



Ontario Institute
for Cancer Research

science → discoveries → solutions

Challenging Multi-Disciplinary Sciences to Impact Cancer



Ontario



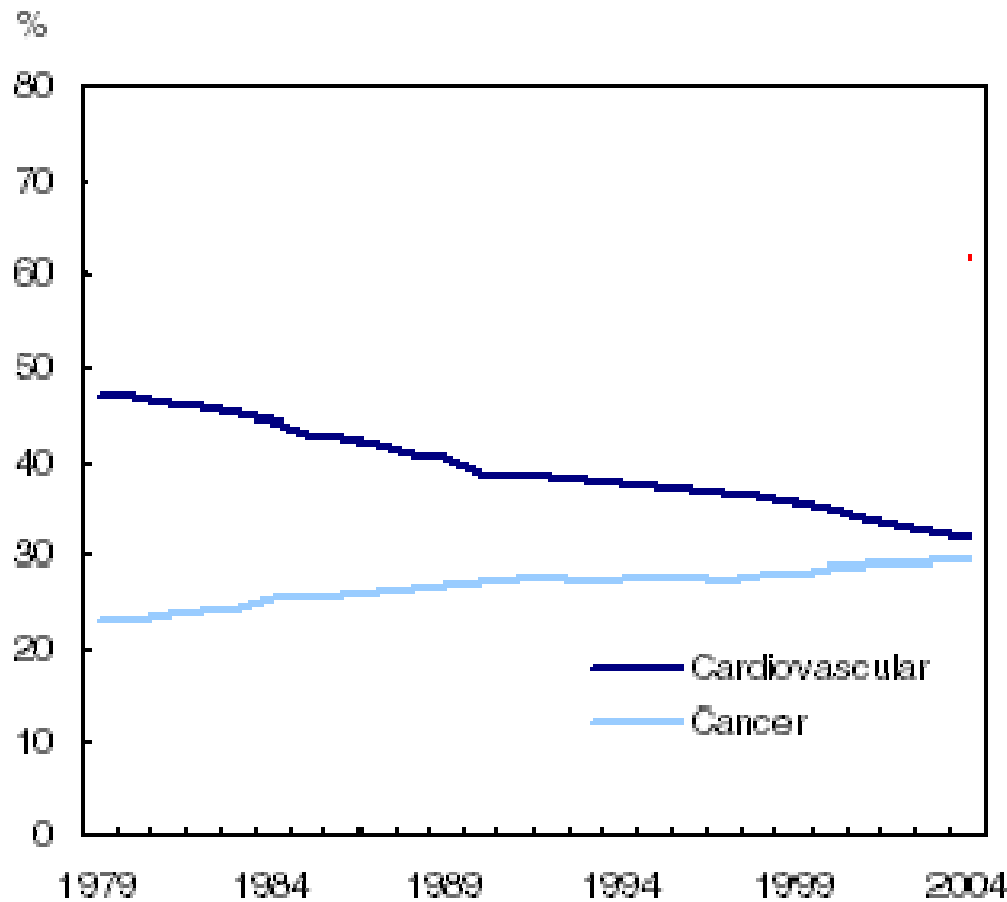
What is the leading cause of death in Canada in 2007?





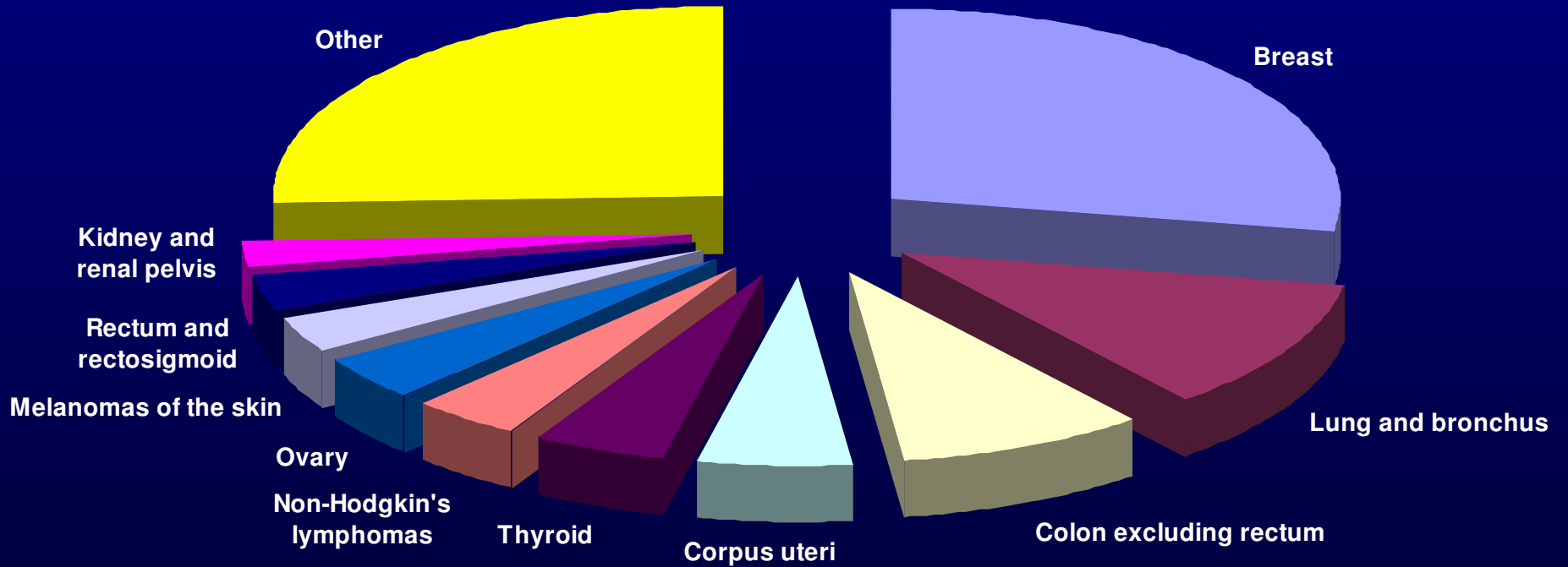
Cancer: Becoming the leading cause of death in North America

Share of deaths due to cardiovascular diseases, cancer and both causes, Canada, 1979 to 2004



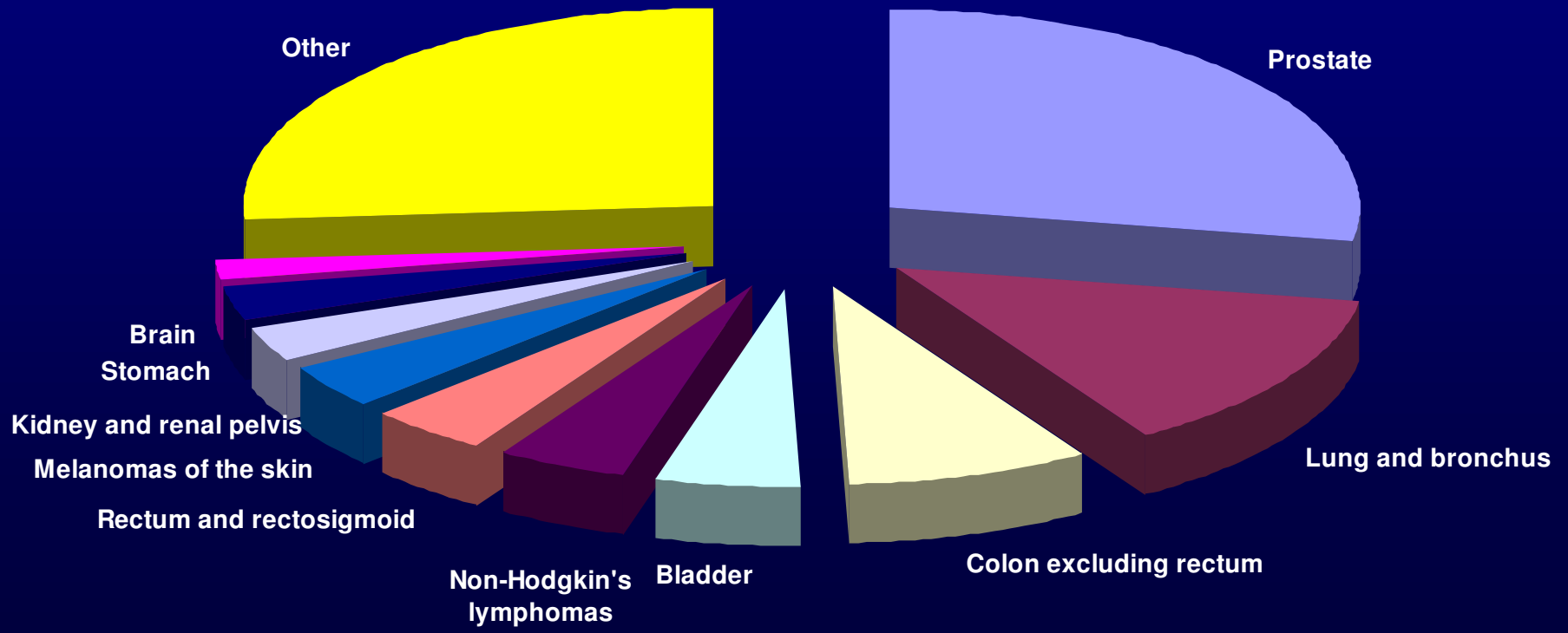


25,659 new cases of cancer in females in Ontario, 2003





27,461 new cases of cancer in males in Ontario, 2003





Question to audience:

Cancer risk in the 40-50 age group:

A. Women have twice the risk as men

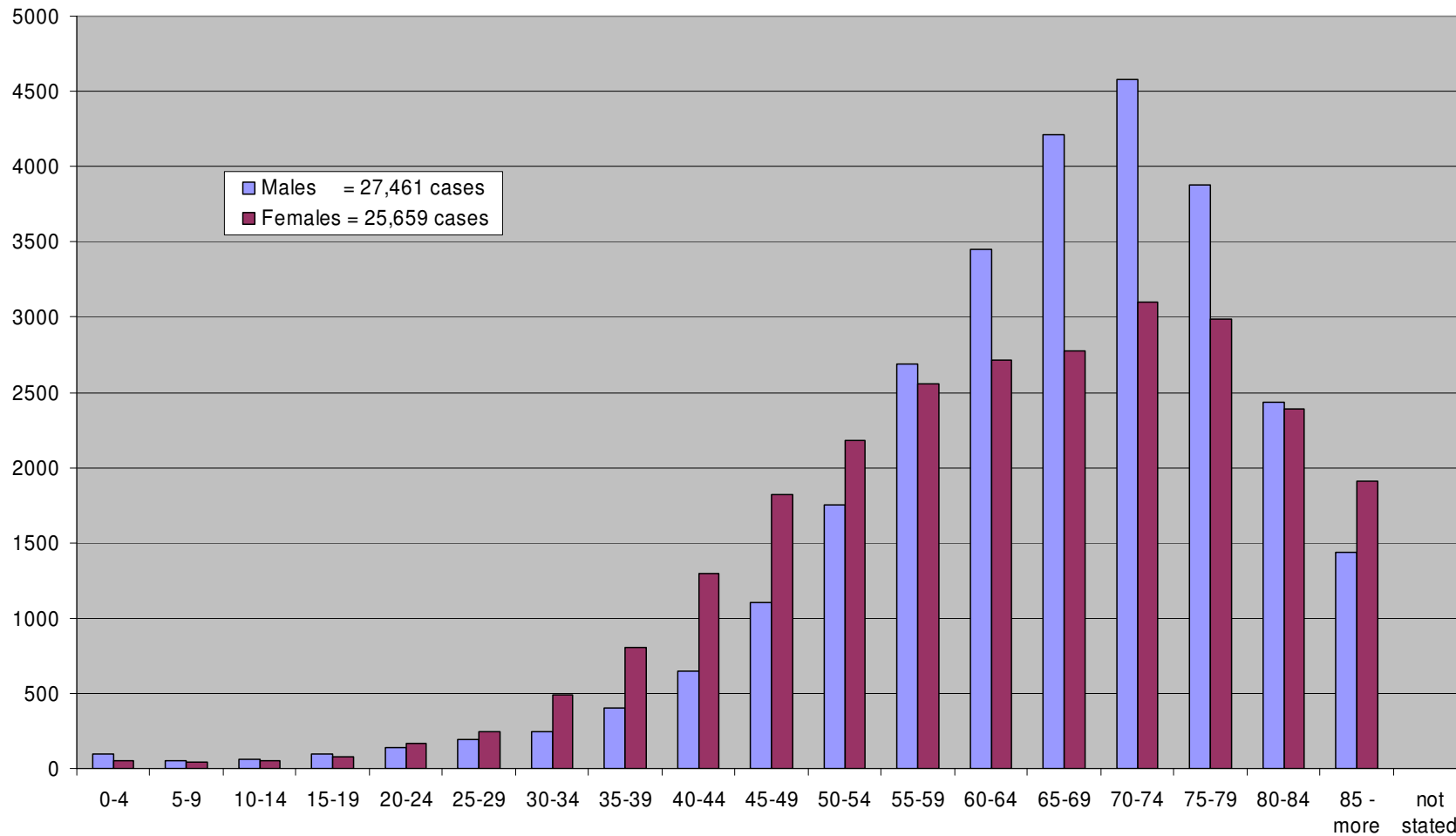
B. Men have twice the risk than women

C. Women and men have similar risks





New cases of cancer in Ontario in 2003





Outline

Simple matters: DNA and Genomes
Human Genome Project

Complex matters: Common Diseases
Cancer

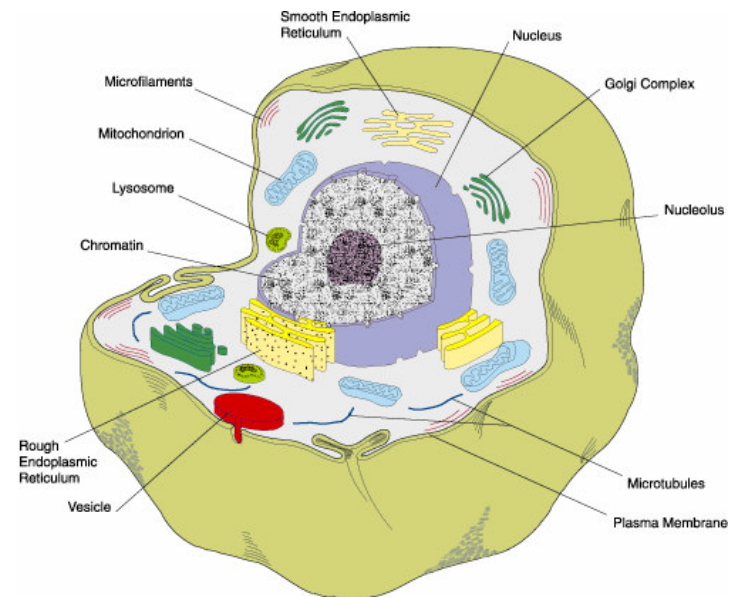
Developing a strategy to impact cancer

Ontario Institute for Cancer Research





Commonalities between buildings and cells



Plan: Blueprint

Genome





GENes and ChromosOMEs = GENOME





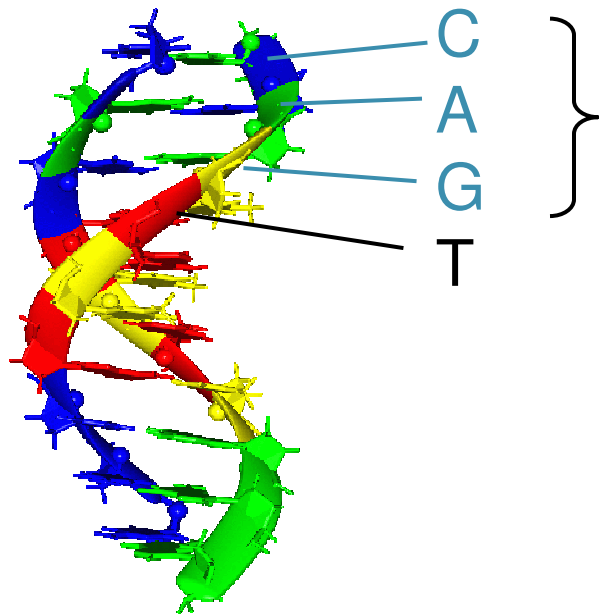
DNA Code

DNA

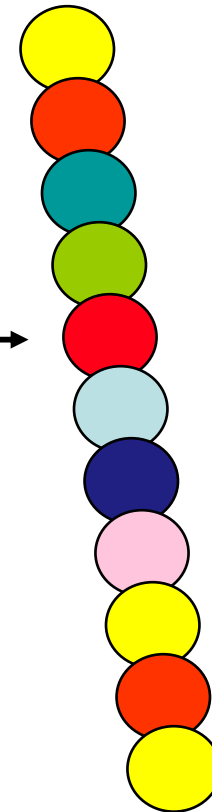
codon

Amino
Acid

Protein



Glycine





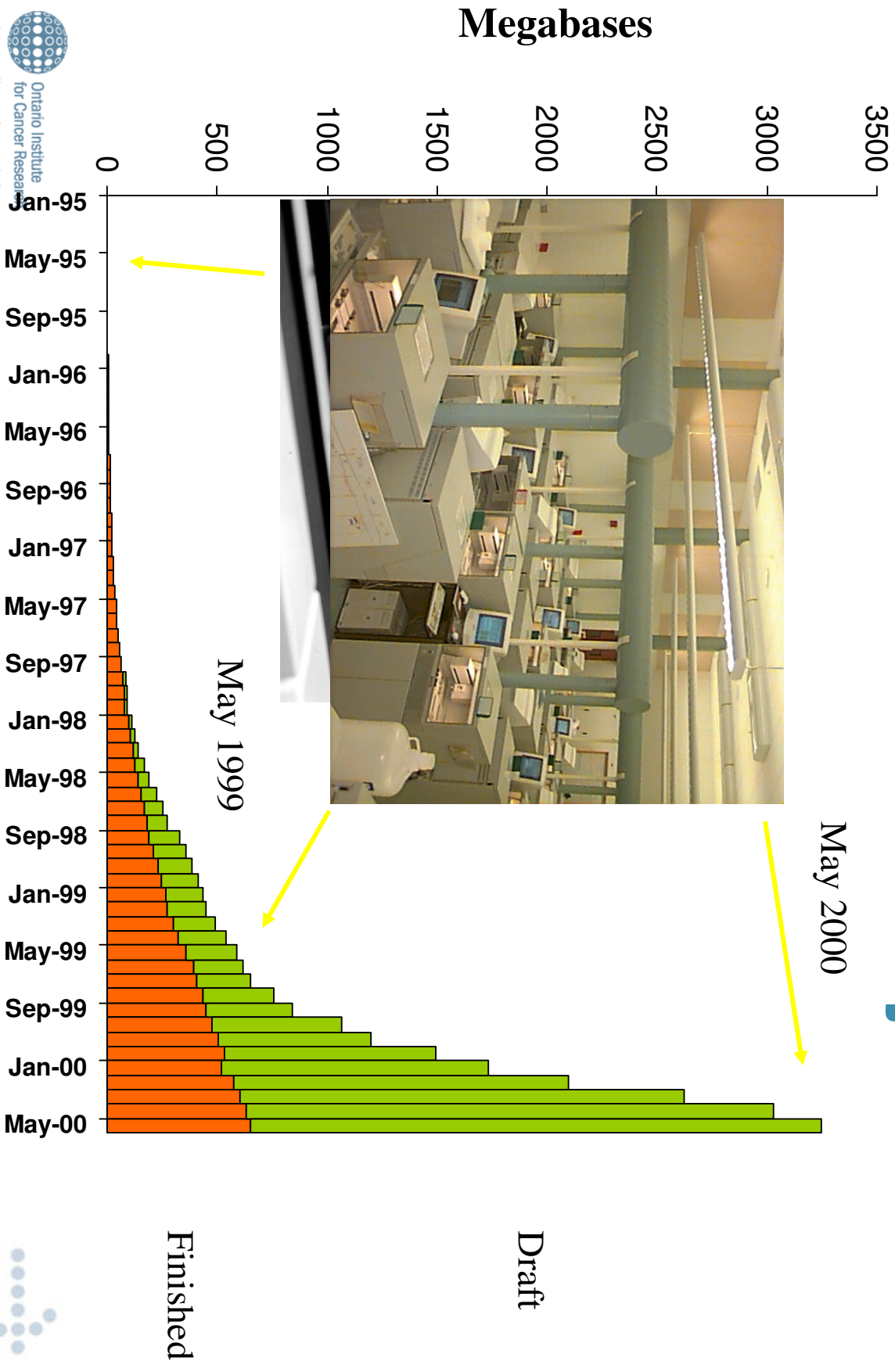
Two alphabets

DNA	Amino Acid	Symbol
TGT	Cysteine	C
GCT	Alanine	A
AAC	Asparagine	N
GCT	Alanine	A
GAC	Aspartic Acid	D
GCT	Alanine	A





Human Genome Project





Human Genome: 3 billion bases

ATGCCGATCGTACGACACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCATCGTACT
TACTGACTGCATCGTACTGACTGCACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCC
CATCGTACTGACTGTCTAGTCTAAACACATCCCACATATCGTCATCGTACTGACTGTCTAGTCTA
CATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCTATGCCGATCGTACGACACATATCG
ACTGTCTAGTCTAAACACATCCATCGTACTGACTGCATCGTACTGACTGCATCGTACTGACTGCA
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CACATCCCACACTTTACCCATATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCCACATAT
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CGTACTGCCCTACGGGACTGTCTAGTCTAAACACATCCATCGTACTGACTGCATCGTACTGACT
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CGTACTGACTGTCTAGTCTAAACACATCCCACATATCGTCATCGTACTGACTGTCTAGTCTAAAC
ACATCCCACACTTTACCCATGATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCCACATAT
CGTCATCGTACTGACTGTCTAGTCTAAACACATCCTATAGCCGATCGTACGACACATATCGTCA
CGTACTGCCCTACGGGACTGTCTAGTCTAAACACATCCATCGTACTGACTGCATCGTACGCCGA





Human Genome: 3 billion bases

ATGCCGATCGTACGACACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCATCGTACT
TACTGACTGCATCGTACTGACTGCACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCC
CATGCCGATCGTACGACACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCC

- **99% « finished »**
- **~30,000 genes**
- **<10,000 genes have a known function**

CCATCGTACTGACTGCATCGTACTGACTGCATCGTACTGACTGCACATATCGTCATACATAGACT
CGTACTGACTGTCTAGTCTAAACACATCCCACATATCGTCATCGTACTGACTGTCTAGTCTAAAC
ACATCCCACCTTACCCATGATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCCACATAT
CGTCATCGTACTGACTGTCTAGTCTAAACACATCCTATAGCCGATCGTACGACACATATCGTCA
CGTACTGCCCTACGGGACTGTCTAGTCTAAACACATCCATCGTACTGACTGCATCGTACGCCGA





Human Genome: 3 billion bases

ATGCCGATCGTACGACACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCATCGTACT
TACTGACTGCATCGTACTGACTGCACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCC
CATCGTACTGACTGTCTAGTCTAAACACATCCCACATATCGTCATCGTACTGACTGTCTAGTCTA
CATATCGTCATCGTACT **G**ACTGTCTAGTCTAAACACATCCTATGCCGATCGTACGACACATATCG
ACTGTCTAGTCTAAACACATCCATCGTACTGAC TCGCA
TCGTACTGACTGTCTAGTCTAAACACATCCGAC TAAA
CACATCCCACCTTACCCATATATCGTCATCGTA ATAT
CGTCATCGTACTGACTGTCTAGTCTAAACACAT TCAT
CGTACTGCCCTACGGGACTGTCTAGTCTAAACA GACT
GCATCGTACTGACTGCACATATCGTCATACATAGACTTCGTACTGACTGTCTAGTCTAAACACCC
CACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCCACCTTACCCATGCATCGTACTG
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AGTCTAAACACATCCCACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCCACCTTAC
CCATGATATCGTCATCGTACTGACTGTCTAGTCTAAACACAT **C**CCACATATCGTCATCGTACTGA
CTGTCTAGTCTAAACACATCCTATACATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCT
ATGCCGATCGTACGACACATATCGTCATCGTACTGCCCTACGGGACTGTCTAGTCTAAACACAT
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CGTACTGACTGTCTAGTCTAAACACATCCCACATATCGTCATCGTACTGACTGTCTAGTCTAAAC
ACATCCCACCTTACCCATGATATCGTCATCGTACTGACTGTCTAGTCTAAACACATCCCACATAT
CGTCATCGTACTGACTGTCTAGTCTAAACACATCCTATAGCCGATCGTACGACACATATCGTCA
CGTACTGCCCTACGGGACTGTCTAGTCTAAACACATCCATCGTACTGACTGCATCGTACGCCGA

Polymorphisms



Single Nucleotide Polymorphisms

SNPs



1 SNP per 1250 nucleotides





Disease mutations

Mutation: A polymorphism that affects the function of a gene

Type I: Complete loss of function.

Severe disease with well-defined inheritance

Type II: Incomplete loss of function:

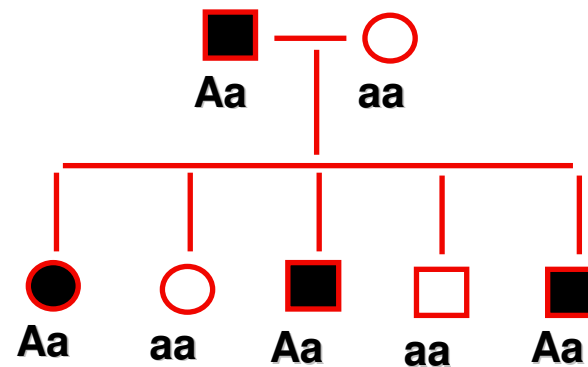
Risk Factor (complex genetic diseases)





« Simple » Disease mutations

Familial Inheritance
Patterns
(dominant, recessive,
X-linked)



Examples:

Cystic Fibrosis
Huntington's Disease



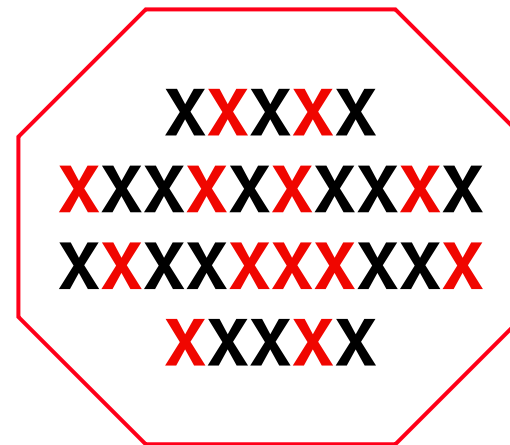
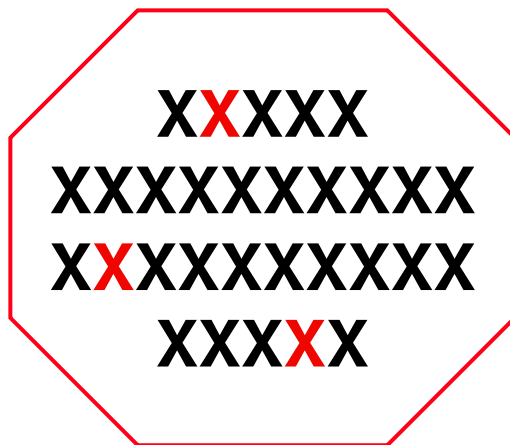


Example of a complex disease mutation

Example: **APOE4 mutation**

General Population: 10%

Alzheimer's patients: 40%

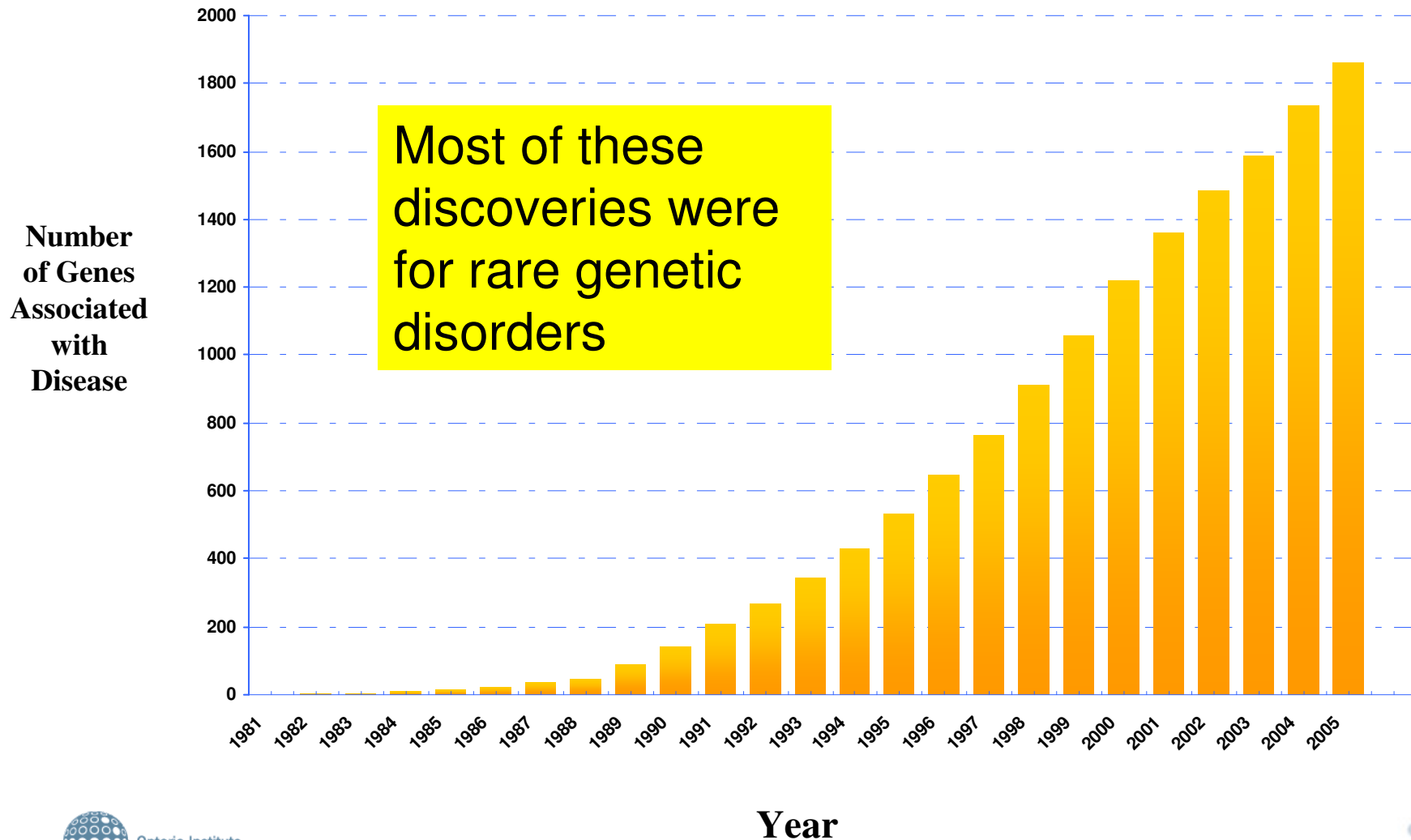


APOE4 ↑ Risk x 4



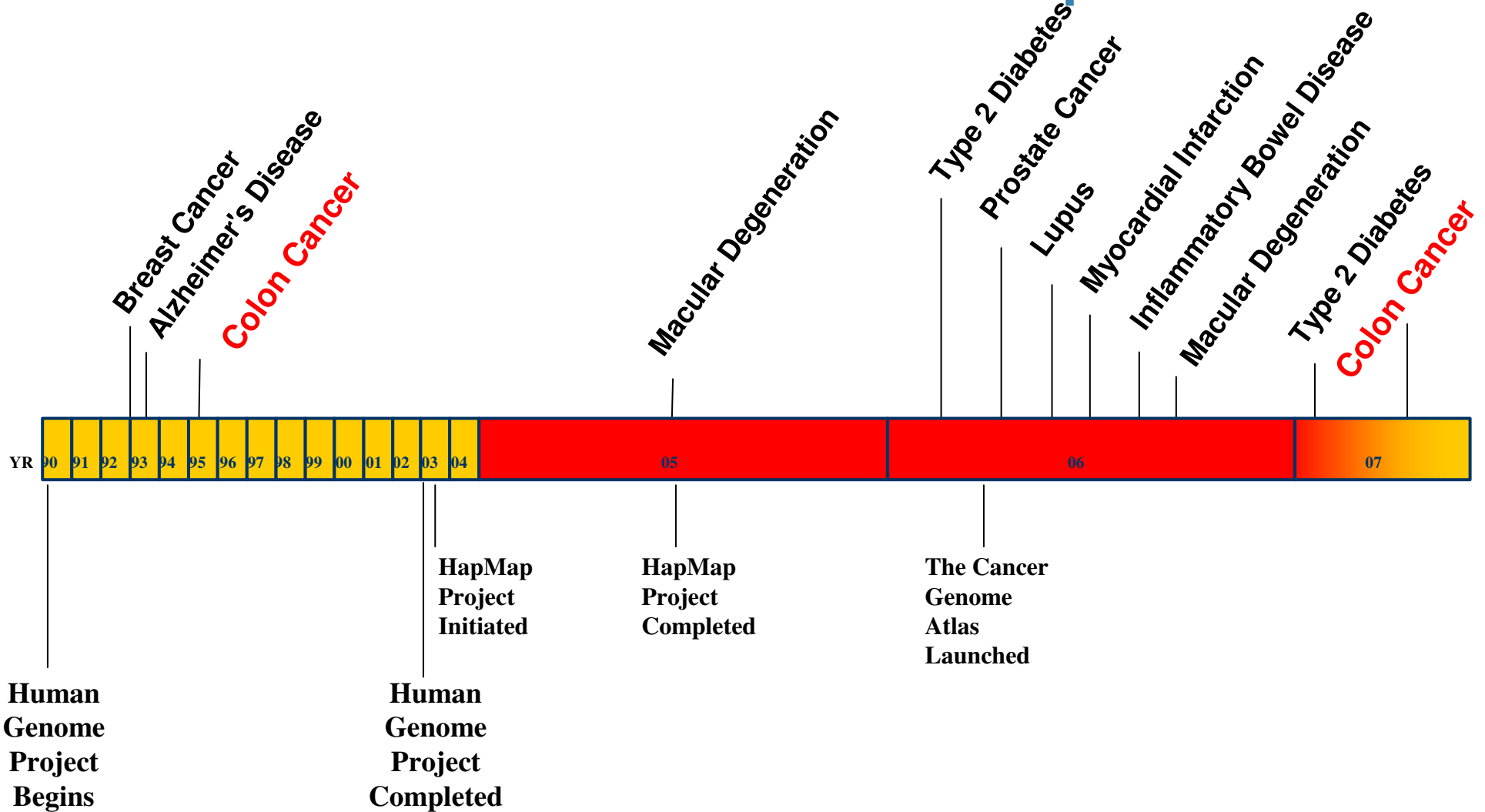


Cumulative Pace of Disease Gene Discovery 1981-2005



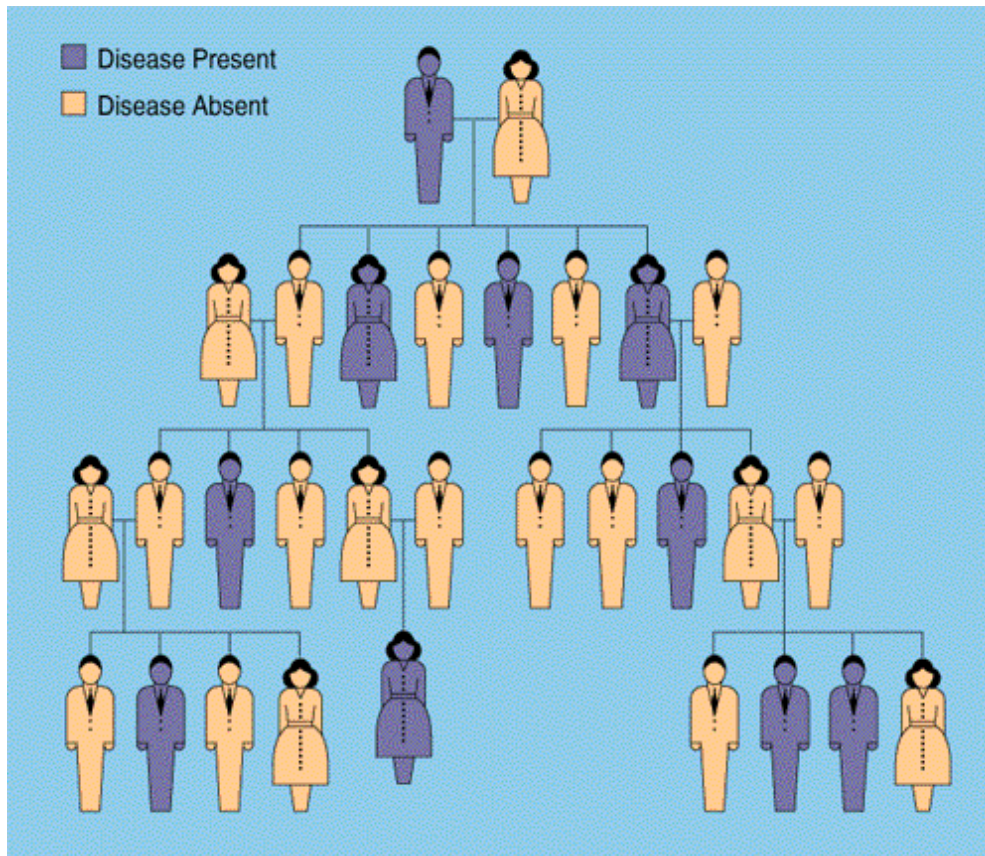


Gene Discoveries for Common Complex Diseases





1995: HNPCC mutations were identified in families with very high rates of colon cancer



These cause about 90 percent of all inherited colon cancers, or about 15 percent of colon cancers.

Testing is available for individuals with family history



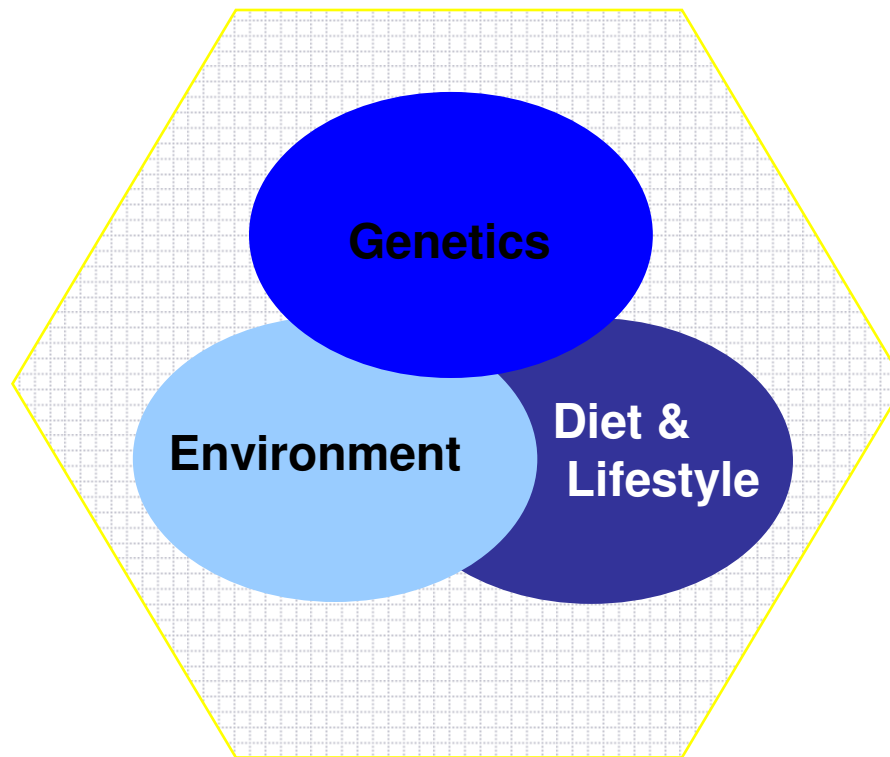


What are the causes of colon cancer in individuals without a strong family history?





What are the causes of colon cancer in individuals without a strong family history?



“webs of causation”





THE ARCTIC PROJECT

Assessment of Risk of Colo-Rectal Tumors in Canada



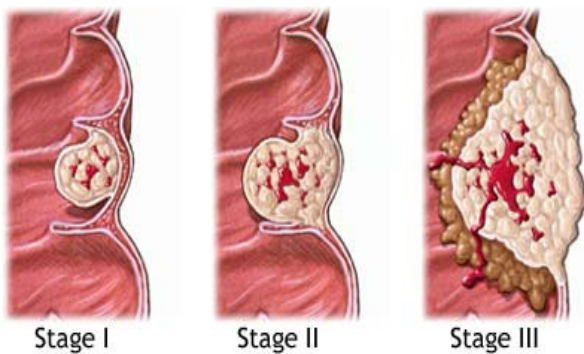
Design:

- 1200 Cases (Ontario)
- 1200 Controls (Ontario)
- 1.4 billion genetic tests



Output:

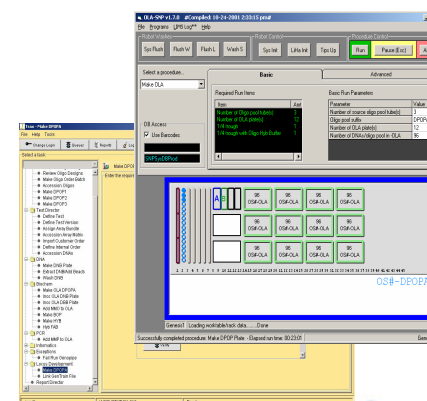
- Predictors of Disease
- Disease prevention
- ARCTIC kits



Stage I

Stage II

Stage III



Brent Zanke, Steve Gallinger, Celia
 Greenwood, Michele Cotterchio, Tom Hudson





Genome-wide association scan identifies a colorectal cancer susceptibility locus on chromosome 8q24

Brent W Zanke¹⁻³, Celia MT Greenwood^{1,4,5}, Jagadish Rangrej⁴, Rafal Kustra^{1,5}, Albert Tenesa⁶, Susan M Farrington⁶, James Prendergast⁶, Sylviane Olschwang⁷, Theodore Chiang⁴, Edgar Crowdy⁴, Vincent Ferretti⁸, Philippe Laflamme⁸, Saravanan Sundararajan⁸, Stéphanie Roumy⁸, Jean-François Olivier⁸, Frédérick Robidoux⁸, Robert Sladek⁸, Alexandre Montpetit⁸, Peter Campbell⁹, Stephane Bezieau¹⁰, Anne Marie O'Shea⁹, George Zogopoulos⁹, Michelle Cotterchio^{1,5}, Polly Newcomb¹¹, John McLaughlin^{1,9}, Ban Younghusband¹², Roger Green¹², Jane Green¹², Mary E M Porteous¹³, Harry Campbell^{6,14}, Helene Blanche¹⁵, Mourad Sahbatou¹⁵, Emmanuel Tubacher¹⁵, Catherine Bonaiti-Pellié¹⁶, Bruno Buecher¹⁰, Elio Riboli¹⁷, Sebastien Kury¹⁰, Stephen J Chanock¹⁸, John Potter¹¹, Gilles Thomas¹⁹, Steven Gallinger^{1,9}, Thomas J Hudson^{2,8} & Malcolm G Dunlop⁶





Ongoing Work

- Further studies of SNPs and genes on chromosome 8 and 9 in other populations
- Analysis of an additional 500,000 genetic markers in the Ontario subjects
- Integration with other international studies





“Gene Dosage” Hypothesis

Risk Variants in an individual

Diabetes



Arthritis



Autism



Asthma



Colon Cancer





“Gene Dosage” Hypothesis

Risk Variants in an individual

Diabetes



Arthritis



Autism



Asthma



Colon Cancer



“ARCTIC TEST”: Not ready until more genes are known and validated





Why test genetic markers if they cannot be altered?





Grand Challenges in Cancer Research





Grand Challenges in Cancer Research

I. Cancer is a complex disease.

- **Every tumour is different. Every cancer patient is different;**
- ***Transformation requires understanding specific changes in a patient's tumour as well as genetic variants of a patient, and tailoring interventions based on the profile of the tumour and the patient.***





Grand Challenges in Cancer Research

II. Cancer is diagnosed late in the disease process.

- **Most tumours are identified when there are over 100 million (and often one billion) cancer cells – at stages where treatment interventions are less effective;**
- ***Transformation requires understanding and targeting interventions at early stages.***





Grand Challenges in Cancer Research

III. Cancer is a disease that can affect any member of our society.

- **Even if the risk of cancer varies according to environmental or genetic factors, everyone is at risk of developing cancer because the predisposing mutations often occur as naturally occurring errors during normal growth of cells;**
- ***Transformation requires a cancer system that can reach every member of our society, irrespective of age, language, education, cultural group, or socio-economic status;***





Grand Challenges in Cancer Research

IV. Optimal cancer care requires new cancer care services, technologies and therapeutic interventions that are affordable by our health care system.

- ***Transformation requires an understanding of costs and benefits, and an approach to balancing these costs and benefits relative to other issues (education, environment, infrastructures, economy, etc.).***





Launching New Cancer Programs at the Ontario Institute for Cancer Research

- Setting difficult goals
- Build innovative teams, recruit 50 PIs
- Integrate with other disciplines
- Interface with the world through partnerships
- Develop effective translation into health care products and services

Funding from Ontario: \$ 346.5 million over 5 years





Ontario Institute for Cancer Research

OICR strategic plan

Consultation





Overview of OICR Programs

Innovation Programs

Prevention

Early
Diagnosis

Cancer
Targets

New
Therapeutics

Translation Programs

Cancer Care
Services

Health
Promotion

Patents-to-
Products

Clinical
Trials





Ontario Cancer Cohort

Project leader: John McLaughlin



Aims to identify cancer risk factors

Platform for studying the natural history of biomarkers

Will tracking the health of Ontario individuals and monitor for Cancer outcomes using public health systems

Requires strategic partnerships to maximize sample size

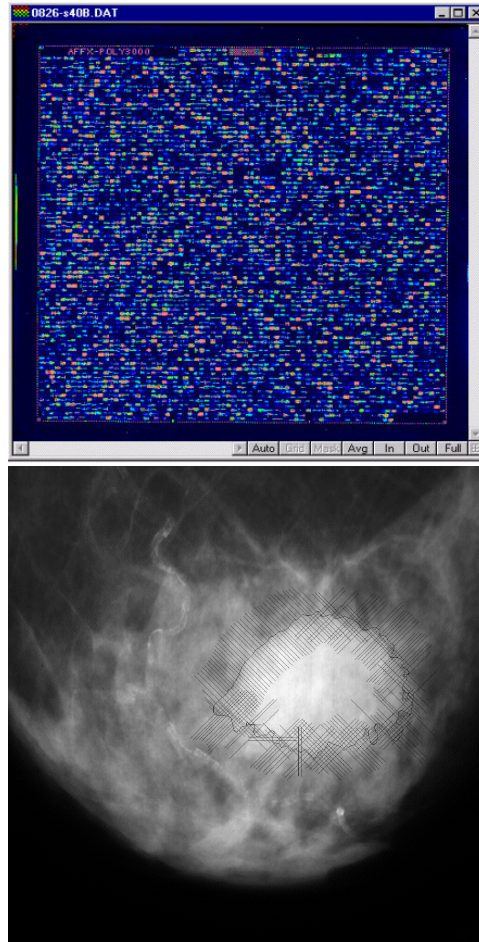




Early Diagnosis

Biomarkers

Identify serum, urine and fecal markers for early stage diagnosis



Imaging

Develop imaging technologies to identify tumours at an early stage

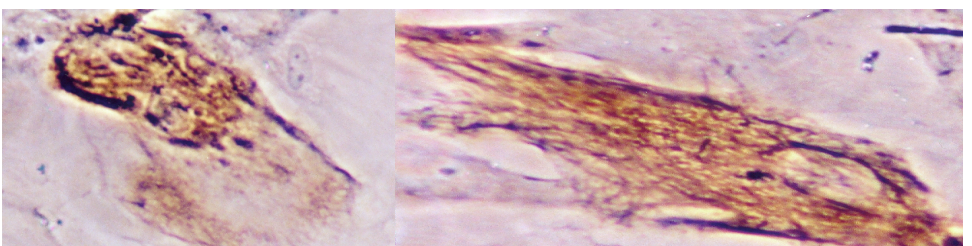




New serum-based biomarkers of ovarian cancer

NOV

TOV (serous papillary)



D43073_at	0.96	509 P	347 P	314 P	485 P	509 P	544 P	509 P	502 P	578 P	518 P	174 P	238 P	291 P	123 P	184 P	146 P	164 P	174 P	255 P	194 P	174 P	195 P	200 P	362 P	494 P
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U19861_at	0.82	86 P	93 P	54 P	32 A	67 P	18 A	86 P	25 A	32 P	29 P	8 A	30 A	23 A	8 A	17 A	8 A	2 A	5 A	19 P	15 A	8 A	22 A	24 A	14 A	3 A
M5252_at	0.82	341 P	53 P	19 A	30	252 P	2	341 P	18 P	2 A	61 P	2 A	9 A	2 A	2 A	2 A	3 A	2 A	2 A	2 A	2 A	2 A	9 A	2 A	2 A	2 A
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M72885_at	0.74	26 A	166 A	2 A	67 A	168 P	347 P	26 A	19 A	13 A	27 A	31 A	2 A	11 A	2 A	2 A	2 A	2 A	5 A	4 A	2 A	2 A	6 A	26 A	2 A	2 A
R62724H	0.74	72 P	47 A	47 A	22 A	86 P	258 A	72 P	76 P	34 P	44 P	20 A	2 A	10 A	2 A	14 A	24 A	2 A	23 P	78 P	2 A	26 A	25 A	16 A	22 P	2 A
M29277_s	0.73	357 P	31 A	2 A	2 A	66 P	29 A	57 P	7 A	31 P	59 P	21 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A
X07438_s	0.73	184 P	430 P	290 P	445 P	131 P	207 P	184 P	308 P	372 P	358 P	91 P	354 P	25 A	62 P	68 P	27 A	23 A	7 A	84 P	12 A	21 A	43 P	189 P	350 P	48 P
M5681_s	0.72	652 P	1039 P	751 P	788 P	1040 P	555 P	652 P	362 P	875 P	309 P	452 P	309 P	614 P	464 P	525 P	626 P	716 P	110 P	581 P	511 P	440 P	716 P	625 P	802 P	120 P
M11431_at	0.72	64 P	105 P	70 P	126 P	45 P	237 P	61 P	126 P	241 P	108 P	29 A	19 A	9 A	2 A	9 A	7 A	48 P	2 A	7 A	2 A	2 A	2 A	874 P	189 P	9 A
M64098_at	0.71	641 P	355 P	820 P	276 P	711 P	580 P	641 P	619 P	456 P	627 P	431 P	506 P	484 P	512 P	474 P	447 P	566 P	464 P	343 P	533 P	553 P	688 P	530 P	616 P	679 P
U36341_m	0.70	367 P	407 P	255 P	217 P	420 P	597 P	168 P	216 P	407 P	358 P	168 P	241 P	182 P	236 P	183 P	157 P	146 P	203 P	162 P	171 P	171 P	333 P	192 P	223 P	
XS2541_at	0.69	52 P	35 P	47 P	12 A	361 P	208 P	52 P	34 P	59 P	166 P	19 A	30 A	187 P	7 A	187 P	5 A	187 P	25 P	187 P	18 A	9 P	13 A	47 P	56 P	40 P
X01257_at	0.69	432 P	422 P	395 P	387 P	404 P	447 P	432 P	303 P	391 P	430 P	260 P	314 P	306 P	305 P	293 P	321 P	273 P	290 P	273 P	317 P	265 P	287 P	351 P	299 P	327 P
M59807_at	0.69	747 P	1032 P	471 P	404 P	731 P	302 P	747 P	234 P	761 P	631 P	272 P	309 P	244 P	38 P	221 P	105 P	172 A	227 P	315 P	221 P	205 P	262 P	571 P	494 P	255 P
U15131_at	0.68	185 A	163 A	95 A	98 A	236 P	115 A	155 A	169 P	131 P	123 P	64 A	62 A	101 P	81 A	34 A	72 P	187 P	187 P	90 P	164 P	114 P	81 A	114 P	81 A	
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X16396_at	0.66	141 P	53 P	75 P	122 P	53 P	423 P	141 P	154 P	105 P	145 P	83 P	69 P	55 P	30 P	24 A	26 A	45 P	70 P	37 P	49 P	40 P	47 P	78 P	94 P	59 P
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X15187_at	0.63	574 P	341 P	661 P	650 P	489 P	627 P	574 P	494 P	582 P	506 P	371 P	463 P	424 P	458 P	410 P	432 P	374 P	455 P	546 P	471 P	472 P	425 P	513 P	486 P	422 P
X12791_at	0.62	152 P	135 P	120 P	127 P	131 P	230 P	152 P	114 P	121 P	162 P	167 P	92 P	101 P	82 P	101 P	93 P	74 P	97 P	113 P	122 P	123 P	86 P	113 P	96 P	
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M2796_at	0.51	237 P	223 P	239 P	290 P	44 A	237 P	252 P	298 P	259 P	297 P	280 P	283 P	247 P	253 P	254 P	222 P	301 P	308 P	310 P	286 P	296 P	304 P	240 P	240 P	221 P
X83416_s	0.51	174 P	254 P	196 P	210 P	315 P	342 P	174 P	116 P	194 P	230 P	260 P	241 P	713 P	411 P	502 P	637 P	419 P	507 P	609 P	470 P	519 P	413 P	252 P	288 P	440 P
X16662_at	0.51	13 P	41 P	2 A	2 A	2 A	13 P	2 A	2 A	6 P	19 P	4 A	492 P	483 P	786 P	750 P	557 P	563 P	779 P	460 P	473 P	233 P	199 P	2 A	20 P	
U48437_at	0.51	50 P	120 M	47 A	32 P	71 P	46 A	50 P	69 A	33 P	83 P	77 M	87 M	156 P	124 P	202 P	198 P	292 P	147 P	260 P	131 P	108 P	107 P	87 P	127 P	
U76421_at	0.50	6 A	12 A	12 A	33 A	7 A	15 A	6 A	20 P	5 P	15 A	24 P	5 P	56 P	40 P	34 A	33 P	66 P	79 P	75 P	115 P	44 P	20 P	95 P	22 P	
U24576_at	0.49	122 P	157 P	100 P	139 P	119 P	240 P	122 P	114 P	53 P	118 P	227 P	253 P	235 P	307 P	280 P	363 P	263 P	351 P	207 P	321 P	334 P	428 P	156 P	112 P	159 P
M91029_s	0.49	166 P	145 P	138 P	156 P	151 P	160 P	166 P	127 P	154 P	193 P	141 P	211 P	311 P	272 P	345 P	310 P	232 P	249 P	265 P	168 P	334 P	302 P	153 P	150 P	208 P
X0192_at	0.48	15 A	16 A	12 A	12 A	12 A	12 A	12 A	12 A	24 P	27 P	17 A	18 P	15 A	4 P	18 P	18 P	18 P	22 P	22 P	36 P	36 P	32 P	32 P	16 A	34 P
Z6248_s	0.47	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	39 A	2 A	2 A	9 A	120 P	2 A	31 P	2 A	37 P	117 P	47 A	2 A	2 A	2 A	
M90657_at	0.47	32 P	16 A	159 P	132 P	42 A	9 A	32 P	96 P	36 A	64 P	231 P	171 P	202 P	429 P	456 P	487 P	402 P	417 P	211 P	236 P	699 P	88 P	47 A	155 P	84 P
M19399_s	0.46	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	3 A	15 P	15 A	4 P	4 P	51 P	44 P	44 P	165 P	2 A	2 A	4 P	61 A	27 M	2 A	7 A	163 P
J04513_at	0.45	26 P	65 A	91 P	70 P	32 P	17 A	26 P	51 P	55 P	33 P	206 P	38 P	241 P	439 P	129 P	143 P	65 P	156 P	87 P	147 P	89 P	77 P	41 P	64 P	152 P
L20859_at	0.44	13 P	32 P	91 P	104 P	92 P	38 P	43 P	121 P	104 P	163 P	254 P	266 P	287 P	153 P	109 P	211 P	107 P	194 P	86 P	146 P	153 P	147 P	136 P	167 P	257 P
M13955_at	0.42	71 P	46 A	131 P	8 A	40 A	581 P	71 P	101 P	45 P	198 P	193 P	801 P	924 P	614 P	1540 P	1655 P	844 P	1365 P	1068 P	179 P	790 P	1554 P	695 P	351 P	20 A
M69023_at	0.41	190 P	150 P	101 P	81 P	195 P	109 P	190 P	177 P	117 P	167 P	295 P	175 P	383 P	248 P	405 P	300 P	379 P	255 P	505 P	224 P	274 P	191 P	147 P	175 P	264 P
M58286_s	0.40	113 P	187 P	141 P	112 P	203 P	126 P	113 P	347 P	185 P	188 P	211 P	297 P	460 P	277 P	433 P	482 P	316 P	325 P	270 P	318 P	433 P	379 P	234 P	195 P	145 P
M59911_at	0.40	117 P	202 P	91 P	36 P	145 P	117 P	36 P	79 P	161 P	178 P	353 P	258 P	338 P	468 P	279 P	548 P	406 P	496 P	312 P	289 P	309 P	192 P	98 P	98 P	
L35475_at	0.38	43 A	53 A	4 A	34 A	44 A	34 A	44 A	34 A	53 A	44 A	60 P	301 P	301 P	68 P	68 P	68 P	68 P	68 P	68 P	68 P	68 P	68 P	68 P	68 P	68 P
M34593_at	0.38	551 P	443 P	374 P	496 P	461 P	460 P	551 P	488 P	547 P	481 P	525 P	297 P	683 P	550 P	681 P	765 P	528 P	484 P	661 P	591 P	654 P	550 P	637 P	413 P	152 P

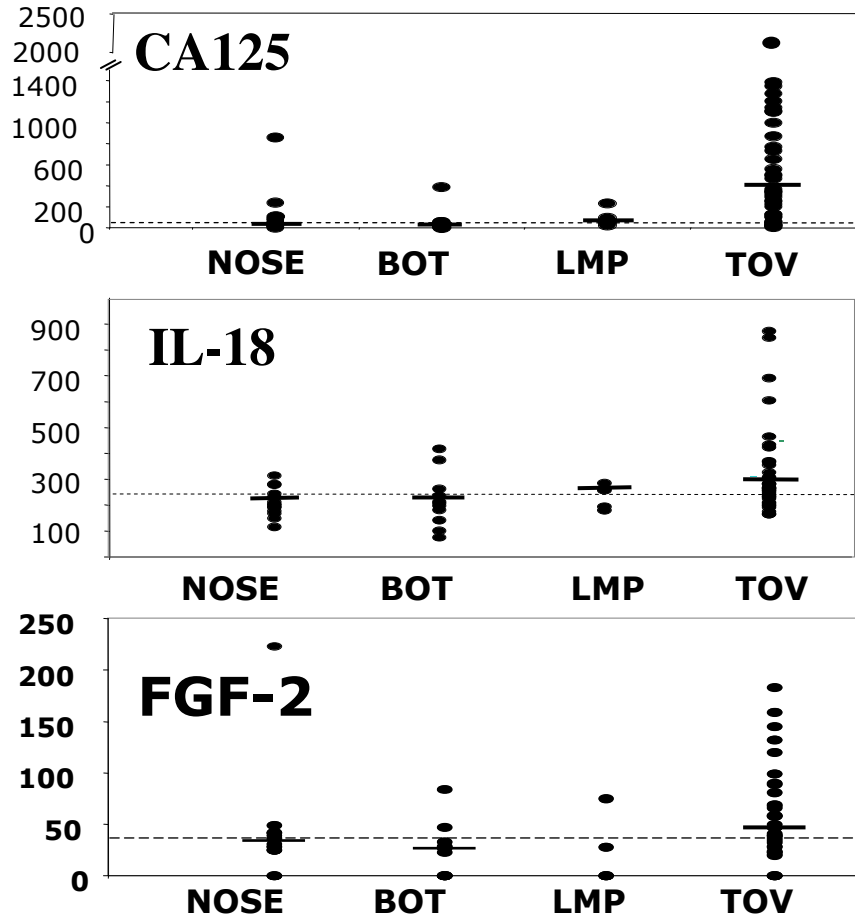
A-M MesMasson lab
P. Tonin and Hudson labs

University of Montreal
McGill University





New serum-based biomarkers of ovarian cancer



Le Page C et al. From gene profiling to diagnostic markers: IL-18 and FGF-2 complement CA125 as serum-based markers in epithelial ovarian cancer. *Int J Cancer*. 2006

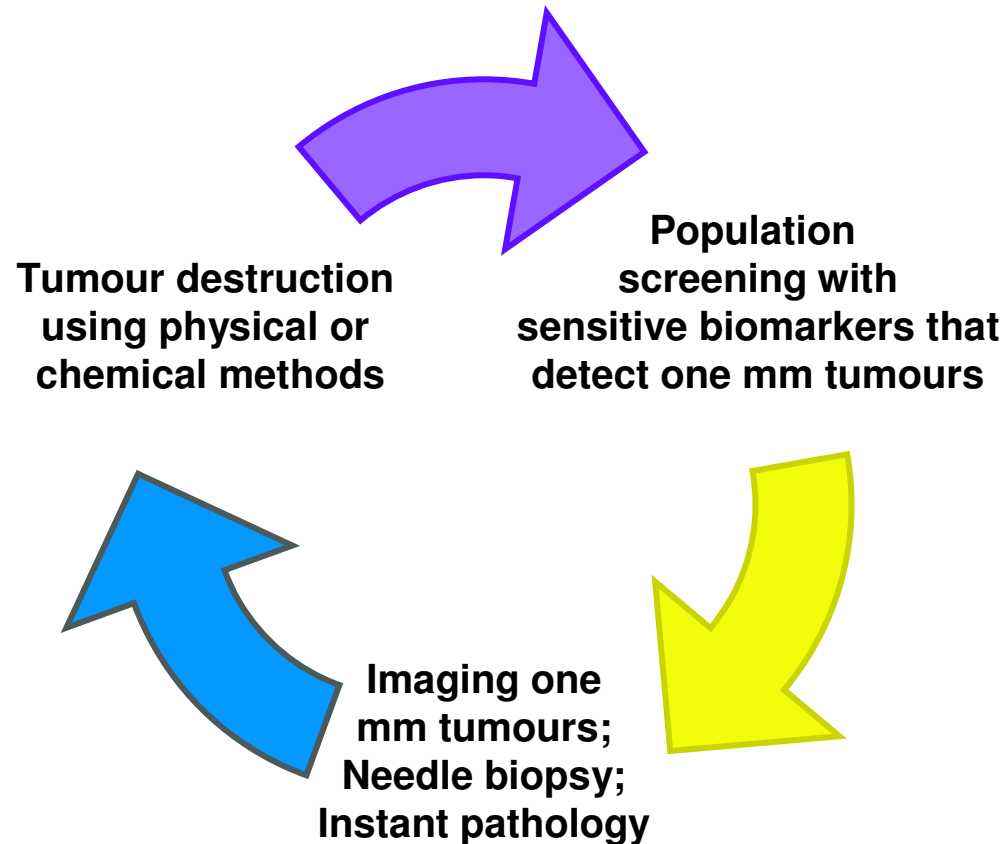


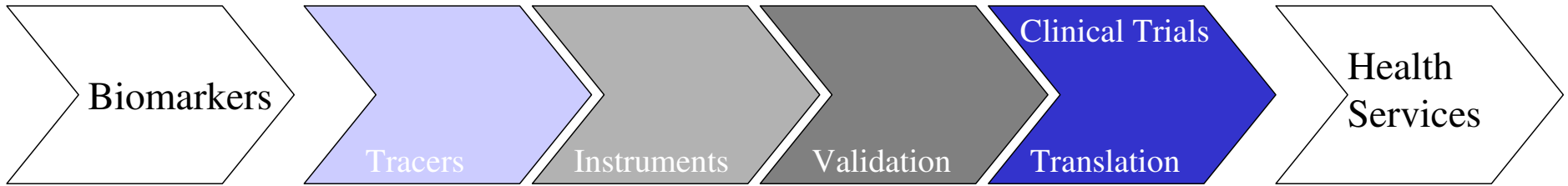


One Millimetre Cancer Challenge (Project Leader: Martin Yaffe)

1 mm x 1 mm x 1 mm tumor contains:
1 cm x 1 cm x 1 cm tumor contains:

~ 200,000 cells
~ 200,000,000 cells





Key Issues:

Transforming biomarkers into tracers

Multiplexing tracers (and new algorithms)

Optimal strategy will vary dependent on tumour site

Validation

- High Risk Individuals
- Biomarker Positive Recurrences
- Ontario Cancer Cohort

Screening and clinical trials





One Millimetre Cancer Challenge is a **metaphor** for change

Identification of small tumors, which usually are less malignant

Better staging (pre-surgery and pre-chemo)

Resolving “biomarker-positive” recurrences and blind biopsies

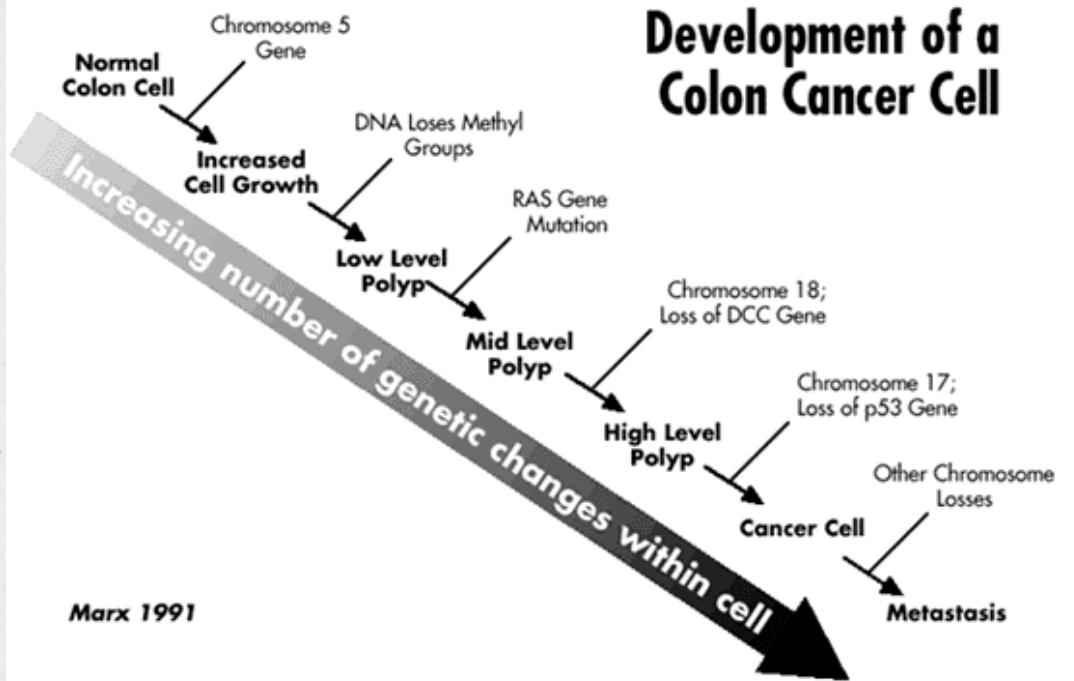
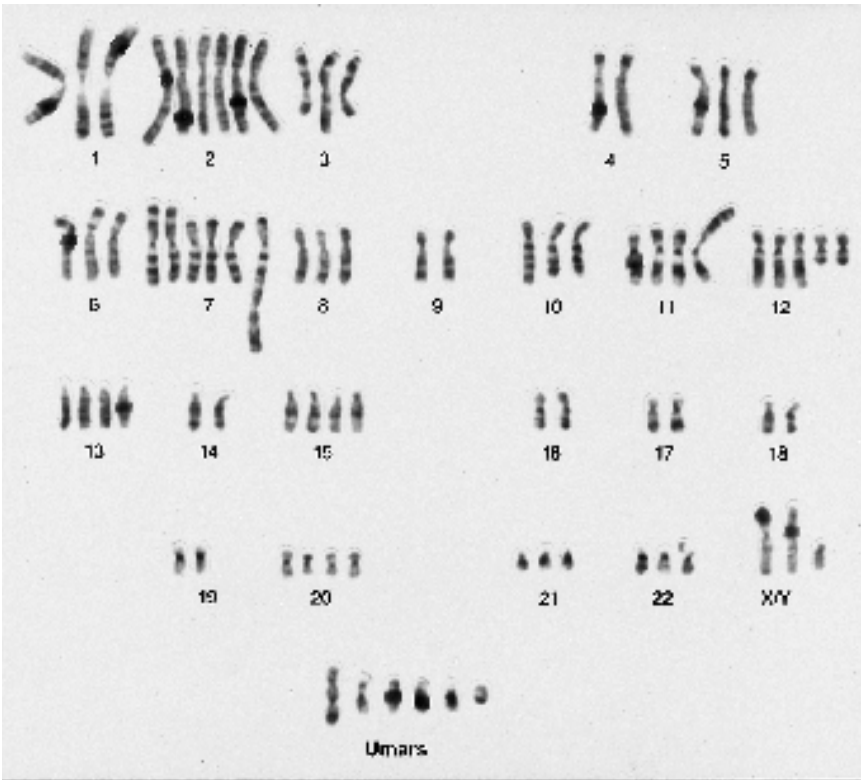
Monitoring response to therapies

Translational Medicine: Moving knowledge into practice



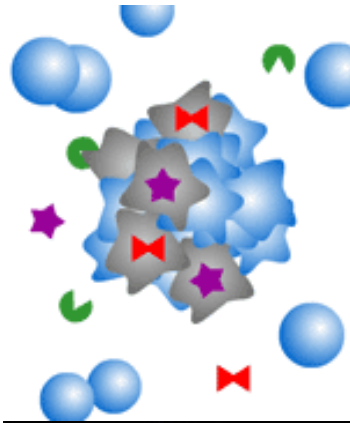


Cancer: A Disease of the Genome





OICR: Selective Therapies



Selective Therapies

- **Discovery research that focuses on ways to selectively attack tumours (and minimize morbidity to patients)**
- **Drugs, biologicals, focussed radiation**
- **Bring innovation to clinical trials**





OICR: Clinical Trials Infrastructure

Funding for 23 adult + 5 paediatric sites

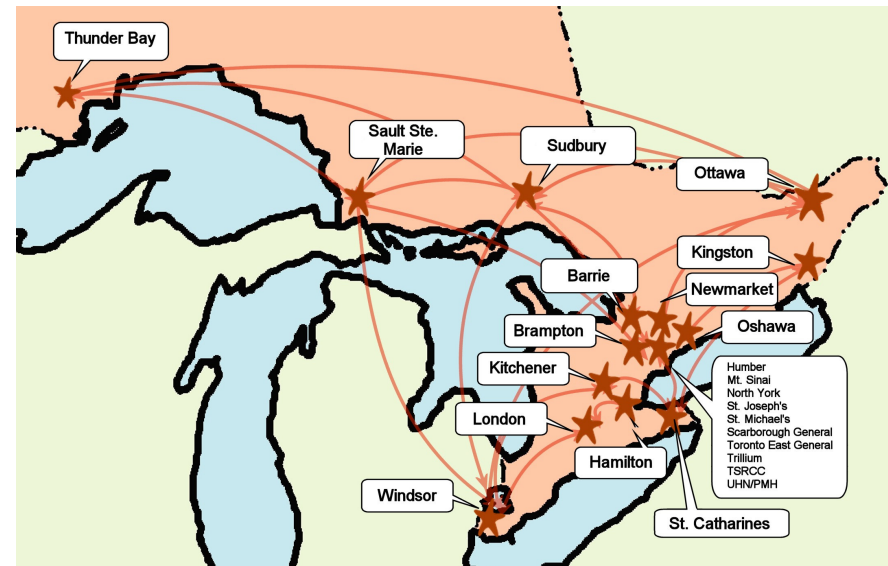
Investment of 13 million at these sites
since 2003

112 new staff hired to date

180 new personnel anticipated by 2007

Increase in patient recruitment

- >11% of patients enrolled in clinical trials 2004 and 2005
- Benchmark of 3-5%



SOPs, Personnel, Communication, Databases, etc.



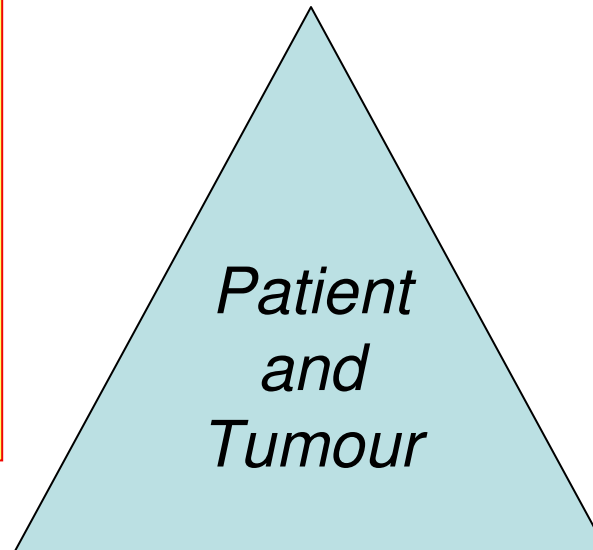


Innovation in Clinical Trials

Drug/Biological

Current designs in clinical trials allow us to identify which regimen is superior

Innovative designs answer WHY.



Imaging

- *Monitoring*
- *Functional Screens*
- *Serial Biopsies*

Genomics and Biomarkers

- *Selection of therapy*
- *Avoidance of known toxicity profiles*
- *Monitoring for recurrence*





OPTIC: Cancer Care Services



Providing Optimal Services to Individuals and Populations

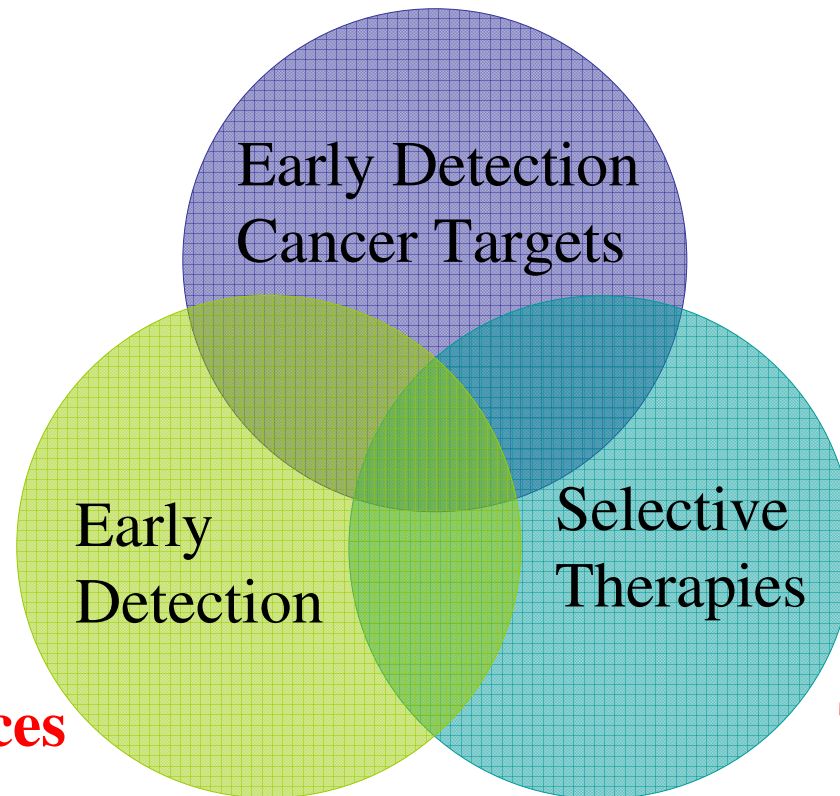
- Supportive and Palliative Care
- Evaluation of products and services
- Effective policies and decisions
- Ensuring equitable access





Commercialization of OICR discoveries

Diagnostic and Biomarker Market



**Medical Devices
Market**

**Therapeutics
Market**





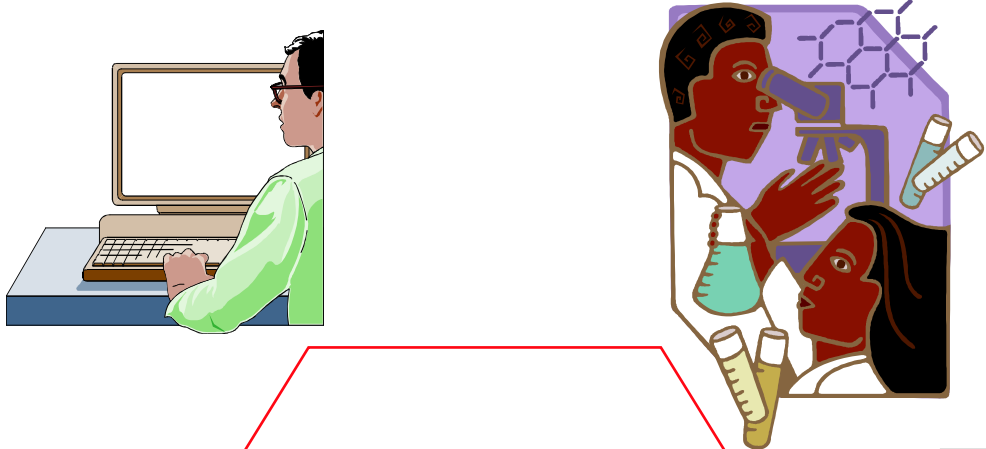
OICR Blueprint

Innovation Programs	Projects	Innovation Platforms			
Prevention	Ontario Cancer Cohort	Imaging and Interventions	Bio-repositories and Pathology	Genomics and High Throughput Screening	Informatics and Bio-computing
Early Diagnosis	One Millimetre Cancer Challenge				
Cancer Targets	Cancer Stem Cells				
	TCGA - International				
New Therapeutics	Selective Agents				
	Immuno- and Bio-therapies				
		↓ ↓ ↓ ↓ ↓ ↓			
Translation Programs	Patents to Products				
	High Content Trials				
	Cancer Care Services (including Health Promotion)				

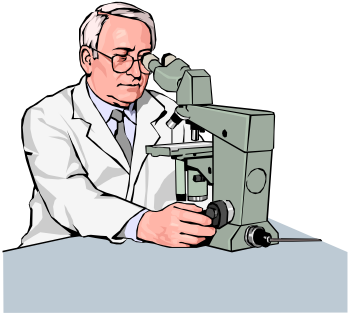
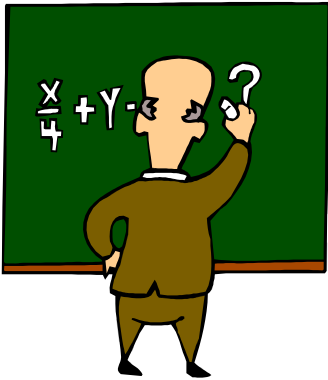




Model for OICR Programs



Multi-Disciplinary teams





Toward(s) effective Cancer Control

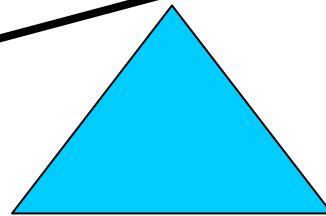
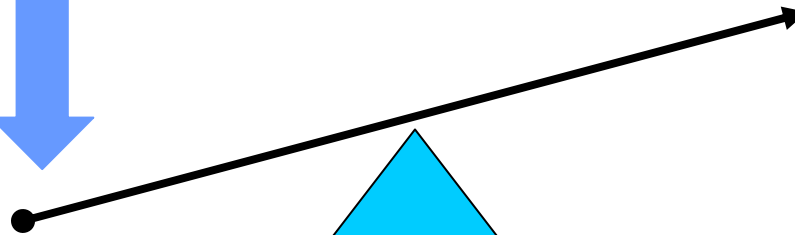
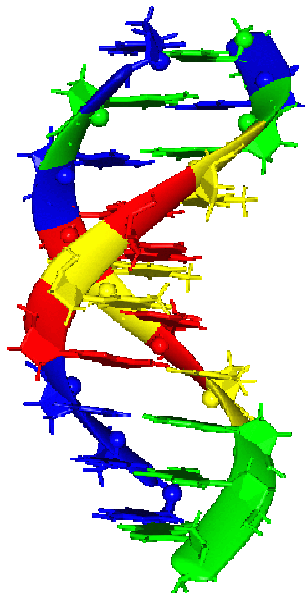
- 1. Primary Prevention Programs based on knowledge of modifiable risk factors (and vaccination where appropriate).**
- 2. Cancer screening guidelines based on an individual's risk (genetic and environmental) and inexpensive biomarkers.**
- 3. Imaging methods to identify millimetre size tumours followed by image-guided biopsies of early tumours.**
- 4. Improved diagnosis through molecular cytopathology.**
- 5. Genome analysis of tumours.**
- 6. Selective therapy for each patient based on the patient's tumour profile.**
- 7. Effective monitoring during therapy and survival.**
- 8. Enhanced quality of life for cancer survivors.**





Conclusions

**Clinical Trials,
Genomics and
Imaging Expertises**



**Ontario Institute for
Cancer Research**

**Health Care
Products
Services**





Sponsors



GenomeCanada



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Ontario Genomics Institute

The Future Is in Our Genes.



National Institutes of Health
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