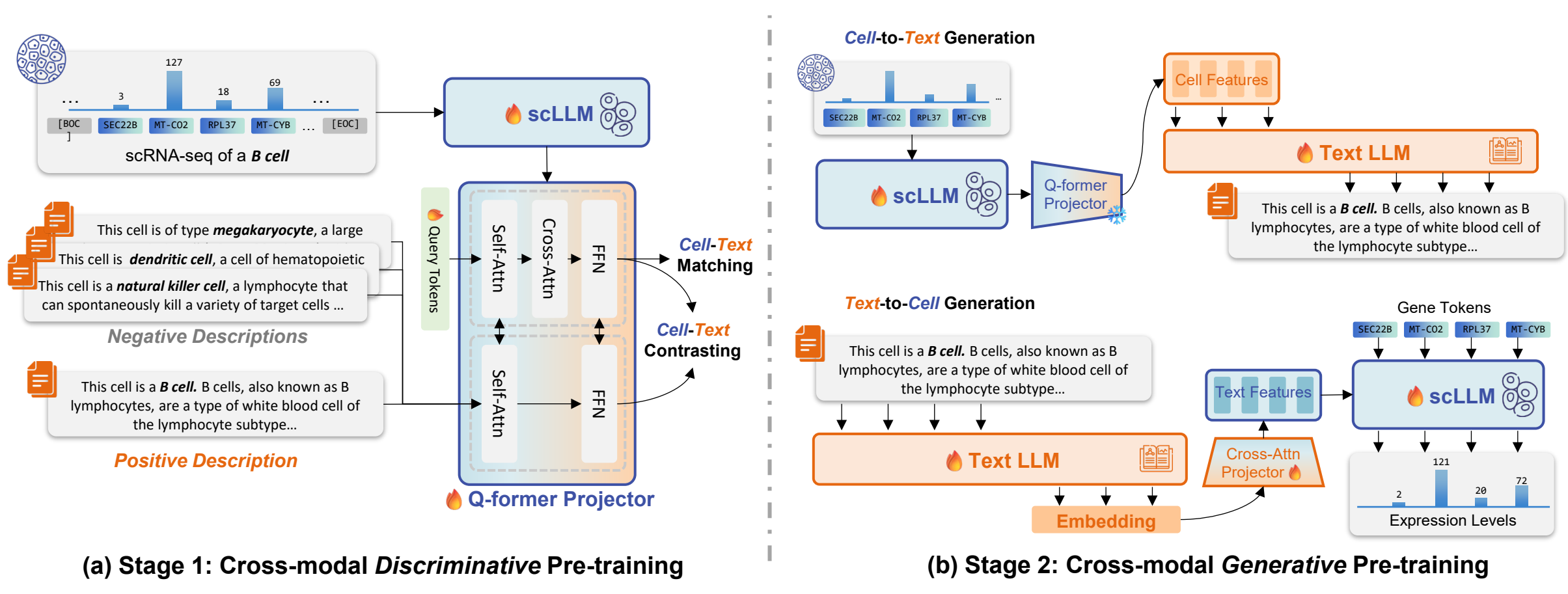
scRNA-seq of a B cell
[BOC]
SEC22B
MT-CO2
RPL37
MT-CYB
[EOC]
127
3
18
69
scLLM
This cell is of type megakaryocyte, a large
This cell is dendritic cell, a cell of hematopoietic
This cell is a natural killer cell, a lymphocyte that can spontaneously kill a variety of target cells ...
Negative Descriptions
This cell is a B cell. B cells, also known as B lymphocytes, are a type of white blood cell of the lymphocyte subtype...
Positive Description
Query Tokens
Self-Attn
Cross-Attn
FFN
Self-Attn
FFN
Cell-Text Matching
Cell-Text Contrasting
Q-former Projector
(a) Stage 1: Cross-modal Discriminative Pre-training
Cell-to-Text Generation
SEC22B
MT-CO2
RPL37
MT-CYB
scLLM
Q-former Projector
Cell Features
Text LLM
This cell is a B cell. B cells, also known as B lymphocytes, are a type of white blood cell of the lymphocyte subtype...
Text-to-Cell Generation
This cell is a B cell. B cells, also known as B lymphocytes, are a type of white blood cell of the lymphocyte subtype...
Text LLM
Embedding
Text Features
Cross-Attn Projector
Gene Tokens
SEC22B
MT-CO2
RPL37
MT-CYB
scLLM
121
2
20
72
Expression Levels
(b) Stage 2: Cross-modal Generative Pre-training