Table S1 Literature review of MMR proteins overexpressed in cancers

Reference	MMR genes/proteins overexpressed	Techniques used	Summary of findings
Wilczak *et al*. (2017)	MSH6, PMS2, MLH1	Immuno-histochemistry (IHC) of 11152 prostate cancer specimens. Deletions measured by FISH	47% samples showed strong Msh6 overexpression, 31.6% showed strong Pms1 overexpression and 39.2% showed strong Mlh1 expression. Staining intensity in normal prostate epithelium ranged from negative to moderate and was typically negative to weak. MSH6, MLH1 and PMS2 expression is particularly strong in cancers with advanced pathological tumor stage, high gleason grade, nodal metastasis and early biochemical recurrence. High levels of MMR gene expression paralleled features of genetic instability, such as the number of genomic deletions per cancer.
Kauffmann *et al*. (2008)	*MSH6, MSH2, PCNA, EXO1*	Microarray in 60 + or - metastasis melanoma samples.	DNA repair and replication genes such as *MSH2*, *MSH6*, *EXO1*, *PCNA* were overexpressed in samples that underwent metastasis compared to those that did not.
Jewell *et al*. (2010)	*MSH2, MSH6*	Microarray in 472 melanoma samples	*MSH2* and *MSH6* are significantly overexpressed in tumors with higher mitotic rate and greater Breslow thickness.
Stark *et al*. (2015)	MSH6	IHC in 211 glioblastoma samples	Expression of MSH6 was significantly associated with proliferation but not with survival.
Huang *et al*. (2017)	MSH2, MLH1	IHC of 120 colon cancer samples	Overexpression of MLH1 and MSH2 is associated with shorter and longer survival of patients respectively. MLH1 is more frequently overexpressed in metastasis group compared to non-metastasis group.

Wagner *et al*. (2016)	MSH2, MSH6	IHC of 115 oral squamous cell carcinomas	High MSH2 and MSH6 expression was found in 59.1% and 46.5% cases, respectively. 27.8% exhibited high MSH2 and MSH6 expression simultaneously. MSH2 expression levels were significantly correlated with the levels of MSH6. MSH6 and MutSα overexpression were associated with poor survival rates.
Vageli *et al*. (2012)	*MSH2*, *MSH6*, *MLH1*, *PMS2*	Real time qPCR of 23 urothelial cell carcinomas	Overexpression of *MSH2*, *MSH6*, *MLH1*, *PMS1* mRNA expression in 47.8%, 30%, 35% and 30% of cases. *MSH2* and *MSH6* expression were correlated; *MSH2* and *MLH1* expression were correlated.
Li *et al*. (2013)	MSH2, MLH1, PCNA	IHC of 181 Non-small cell lung cancer	The expression of MLH1, MSH2 and PCNA increased in cancers with EGFR mutations.
Norris *et al*. (2007)	PMS2	IHC of 33 tumors from 19 prostate cancer patients	Increase in PMS2 levels was identified in prostate cancer tissue. Prostate tumors with elevated levels of PMS2 were genetically unstable (MSI), which was corrected by MLH1 co-elevation.
Norris *et al*. (2009)	PMS2	Quantitative IHC of 166 prostate cancer patients	PMS2 expression elevated in 67% of patients and correlated with tumor volume. PMS2 expression higher in recurrent patients, compared to non-recurrent patients. PMS2 expression shown to be a predictor of time-to-recurrence after surgery.
Velasco *et al*. (2002)	MSH2	IHC from 101 prostate cancer patients	Increased MSH2 expression observed in 32% of benign prostatic hyperplasia and 71% of cancer specimens compared to normal glands. Microsatellite instability detected in 26% of moderate to high staining MSH2 prostate carcinoma specimens.

			Decreased risk of recurrence correlated with absent to low MSH2 staining in malignant prostate tissue.
Li M *et al*. (2008)	MSH2, MLH1	IHC of 191 gastric cancers	Overexpression of MLH1 and/or MSH2 was observed and linked to tumor aggressiveness.
Srivastava *et al*. (2004)	MSH2	IHC of 55 glioblastomas	Significantly higher expression of MSH2 protein in high grade as compared with low grade primary human gliomas. No such difference was observed for MLH1.
Castrilli *et al*. (2002)	MSH2, MLH1	IHC of 43 salivary gland tumors	Malignant tumors contained significantly higher proportions of MSH2 and MLH1 positive cells compared to pleomorphic adenomas.
Friedrich *et al*. (1999)	MSH2	IHC of 40 ovarian carcinomas	All ovarian carcinomas analyzed revealed moderate to strong MSH2 staining as compared to normal ovarian tissue which showed negative to weak staining.
Leach *et al*. (2000)	MSH2	IHC of 17 urothelial carcinomas	Increased expression of MSH2 was detected in all tumors examined.
Hamid *et al*. (2002)	MSH2, PCNA	IHC of 27 endometrial carcinomas	62.5% of tumor samples showed moderately to markedly stronger expression of MSH2 and PCNA than in normal proliferative endometrial glandular cells. MSH2 expression correlated with PCNA expression.
Rass *et al*. (2001)	MSH2	IHC and RT-PCR of melanocytic tumors	Higher protein expression and mRNA levels of hMSH2 in aggressive, malignant melanocytic tumors was seen. Levels of MSH2 were not correlated with the proliferation marker Ki-67.

Summary of studies that have found various MMR genes or proteins to be overexpressed in a variety of cancers and outcomes they have been linked to.