

S3A CELLxGENE Schema 5.x Compliance (expected)
* Traditional = Zellkonverter/convert2anndata via FFI

Section	Field	Required Type	Description	CrossCell	Traditional*
obs	organism_ontology_term_id	string	e.g. NCBITaxon:9606	✓	✓
obs	tissue_ontology_term_id	string	e.g. UBERON:0000178	✓	✓
obs	assay_ontology_term_id	string	e.g. EFO:0009922	✓	✓
obs	disease_ontology_term_id	string	e.g. PATO:0000461	✓	✓
obs	cell_type_ontology_term_id	string	e.g. CL:0000084	✓	✓
obs	sex_ontology_term_id	string	e.g. PATO:0000384	✓	✓
obs	development_stage_ontology_term_id	string	e.g. HsapDv:0000087	✓	✓
obs	self_reported_ethnicity_ontology_term_id	string	e.g. HANCESTRO:0005	✓	✓
obs	donor_id	string	unique donor identifier	✓	✓
obs	suspension_type	categorical	cell, nucleus, or na	✓	X
obs	is_primary_data	bool	True/False	✓	X
var	feature_id	string	Ensembl gene ID	✓	✓
var	feature_name	string	gene symbol	✓	✓
var	feature_reference	string	e.g. NCBITaxon:9606	✓	✓
var	feature_biotype	string	e.g. gene	✓	✓