

Supplementary Table S1. Baseline characteristics of all cohorts

Baseline characteristics of ICC			
		Cohort A	Cohort B
Patient number	/	20	20
ROI number	/	100	100
Age	Range (years)	44-79	43-82
	Median (years)	65.0	56.5
Sex	Male	13 (65.0%)	9 (45.0%)
	Female	7 (35.0%)	11 (55.0%)
Location	Right	9 (45.0%)	10 (52.6%)
	Left	8 (40.0%)	9 (47.4%)
	Both	3 (15.0%)	0
Tumor diameter	Range (cm)	1.2-14	0.5-13
Unifocal/Multifocal	Unifocal	17 (85.0%)	18 (90.0%)
	Multifocal	3 (15.0%)	2 (10.0%)
Grading	Moderately differentiated	12 (60.0%)	13 (65.0%)
	Low grade	8 (40.0%)	7 (35.0%)
pT	1a	4 (20.0%)	5 (25.0%)
	1b	2 (10.0%)	2 (10.0%)
	2	9 (45.0%)	8 (40.0%)
	3	3 (15.0%)	3 (15.0%)
	4	2 (10.0%)	2 (10.0%)
	x	8 (40.0%)	13 (65.0%)
pN	0	8 (40.0%)	5 (25.0%)
	1	4 (20.0%)	2 (10.0%)
HBV infection	Positive	5 (25.0%)	6 (30.0%)
	Negative	15 (75.0%)	14 (70.0%)
Baseline characteristics of CRLM			
		Cohort A	Cohort B
Patient number	/	20	20
ROI number	/	100	100
Age	Range (years)	25-74	49-80
	Median (years)	58	62
Sex	Male	9 (45.0%)	11 (55.0%)
	Female	11 (55.0%)	9 (45.0%)
Location	Right	15 (75.0%)	15 (75.0%)
	Left	3 (15.0%)	5 (25.0%)
	Both	2 (10.0%)	0
Tumor diameter	Range (cm)	0.2-5.5	0.6-10
Unifocal/Multifocal	Unifocal	10 (50.0%)	13 (65.0%)
	Multifocal	10 (50.0%)	7 (35.0%)

Grading	Moderately differentiated	14 (70.0%)	14 (70.0%)
	Low grade	6 (30.0%)	6 (30.0%)

ICC:intrahepatic cholangiocarcinoma; CRLM:colorectal cancer liver metastases

Supplementary Table S2. The polarization basis parameters (PBP)

B_b	$(M_{22} + M_{33})/2$
B_β	$(M_{23} - M_{32})/2$
$B_{\bar{b}}$	$(M_{22} - M_{33})/2$
$B_{\bar{\beta}}$	$(M_{23} + M_{32})/2$
t_1	$\sqrt{B_{\bar{b}}^2 + B_{\bar{\beta}}^2}/2$
det B	$M_{22}M_{33} - M_{23}M_{32}$
norm B	$\sqrt{M_{22}^2 + M_{33}^2 + M_{23}^2 + M_{32}^2}$
CD	$M_{14} + M_{41}$
P_L	$\sqrt{M_{21}^2 + M_{31}^2}$
D_L	$\sqrt{M_{12}^2 + M_{13}^2}$
r_L	$\sqrt{M_{24}^2 + M_{34}^2}$
q_L	$\sqrt{M_{42}^2 + M_{43}^2}$
Transpose asym DP	$\sqrt{(M_{12}^2 - M_{21}^2) + (M_{13}^2 - M_{31}^2)}$
Transpose asym rq	$\sqrt{(M_{24}^2 - M_{42}^2) + (M_{34}^2 - M_{43}^2)}$

det MM	Matrix determinant of Mueller matrix
norm MM	Matrix norm of Mueller matrix
Trace MM	Trace of Mueller matrix
$ \vec{P} $	$\sqrt{M_{21}^2 + M_{31}^2 + M_{41}^2}$
$ \vec{D} $	$\sqrt{M_{12}^2 + M_{13}^2 + M_{14}^2}$
$\vec{P} \cdot \vec{D}$	$M_{12}M_{21} + M_{13}M_{31} + M_{14}M_{41}$
$\vec{P} m \vec{D}$	Invariant under rotation and retarder transformation
$\vec{P} m^T \vec{D}$	Invariant under rotation and retarder transformation
λ_1	Eigenvalues of coherence matrix
λ_2	Eigenvalues of coherence matrix
λ_3	Eigenvalues of coherence matrix
λ_4	Eigenvalues of coherence matrix
P_1	Indices of polarimetric purity
P_2	Indices of polarimetric purity
P_3	Indices of polarimetric purity
PI	Overall purity index
PD	Depolarization index
S	Polarization entropy
E_S	$M_{11} - M_{22} - M_{33} - M_{44}$

E_1	$(M_{11} + M_{22})^2 - (M_{12} + M_{22})^2$ $- (M_{33} + M_{44})^2$ $- (M_{34} + M_{43})^2$
E_2	$(M_{11} - M_{22})^2 - (M_{12} - M_{21})^2$ $- (M_{33} - M_{44})^2$ $- (M_{34} + M_{43})^2$
E_3	$(M_{11} + M_{21})^2 - (M_{12} + M_{22})^2$ $- (M_{13} + M_{23})^2$ $- (M_{14} + M_{24})^2$
E_4	$(M_{11} - M_{21})^2 - (M_{12} - M_{22})^2$ $- (M_{13} - M_{23})^2$ $- (M_{14} - M_{24})^2$
E_5	$(M_{11} + M_{12})^2 - (M_{21} + M_{22})^2$ $- (M_{31} + M_{32})^2$ $- (M_{41} + M_{42})^2$
E_6	$(M_{11} - M_{12})^2 - (M_{21} - M_{22})^2$ $- (M_{31} - M_{32})^2$ $- (M_{41} - M_{42})^2$
D	Diattenuation
Δ	Total depolarization
δ	Linear depolarization

R	Retardence
α	Circular dichroism