

Cover Page



Universiteit Leiden



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**Mismatch repair and MUTYH deficient colorectal cancers:
at the crossroad of genomic stability and immune escape**

Noel Filipe da Cunha Carvalho de Miranda

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**Mismatch repair and MUTYH deficient colorectal cancers:
at the crossroad of genomic stability and immune escape**

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ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
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volgens besluit van het College voor Promoties
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door

Noel Filipe da Cunha Carvalho de Miranda
geboren te Póvoa de Varzim, Portugal
in 1982

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Kettlewell found that in unpolluted areas, more of his light-colored moths had survived. In soot-blackened areas, more of the dark-colored moths had survived. Thus Kettlewell showed that in each environment the moths that were better camouflaged had the higher survival rate. It was logical to conclude that when soot darkened the tree trunks in the area, natural selection caused the dark-colored moths to become more common. Today Kettlewell's work is considered to be a classic demonstration of natural selection in action.

-BIOLOGY ("The Elephant Book"), Miller & Levine, p.298. -

To my parents
and
in memory of Prof. Noé Gonçalves de Miranda

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Abbreviations:

BMP	Bone morphogenetic protein
CIMP	CpG island methylator phenotype
CIN	Chromosomal instability
CTL	Cytotoxic T cell
FAP	Familial adenomatous polyposis
HLA	Human leukocyte antigen
HNPCC	Hereditary non-polyposis colorectal cancer
MAP	MUTYH-associated polyposis
MHC	Major histocompatibility complex
MSI	Microsatellite instability
MSI-H	Microsatellite instability - high
NK	Natural killer
TGF- β	Transforming growth factor beta

