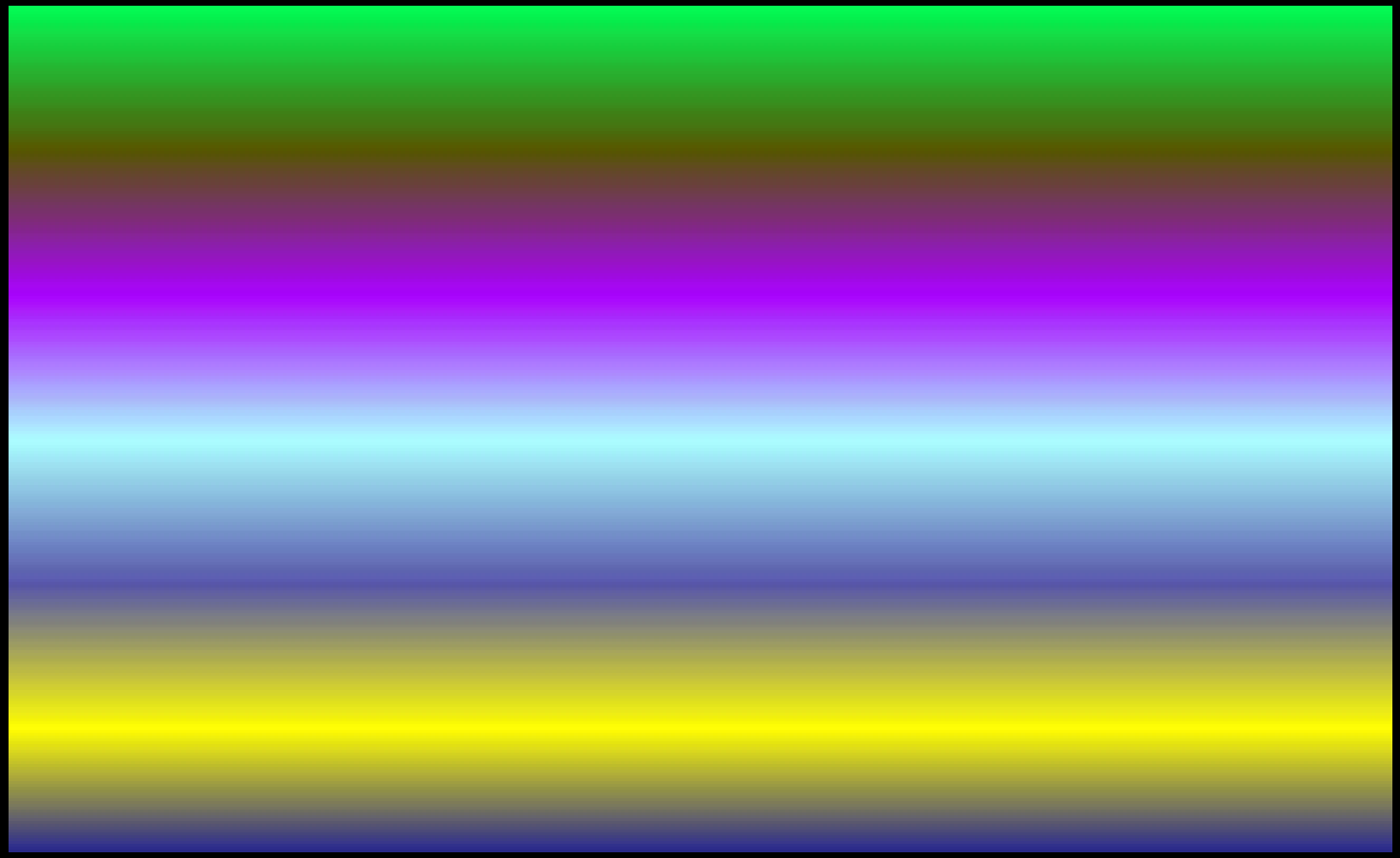
Metasystemische Ergebnisse zur

microRNA/mir-10b

Bensberg, den 1.10.2007 K. K. Panzer PerZan



Tiny RNA s, big problems:

Spread of breast cancer to other body parts is linked to microRNA/mir-10b

The smallest bit of genetic material may cause the deadliest of tumours. Researchers have implicated a tiny RNA molecule in the invasive spread of breast cancer — the factor responsible for most deaths from the disease. In 2007, around 179,000 people in the United States will be diagnosed with invasive breast cancer and some 47,000 will probably die.

RNA is one of the main players in human genetics; the most well studied type, messenger RNA (mRNA), is vital for translating the code of our DNA, allowing those instructions to be read and used to produce proteins.

MicroRNAs — tiny strings of genetic code often just a couple of dozen nucleotides or 'letters' long — can block this translation process by binding to mRNAs, stopping the production of proteins. A spate of new research has found these diminutive molecules to be involved in crucial processes of development, metabolism and cell suicide.

Now, a team led by Robert Weinberg at the Massachusetts Institute of Technology's Whitehead Institute in Cambridge has linked one of these up-and-coming molecules to invasive breast cancers. I think that these microRNAs are going to be involved ubiquitously in regulating a wide variety of cellular processes, and this is just the tip of the iceberg," Weinberg says.

If the molecule can be confirmed as a key player in cancer migration, and targeted by drugs, the find may lead to a new preventative measure against the deadly spreading of tumours. At the moment, such cancers are normally treated through radiation and chemotherapy.

On the move

A tumour's ability to hitch a ride in the bloodstream and take up residence elsewhere in the body, a process known as metastasis, is the most insidious trait of cancer. It often occurs in the later stages of the disease and precedes 90% of cancer deaths. In breast tumours, cells migrate to lymph nodes, the brain and other spots where they form deadly secondary tumours.

She and Weinberg performed a genome-wide scan of breast cancers, looking for microRNAs that are present in cases in which metastasis occurred. They found one microRNA, called **miR-10b**, that was highly expressed in 9 out of 18 patients with metastatic breast cancer, and not highly expressed in five women with less deadly tumours, they report today in *Nature*1.

When the team looked at a well studied line of human breast cancer cells, extracted from another metastatic tumour, it found that the cancer cells expressed miR-10b at levels 50 times that of a non-invasive cell line.

To see whether this microRNA was driving metastasis, the team implanted human cells expressing high levels of miR-10b into the fat pads of mice — a common way of testing human cancers. The tumours spread to the blood vessels and lungs of the rodents. When the team injected mice with similar cancer cells lacking miR-10b, the tumours stayed put.

The researchers don't know exactly how miR-10b promotes metastasis, but one of the proteins it blocks production of, called HOXD10**,** has a role in embryonic development. It could be that metastatic tumours hijack the existing cellular pathway designed to turn a blob of cells into a full human, and use this to efficiently move cells around the body. "Cancer cells are not clever enough to invent these traits on their own. Instead they resurrect programmes that are in the embryo," Weinberg says.

Stop the spread

It remains to be seen whether blocking miR-10b could forestall deadly metastases in breast cancer patients. But molecules that inhibit microRNAs, called antagomirs, have already been shown to work in human cells *in vitro*, says Ramin Shiekhattar, a cancer biologist at the Centre for Genomic Regulation in Barcelona, Spain. Antagomirs bind microRNAs and keep them from acting on their normal mRNA targets.

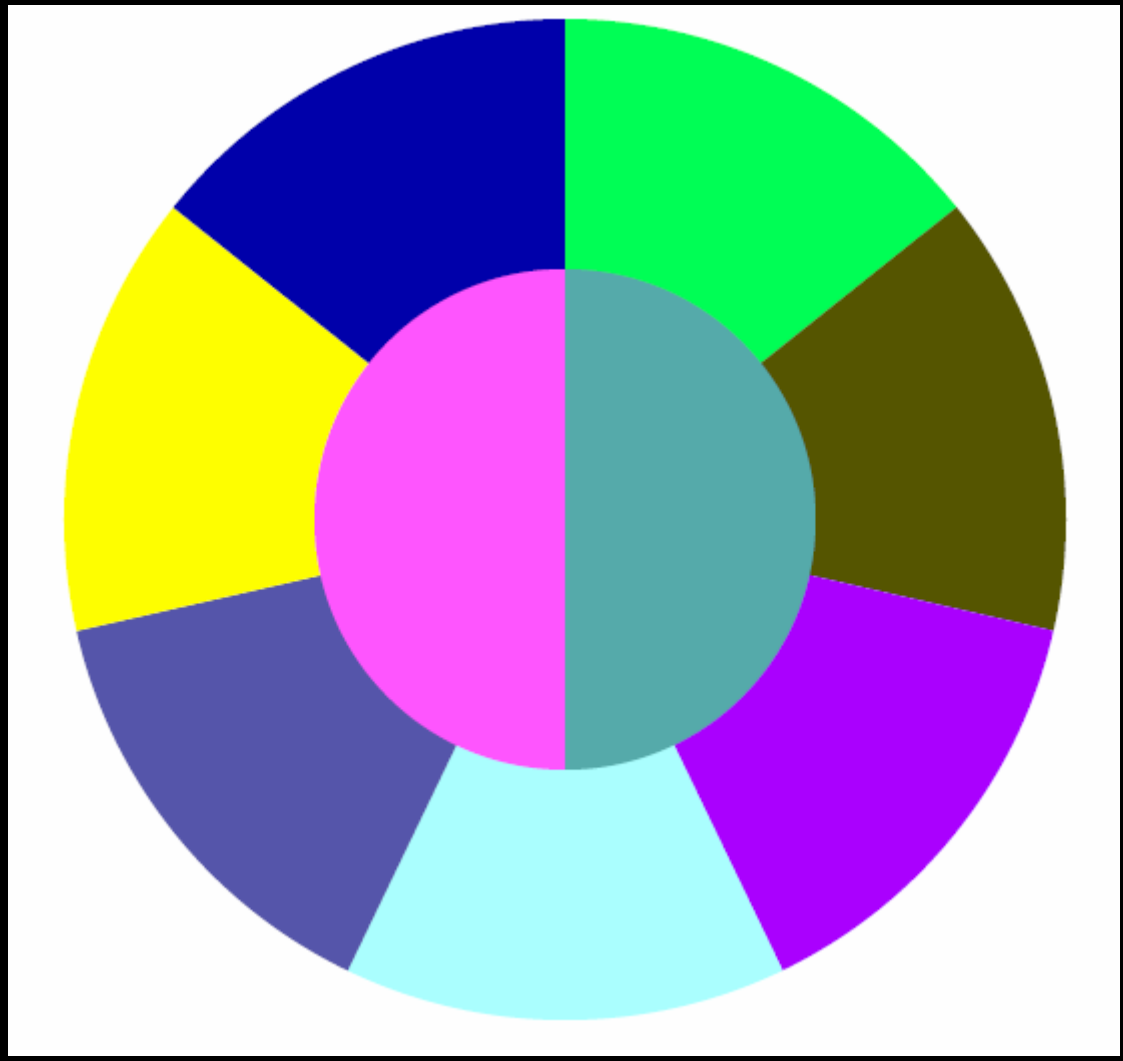
Thomas Tuschl, a molecular biologist at Rockefeller University in New York, isn't yet convinced that miR-10b is so important, because it has only been found in nine metastatic tumours so far — a very small sample. "You would expect more clinical data, and it's just not there," he says.

MIRN10B microRNA 10b [*Homo sapiens*]
GeneID: 406903 Locus tag: HGNC:31498
Sequenz:

taccctgtagaaccgaatttgt

Die microRNA wird metasystemisch als „quasi DNA-Sequenz“ gerechnet:

Nr.	Cd.	AminoAcid char/atr	PerZan index	proc. col	pos. col	con-densed	I Ging
1	TAC	Tyr / Y / *	31	g>b	Y/V	C	Einwirkung
2	CCT	Pro / P / o	36	s>y	S/R	G	Zensur
3	GTA	Val / V / o	59	r>v	B/G	G	Aufloesung
4	GAA	Glu / E / -	44	w>b	W/B	A	Durchdringung
5	CCG	Pro / P / o	22	v>y	V/R	C	Gestaltung
6	AAT	Asn / N / *	34	y>y	O/W	A	Macht
7	TTG	Leu / L / o	23	v>s	V/S	T	Zersplittung



10B_falg.rtf - Faecher-Lesen –
2005-10-06 PerZan

leveln

GA…..

leveln-1
CGGACAT
CGG 21 Reform **ACA 9 Form**

Metasystemisches Ergebnis:

Der Nucleus ermittelt eine unvollständige „quasi“ Triplett- Struktur, nämlich

GA..n

Das kann zu 4 möglichen Codon-Äquivalenten führen:

GA-A 44 Durchdringung	„penetrieren“, „infiltrieren“	->	nach innen
GA-C 28 kritische Masse	„überbordend“, “platzend“	→	nach außen
GA-G 50 Kosmische Ordnung	nach allen Seiten wirkend	->	radial
GA-T 32 Dauer	wechselwirkend ,Zeitpfeil	→	„oben/unten“

GA-N beschreibt in der Summe seiner Optionen eine vollständige, raum-zeitliche Ausdehnung, die bildhaft mit der Migration von Krebszellen verglichen werden kann.

Man könnte das Ergebnis auch so interpretieren, dass die sehr kurze GA.. - kondensierende microRNA in Verbindung mit einem anderen A-, G-, C- oder T- kondensierenden DNA-Abschnitt eine Struktur, ein Molekül, zu einer im wahrsten Wortsinne „schnell raumgreifenden“ Entwicklung stimulieren kann.