Molecular alteration pathway	Colorectal	Gastric	Liver	Pancreatic	Oesophageal	Gallbladder
TP53	●●●	●●●	●●●	●●●	●●●	●●●
KRAS	●●●	●	●	●●●	●	●●
APC / Wnt signalling	●●●	●	●●●	●	–	●
PI3K/AKT (PIK3CA/PTEN)	●●●	●●●	●	●	●	●
MMR / MSI pathway	●●●	●●	●	●	●	–
ERBB signalling (ERBB2/EGFR)	●	●●●	●	●	●●	●●●
DNA damage repair	●●	●	●	●●●	●	●
Chromatin remodelling (e.g. ARID1A)	●	●●●	●●	●	●	●
RTK–RAS–MAPK signalling	●●●	●●●	●●●	●●●	●●●	●●●
Epigenetic dysregulation	●●	●●●	●	●	●●	●
Inflammation / viral-associated pathways	●	●	●●●	●	●	●
Mucin/ECM/glycosylation pathways	●	●	●●	●	–	●

Figure 2. Comparative overview of recurrent molecular alterations and pathways across digestive system cancers.

This figure summarises commonly reported molecular alterations and biological pathways identified across the included studies. The qualitative scale reflects the relative consistency of reporting across studies rather than quantitative mutation frequency. ●●● indicates alterations consistently reported across multiple studies, ●● indicates moderate reporting, ● indicates less frequent or context-specific reporting, and – indicates limited or no prominent reporting within the included literature. Abbreviations: MMR, mismatch repair; MSI, microsatellite instability; ECM, extracellular matrix.