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The relationship between an inefficient immune system and ageing

Richard G. Stead

September 2010

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Content:

1. Infections
2. Bacteria and Viruses
3. Magic Bullet – The search
4. Pathogens and Anti-aging

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History of Medicine

2000BC Here, eat this root
1000AD That root is heathen. Here say this prayer
1850AD That prayer is superstition. Here drink this potion
1920AD That potion is snake oil. Here swallow this pill.
1945AD That pill is ineffective. Here, take this penicillin.
1955AD Ooops, bug mutated. Here take this tetracycline.
1960-1999 39 more oops. Here take this MORE powerful antibiotic.
2000AD The bugs have won. Here, eat this root!

Anon. WHO 2000 "Overcoming Antimicrobial Resistance"

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"..at times one feels that to write about infectious disease is almost to write of something that has passed into history."

McFarlane Burnett Nobel Prize Winner's introduction to his 1962
"Natural history of Infectious disease".

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"We stand on the brink of a global crisis in infectious diseases. No country is safe from them. No country can any longer afford to ignore their threat."

Gro Harlem Brundtland WHO Annual Report 1996

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17 million people die each year from infectious diseases.
Of these one third are in the developed world.
20% of all deaths in the developed world were from infectious diseases in 1992.
An increase of 50% since 1980.

Journal of Am Med Assoc 1996/275 pp189-193

Bill Clinton 2000
"The spread of disease is the one global problem from which .. No nation is immune".

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"Most Governments are asleep at the switch when it comes to being able to handle a public health crisis caused by infectious disease, even though we are facing a relentless increase in antibiotic resistance across all classes of drug".

George Poste 2005
Director of the Biodesign Institute at Arizona State University

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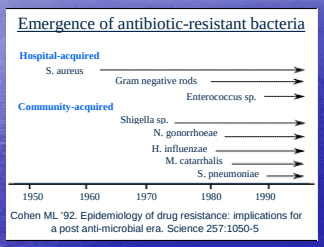
History of resistance



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Why this Growth of Resistance?

Many, many reasons – not least of which is the over-use and ready availability of our weapons – antibiotics – but also the very clever work of the pathogens involved.

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Where are the new classes of Antibiotics?

But are these what we need?

Their effectiveness is over so soon – yet they are all we have.

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Our own Immune system

We are under continual attack.

What happens when we have a low state of health?

We all have pathogens present all the time. What are they up to?

Pathogens lead to more than infections?

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What effect do these non-infection actions have on aging?

Is a better, healthier life anti-aging?

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Immune systems:

1. Mechanical
2. Chemical
3. Biological
4. Innate

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Side effects of bacterial residence

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Side effects of viral residence

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Health-Care Crisis

Vaupel & Geppen, Science May 2002 (OECD)

	1981	1997
• Life expectancy (m)	70.9	74.6
• Health expectancy	64.4	66.9
• Health gap	6.5	7.7
• Life expectancy (w)	73.1	77.4
• Health expectancy	64.7	68.2
• Health gap	8.4	9.2

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"…a magic bullet that would destroy bacterial cells but leave human cells unscathed."

The conclusion of pathologist Paul Ehrlich in 1885

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Knowing the ferocity, determination and unreliability of these pathogens, how have we survived so long?

Not just humans but all animals?

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We looked at

Nature and its chemistry

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Immune systems:

1. Mechanical
2. Chemical
3. Biological
4. Innate

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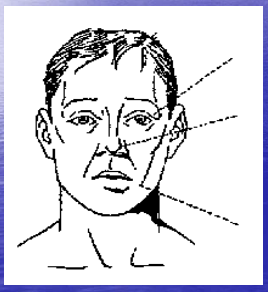
Human defence system



- Tears
- Mucous membrane
- Saliva

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$OSCN^-$

HYPOTHIOCYANITE

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Tears

NaSCN

Tears → $OSCN^-$

Peroxidase

H_2O_2

Lactic Bacteria → Pathogens

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TARGET MICROORGANISMS

Non-Exhaustive List

Bacteria

- escerichia coli
- yersinia enterocolitica
- klebsiella pneumoniae
- klebsiella oxytoca
- streptococcus agalactiae
- streptococcus mutans
- staphylococcus Aureus
- Salmonella species
- shingella sonnei
- listeria monocytogenes
- ancinetobacter species
- neisseria species
- haemophilius influenza
- campylobacter jejuni
- areomonas hydrpphila
- pseudomonas aeruginosa
- capnocytpphaga ochracea
- selenomonas sputigena
- wolinella recta
- enterobacter clocae
- helicobacter sp.
- bacillus Cerus
- campylobacter

Virus

- **herpes simplex virus**
- **immunodeficient virus**
- **respiratory syncytial**

Yeast and Moulds

- **candidia albicans**
- **aspergillus niger**

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GRAM –ve

- E-coli
- salmonella species
- shingella sonnei
- legionella
- campylobacter

GRAM +ve

- staphylococcus aureus
- streptococcus
- listeria monocytogenes

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Impact study of OSCeauN® solutions on a population of *escherichia coli*

Designation	A	B	C	Neg. control
[OSCN⁻]T_0 (µM)	220± 5	463± 4	630± 7	0
CFU/ml @ 0 min	unknown	unknown	unknown	370 ± 21
CFU/ml @ 5 min	325 ± 50	60 ± 20	30 ± 15	unknown
CFU/ml @ 15 min	301 ± 37	10 ± 3	2 ± 1	unknown
CFU/ml @ 30 min	250 ± 63	0	0	unknown
CFU/ml @ 60 min	190 ± 27	0	0	330 ± 83

TMI-E, Lyon

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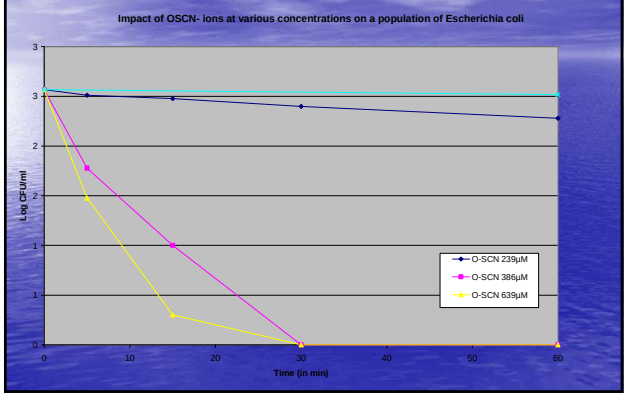

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salmonella infantis : Impact on a 10^3 CFU/ml population

Designation	A	B	C	Neg. control
[OSCN⁻]T_0 (µM)	190± 10	362± 6	675± 4	0
CFU/ml @ 0 min	unknown	unknown	unknown	7013 ± 643
CFU/ml @ 15 min	2814 ± 1596	736 ± 468	79 ± 31	unknown
CFU/ml @ 60 min	269 ± 126	0	0	unknown
CFU/ml @ 120 min	9 ± 6	0	0	unknown
CFU/ml @ 240 min	0	0	0	4120 ± 2730

TMI-E, Lyon

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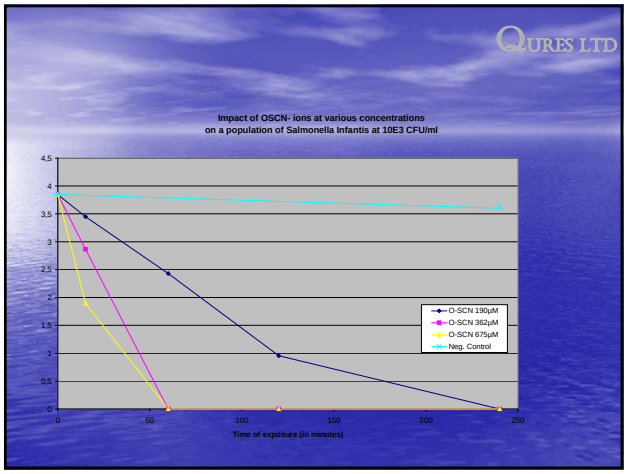

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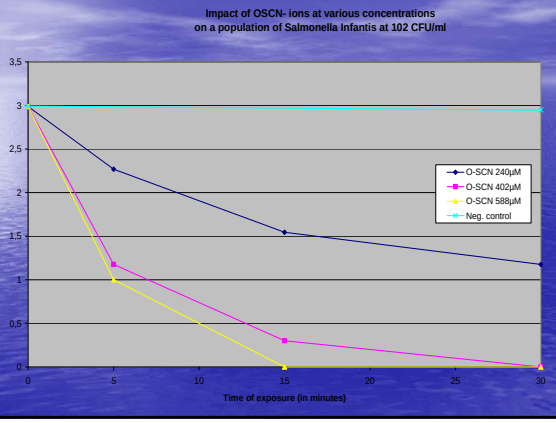
salmonella infantis : Impact on a 10^2 CFU/ml population

Designation	A	B	C	Neg. control
[OSCN⁻]T_0 (µM)	240± 8	402± 7	588± 8	0
CFU/ml @ 0 min	unknown	unknown	unknown	970 ± 71
CFU/ml @ 5 min	185 ± 112	15± 5	10 ± 4	unknown
CFU/ml @ 15 min	35 ± 18	2± 1	0	unknown
CFU/ml @ 30 min	15 ± 5	0	0	830 ± 139

TMI-E, Lyon

QURES LTD



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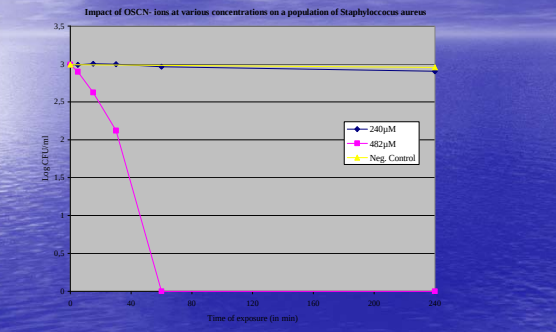
Impact study of OSCeauN® solutions on a population of *staphylococcus aureus*

Designation	A	B	Neg. control
$[OSCN^-]T_0$ (µM)	240± 6	482± 10	0
CFU/ml @0 min	unknown	unknown	980 ± 163
CFU/ml @5 min	976 ± 527	790 ± 313	unknown
CFU/ml @15 min	1004 ± 532	420 ± 195	unknown
CFU/ml @30 min	993 ± 467	132 ± 69	unknown
CFU/ml @60 min	921 ± 449	0	unknown
CFU/ml @240 min	894± 431	0	900 ± 452

TMI-E, Lyon

QURES LTD



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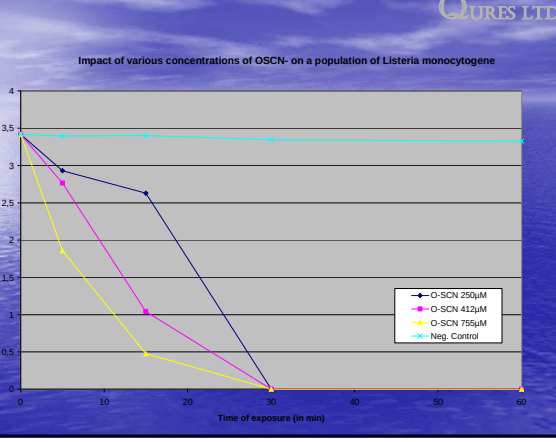
Impact study of OSCeauN® solutions on a population of *Listeria monocytogene*

Designation	A	B	C	Neg. control
$[OSCN^-]T_0$ (µM)	246±7	412±3	755±6	0
CFU/ml @0 min	unknown	unknown	unknown	2614±532
CFU/ml @5 min	853±234	560±174	72±27	2489±1196
CFU/ml @15 min	426±123	11±4	3±2	2529±884
CFU/ml @30 min	0	0	0	2223±756
CFU/ml @60 min	0	0	0	2120±839

TMI-E, Lyon

QURES LTD



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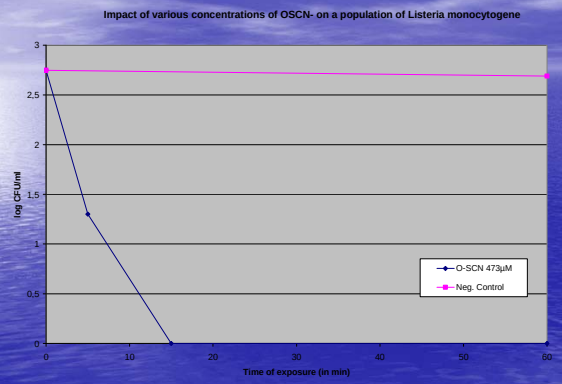
Listeria monocytogene : Impact on a 10^2 CFU/ml population

Designation	A	Neg. control
$[OSCN^-]T_0$ (µM)	473± 11	0
CFU/ml @0 min	unknown	560 ± 96
CFU/ml @5 min	20 ± 3	unknown
CFU/ml @15 min	0	unknown
CFU/ml @60 min	0	490 ± 85

TMI-E, Lyon

QURES LTD



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No harm to "friendly" bacteria.

Why?

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Could this be the

"magic bullet"?

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Delivery systems:
oral
lungs
topical

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Anecdotal reports

Pilot Study

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Pilot Study

Dr S Ladi

Presented at Evian
April 2009

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First clinical experience with OSCeauN

- The aim of the survey
  - to prove the efficacy of the substance in vivo
  - to determine the fields of the further possible clinical use
  - to compare the efficacy with antibiotics
  - detect possible side effects

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4 groups of patients

- Helicobacter pylori infection (proven by ammonia exhalation test) – 3 patients
- Soft tissue infection – 5 patients
- URTI – viral – 5 patients
  bacterial – 4 patients
- Pneumonia – 3 patients

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Helicobacter pylori infection

- Single dose of OSCeauN (0,5l in two portions 1 hour between)
- Repeated dose the other day
- Exhalation test on the 7th day : all negative!
- Exhalation test repeated 4 weeks later: 2 negative, 1 positive

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Soft tissue infection

- 3 diabetic with lower limb ulcer, 1 with chronic venous insufficiency, 1 with infection of the hand after an accidental injury
- The diabetic patients got 1 single dose of OSCeauN each week for 4 weeks. The ulcer cleared up and shrinked by 2,5 cms average from the diameter of 4-7,5 cms.
- No antibiotics were administered or applied topically just a cream with salicilyc acid at the margin of the wound to enhance skin growth

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Soft tissue infection

- The patient with the chronic venous insufficiency got 4 doses of OSCeauN for 4 weeks. The ulcer dried and shrinked by 1,5 centimeters (originally it was 4,5 cms)
- The patient who had an injury of the hand is a carpenter, had allergic reactions to most of the antibiotics. He got 4 doses in 4 weeks, the discharge from the drain cleared up in 3 days, the wound was closed in 5 days.

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URTI infections - bacterial

- 4 patients, 2 single doses of OSCeauN for 2 days
- We measured: fever, quantity and colour of the discharge, subjective overall condition, liver enzymes, WBC count, We, CRP. Unfortunately we could not culture the bacteria.

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URTI infections - bacterial

- We compared the recovery of the patients to the recovery of the conventionally treated group (antibiotics).
- The average recovery was 1 day shorter than the control group (not significant)

  (6 days – OSCeauN group

  7 days – conventionally treated group)

  The efficacy with 2 single dose was at least as good as with antibiotic in the control group

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URTI infections - viral

- 5 patients, 2 single doses of OSCeauN the following days.

  We started the survey during the February influenza epidemic.(age 21-48)
- The fever and most of the symptoms dropped in 48 hours (usually it lasted for 5 days), the liver enzyme levels were normal, the elevated We and CRP levels returned back to normal range in 4-7 days.

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URTI infections - viral

- No relapses were experienced. No secondary infections. The secondary infections among the conventionally treated group were quite high this season, 1/3 fell into sec. infections.
- Remark: The recovery of the OSCeauN group was remarkably faster, even it is not significant

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Pneumonia cases

- 3 cases, radiologically proven pneumonia
- Immediate treatment (2 doses), we waited for 24 hours for the improvement of the symptoms. (if not-antibiotic treatment)
- We observed: fever, auscultation signs, quality and quantity of the discharge, liver and kidney parameters, haematologic parameters, We, CRP.(day 0, 7 and 14)
- We compared the results with the conventional antibiotic treatment

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Pneumonia - results

- All the 3 patients completely recovered in 8-11 days
- The leukocytosis and the inflammatory parameters returned back to normal range by day 14.
- The symptoms decreased faster than it is usual with AB treatment (fever & discharge)
- The duration of recovery was about the same as with the conventional therapy (8-12 days)

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A case history with OSCeauN

- 88-year old lady, serious bronchial infection which quickly turned into lobar pneumonia
- Failing respiratory function, failing blood gas parameters, losing consciousness
- Immediately start artificial respiration with hyperbaric oxygen and PEEP, combined intravenous antibiotic treatment (Vancomycin + Cefepim). Continuous fever.
- The treatment was unsuccesful for 5 days, change to a 3rd antibiotic (Moxifloxacin), still respired.

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A case history with OSCeauN

- The result of the bacterial culturing arrived on the 8th day (Klebsiella Pneumoniae), change to the 4th antibiotic (Amikacin).
- Still high fever for 3 days, the stopping of the PEEP respireing was unsuccesful, conicotomy
- Day 11: Start of the OSCeauN by means of a gastric tube (the patient was still unconscious)
- In 2 days the fever has gone, they could stop the artificial respireing, the patient came back to consciousness, the recovery continued with massive pharmaconutritional support.

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Clinical Trials

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OSCN⁻

Mathematical and targetted –Sulphydryl group:
a single molecule will disarm a single bacteria.

It takes several molecules to disarm a virus

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OSCN⁻

No residual action

short half-life

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OSCN⁻

What about resistance in the future?

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OSCN⁻

What about toxicology?

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We face threats of infection from:

superbugs
resistant bacteria
bio-terrorism
long term residence of pathogens

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Applications for OSCeauN®

- Wash down patients
- Wash down beds
- Wash dirty clothes before/after laundry
- Rinse communal areas
- Wash down kitchen
- ???
- Wash down equipment, tools and working areas.
- floors,walls and drains
- Handwashing
- Humidify air
- ???

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Summary OSCeauN®

- More effective than other treatments
- Wider scope than other treatments
- Simple to prepare
- Simple to administer
- Faster effectiveness
- Safer than all other treatments, for
  - Employees/Staff
  - Patients
  - Premises
- Benefits
  - "Natural"
  - Nursing time
  - Hospital beds/time
  - Outpatients
  - GP prescribing

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- Air Treatment

Lyon Hopital E.Herriott

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OSCN-

Where could this be of benefit?

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