoRNAs in publicly available smoker and non-smoker lung adenocarcinoma small high throughput sequencing data. Eight non-smoker and twelve smoker matched tumor and control samples were aligned on the human genome using Novoalign. The differentially expressed piRNAs and snoRNA were obtained using EdgeR and the constitutively expressed were assigned using variance analysis. We identified several distinct sets of differentially expressed piRNAs and snoRNAs among the samples studied. SNORD89 was found less expressed in tumor samples and more expressed in smoker's samples, while piR_023057 and piR_015341 were found more expressed in non-smokers. Most of the snoRNA were also reported as anomaly expressed in cancer. We also identified snoRNA and piRNA constitutively expressed in both tumor and control samples, regardless of smoke status, including SNORD43 and SNORD57. The expression of SNORD43 was already reported as stable and useful as normalization parameter for prostate, bladder and renal cancer. Although none of our piRNA has been previously reported in cancer samples, PIWI proteins have been reported altered in lung cancer and related to patient survival. Our findings stress the importance of non-coding RNAs in cancer biology and prognosis and their increasing role as potential biomarkers for diagnosis and treatment. In conclusion, we identified a set of piRNA and snoRNA that can distinguish smokers from non-smokers in lung cancer.

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