



RELX “1+4” Scientific Research Chain

The “1” in the RELX “1+4” Scientific Research Chain refers to product quality. On the premise of ensuring product quality, we conduct scientific research through four major scientific research modules: physical and chemical research, toxicological research, clinical research and long-term impact assessment to promote product innovation and harm reduction.

Product Quality



We regard stable product quality and strict quality control as the premise of all scientific research. We established a quality assurance system that covers the entire product lifecycle to ensure that every step of the manufacturing process is under strict control. Product quality is always the priority when product quality conflicts with other processes.

Physical and Chemical Research

We monitor several indicators and impurity pollutants in e-liquids and systematically analyze the e-liquid contact materials’ E&L (extractable and leachable). We pay attention to the content of various chemical components in aerosols, focusing on potential risk components in the release of these chemicals. We accumulate a large amount of data to provide basic information for quantitative risk assessment and other biological experiments and clinical scientific experiments. CNAS³ has accredited the RELX Physical and Chemical Laboratory.

Toxicological Research

Our Life Science Laboratory conducts preclinical biological risk assessments of e-liquids and aerosols, including cytotoxicity, genotoxicity, acute toxicity testing in animals, and subacute toxicity testing in animals, to verify products’ ability to reduce harm. By the end of 2022, we had published seven papers in international journals demonstrating the inhalation safety and harm reduction of e-vapors. Moreover, we cooperate with universities and research institutes(including Chinese Academy of Sciences, Sun Yat-sen University, and Fuzhou University), to carry out scientific research on the harm reduction of e-vapors, to study the science of e-vapor from different dimensions, and continue to expand our understanding in this field.

Clinical Research

Focused on safety of e-cigarettes, we regularly track users in clinical research and monitor changes in various physiological indicators and relevant biomarkers in the body. We also research users’ vaping behavior and nicotine pharmacokinetics.

Long-term Impact Assessment

We run long-term studies on the change of users’ characteristics in the field of public health, predicting the mid- and long-term impact of e-vapor products based on statistical analysis models and toxicological and clinical research results.

³ CNAS (China National Accreditation Service for Conformity Assessment) is the only institution in China approved and authorized by the Certification and Accreditation Administration of People’s Republic of China to accredit national accreditation laboratories.

In March 2022, Qilu University of Technology and we jointly published the SCI paper “A comparative assessment of e-cigarette aerosol extracts and tobacco cigarette smoke extracts on in vitro endothelial cell inflammation response” on the *Human and Experimental Toxicology*. The paper proves that cytotoxicity induced by four types of e-cigarettes is significantly lower than commercial cigarettes in HUVECs.

2022
March

2022
July

In July 2022, we published the SCI paper “Chemical analysis of selected harmful and potentially harmful constituents and in vitro toxicological evaluation of leading flavoured e-cigarette aerosols in the Chinese market” on the *Drug Testing and Analysis*. The paper verifies that compared with cigarettes, use of e-cigarettes may significantly reduce exposure to harmful substances with mitigated cytotoxicity and less mutagenic effect.

In September 2022, Sun Yat-sen University and we jointly published the SCI paper “Combined biological effects and lung proteomics analysis in mice reveal different toxic impacts of electronic cigarette aerosol and combustible cigarette smoke on the respiratory system” on the *Archives of Toxicology*. The paper concludes harm of e-cigarette aerosol on the respiratory system is less than combustible cigarette smoke of same dose and provides additional proof of the relative safety of e-cigarettes.

2022
September

2022
November

In November 2022, Fuzhou University and we jointly published the SCI paper “Exosome proteomics study of the effects of traditional cigarettes and electronic cigarettes on human bronchial epithelial cells” on the *Toxicology in Vitro*. The paper verifies the significantly lower toxicity of e-cigarettes than cigarettes.