

TIM LAKE

Some informational genes are
resistant to lateral
transfer

Some operational genes can
be transferred

CHIMERAS

SOBIN

ZILUB

GUPTA

RDOOLITTLE

WFDOLITTLE

B602DINT



Informational

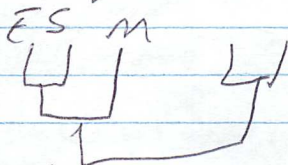


Operational

Why long branch to *Methanogen*

Rooting the tree

- find paralogs
- regard them to be orthologs



Informational
rooted
like this

Operational
had all
possible
roots.

Veronika Vonstein

Zygomonas
Thiobacillus ferrooxidans

3D. dimensions of ORF annotation

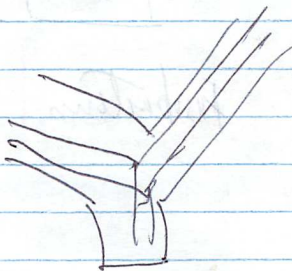
① in phylog. space

② in cellular metabolism

③ in the chromosome

6

102



EA Raleigh - Genomic Carpetbaggers

Restriction Systems

- type II R + M systems evolve independently

Carpetbaggers

outsiders

parasites

bring new skills

generate new ideas

Outsiders

- Horizontal transfer

- Incongruency of trees

modification dependent restriction
- methylation leads to cutting

NEW SKILLS

① parasite defense

Restriction + Homol. Recombination

- reassortment of alleles

- sugg. intergenomic recomb is rare

- sugg. intragenomic reco. is high



J Reeve - Nucleosomes

Genomic structure in *M. thermocautotrophus*

M. fervidus

- 3370 GC

- 83°C growth T°

- purified DNA binding proteins
- added back to -- got regular structure
- what does this mean?

H1 - is a dimer

- it is not histone-like

Archaea

- histone fold = 3 helix fold
- always dimers

What about
nucleosome
altering proteins

Nucleus Is

↓
extract

↓
isolate prot DNA

↓
micro. nuclear

↓
get multiples of ~60 bp

where are structures in vivo?



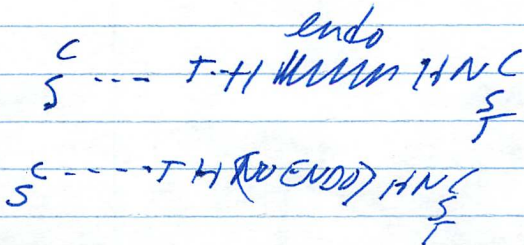
Protein Sph. Lin

Vent Pol Gene - T. b. thuraxis
- ORF too large



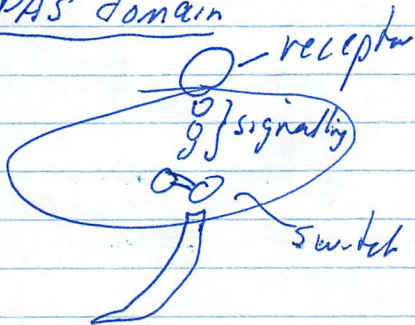
Purifying precursor

- intermediate at high no/wt



for Zhulin Chemotaxis in Coli

PAS domain



Genomes

Evolution - some cases all genes
coded w/in one operon

Craig Richmond

Genome wide expression

- Gene expression profiling using
radioactive spot blots

~~Gene chips~~

Don't normalize qnts of DNA

How compare blots

- signal intensity as % of total
- or use yeast spots

Affy chip

- 15 oligos/gen
- chosen by uniqueness
- 300,000 oligos (25mers)



Frank Robb

Pyrococcus furiosus - med. sea
Thermococcus litoralis
Pyrococcus horikoshii - deep sea vent

SNYPER

BAL	TAM
BOS	NY
CHI	AN
KL	UA
CL	TEX
MIN	SEA

Miller

browning mutators for many generations

Steps of selection
pressure leads
to mutators taking
over population



SBattis - Dradodivans

- many mesophiles
- some thermophiles
- etc.



Joe Diruggiero

GC content NOT correlated
w/ hyperthermophily

How protect DNA

- high intracellular salt
- histone + histone-like proteins
- topology

RAD A } not damaged in incubation
RAD B }

Tom CEBULA

most of muts are deletions
w/ flanking repeats

Non-repair activities

- ① RecA = tx reg
 - ② P53?
 - ③ Ad q
 - ④ PHR
 - ⑤ TFIIT
-

Some genes in nuclear
genes have lost gen
order

R. Charlebois - Univ. of Ottawa

NCBI

ANALYSIS UPDATED NIGHTLY

Types of Analysis

Genome Databases

- ① # of bact spec. ~~ORFS~~
- ~~② #~~
- ② Families
- ③ best hit is w/ X

Pat Higgins Warren

Smith-Kline Beech

- ~75 people in bioinformatics

Criteria for ^{selection} sequencing

Spectrum + specificity

Essential + expressed in vivo

Cellular location

Novelty

High throughput selection

Collect sequence

Blast 2P

Located results into relational table

Superfamilies

Align + tree

- RFC2 - in arcs/archs
similar to DNAZ



Major facilitator ^{superfamily} (MFS)

e.g. ~~lact~~ lact

RND superfamily

www-biology.ucsd.edu/

~msaieir/transport/htthpy.html

• ~ipaulesen/transport/htthpy.html

Dier Maizel

① Intro to repair

Evolutionary Mol. Bio.?

① Intro

② Evo/ mol/ bio

③ DNA repair

④ D. ff in repair

⑤ Comp genomics

⑥ Two stories of uses of evolution

⑦ SNFZ

⑧ Muts

⑨ All genomes -- quick tables

⑩ How much sense --

PG (x) ←
prediction
EXAMPLES

- SNFZ

- Muts

Intr = 10 ~~4~~ 4⁰ although offends

Methods = ~~10~~ 10/4 about repin

SVF2 = 4 24 what I am

Tests = 10 28 = 10 min 38 really interests

Repairs 15 53 in 15 apply end

HV = 10 63 networks