When a vital research project gets bogged down because you need essential supplies in a hurry, tell your troubles to a friend you can trust. The kind of friend you'll always find at NBCo.

At NBCo., we'll give you more than a sympathetic ear. We'll give you a helping hand. And we'll begin the instant you call. Within an hour of getting your stat order, we'll have it filled and checked five times for absolute accuracy and completeness . . . and start it on its speedy way. On request, you'll have the help you need in 24 hours, if you're located anywhere in the United States. Within 80 hours anywhere in the world.

And because we want to keep you as a lifelong friend, we'll never fail to deliver the finest quality biochemicals from our stock of more than 4000 items. And at a very nice price, because we have so many other friends all over the world.

Next time you need biochemicals, give NBCo. a call. After all, what are friends for?
The Journal of General Microbiology

Volume 68, Part 2. October 1971

DEVELOPMENT AND STRUCTURE
K. GULL and A. P. J. TRINCI Fine Structure of Spore Germination in Botrytis cinerea

PHYSIOLOGY AND GROWTH
M. L. SELIGMAN and H. G. MANDEL Inhibition of Growth and RNA Biosynthesis of Bacillus cereus by Quinacrine

BIOCHEMISTRY
A. W. RODWELL The Incorporation of Elaidate, Oleate and Straight-chain Saturated Fatty Acids by Mycoplasma Strain Y
A. W. RODWELL and J. E. PETERSON The Effect of Straight-chain Saturated, Monoenoic and Branched-chain Fatty Acids on Growth and Fatty Acid Composition of Mycoplasma Strain Y

GENETICS AND MOLECULAR BIOLOGY
E. J. FRIEND and D. A. HOPWOOD The Linkage Map of Streptomyces rimosus
P. H. WILLIAMS and C. H. CLARKE Pre- and Post-irradiation Effects upon Lethality and Reversion in Salmonella typhimurium

TAXONOMY
M. TSUKAMUR and S. MIZUNO Mycobacterium obuense, a Rapidly Growing Scotochromogenic Mycobacterium Capable of Forming a Black Product from p-Aminosalicylate and Salicylate
T. A. EL-SHARKAWY and D. HUISINGH Electrophoretic Analysis of Esterases and Other Soluble Proteins from Representatives of Phytopathogenic Bacterial Genera
T. A. EL-SHARKAWY and D. HUISINGH Differentiation among Xanthomonas Species by Polyacrylamide Gel Electrophoresis of Soluble Proteins
J. J. S. SNELL and S. P. LAPAGE Comparison of Four Methods for Demonstrating Glucose Breakdown by Bacteria

SHORT COMMUNICATIONS
H. YOUNG and D. J. STEWART A Turbidimetric Method for the Assay of Pyocin Activity
J. R. MURPHY, J. M. KORNFELD and R. C. TILTON Biphasic Thiosulphate Utilization by a Marine Thiobacillus
H. NAKAMURA Dependence of the Selection of Thymineless Mutants on the Acriflavine Sensitivity in Escherichia coli Treated with Aminopterin
L. P. T. M. ZEVENHUIZEN Chemical Composition of Exopolysaccharides of Rhizobium and Agrobacterium
I. H. C. GALLAGHER Occurrence of Waxes in Acinetobacter
D. P. HEAF and D. LEE A Viability Assay for Tetrahymena pyriformis

Price £3.00 net ($9.00 in U.S.A.) Annual subscription £30 net ($100.00 in U.S.A.)

CAMBRIDGE UNIVERSITY PRESS

Bentley House, 200 Euston Road, London, NW1 2DB
American Branch: 32 East 57th Street, New York, N.Y. 10022
**GALACTOSE**

Another FIRST from Sigma

COMPLETE OFFERING OF ENZYMES AND SUBSTRATES FOR

**“LELOIR PATHWAY”**

**GALACTOSE METABOLISM • GLUCURONIDE SYNTHESIS**

<table>
<thead>
<tr>
<th>Enzyme/Phosphate</th>
<th>Unit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAL-1-P</td>
<td>2 units</td>
<td>$5.50</td>
</tr>
<tr>
<td>Galactose-1-Phosphate</td>
<td>5 units</td>
<td>$10.00</td>
</tr>
<tr>
<td>UDPG</td>
<td>2 units</td>
<td>$5.00</td>
</tr>
<tr>
<td>UDPGAL</td>
<td>2 units</td>
<td>$5.00</td>
</tr>
<tr>
<td>G-6-P</td>
<td>2 units</td>
<td>$5.00</td>
</tr>
<tr>
<td>UDPGA</td>
<td>2 units</td>
<td>$5.00</td>
</tr>
</tbody>
</table>

**GLYCOLYTIC CYCLE**

For the first time, all enzymes and substrates for the “Leloir Pathway”, Galactose Metabolism and Glucuronic Synthesis are available. Many of the following preparations are offered here for the first time anywhere. Prices are tentative. Many have already been substantially reduced. Others will be reduced as demand warrants.

Since most enzymes are about 30% more active at 30°C than at 25°C, reactions performed at higher temperatures may result in saving time and material.

**GALACTOKINASE**

GO130 From Yeast. Present lot contains 75% Buffer Salts. Approx. 50-50 units/mg Protein.

Unit Definition: One unit will convert one mMole of Galactose to Gal-1-P per min. at pH 7.0 at 25°C. Approx. 1% Hexokinase impurity.

2 units $ 5.50
5 units $10.00
10 units $15.00

**GALACTOSE-1-PHOSPHATE URIDYL TRANSFERASE**

GS128 From Yeast. Present lot contains approx. 85% Buffer Salts. Approx. 2 units/mg Protein.

Unit Definition: One unit will form one mMole of G-1-P from UDPG and Gal-1-P per min. at pH 8.7 at 25°C. Approx. 5% Pyrophosphorylase impurity.

2 units $ 5.00
5 units $15.00

**PHOSPHOGLUCOMUTASE**

P7502 From Rabbit Muscle. Crystalline. Ammonium Sulfate Suspension. 80-130 units/mg Protein.

Unit Definition: One unit will convert one mMole G-1-P to G-6-P per min. at 7.4 at 30°C.

200 units $ 7.90
500 units $18.00
1000 units $38.00

**URIDINE-5’-DIPHOSPHOGLUCOSE DEHYDROGENASE**

U5500 Powder. Buffered preparation. From Bovine liver. Approx. 500 units/mg Protein.

Unit Definition: One unit will oxidize 4.0 × 10⁻⁴ mMoles of UDPG/min. at pH 7.7 at 25°C.

10,000 units $9.90
20,000 units $16.50
50,000 units $33.00

**URIDINE-5’-DIPHOSPHOGLUCOSE PYROPHOSPHORYLASE**

U1501 From Yeast. Ammonium Sulfate Suspension. Approx. 45 units/mg Protein.

Unit Definition: One unit will cause the formation of 1.0 mMole of G-1-P from UDPG and inorganic Pyrophosphate per min. at pH 7.6 at 25°C. Impurities include Alcohol Dehydrogenase and GDP.

25 units $ 6.50
100 units $18.00
500 units $60.00
1000 units $100.00

**URIDINE-5’-DIPHOSPHOGLUCURONYL TRANSFERASE**

U3626 From Rabbit liver. Crude microsomal preparation. Present lot contains approx. 10% Buffer Salts. Approx. .0015 units/mg Protein.

Unit Definition: One unit will transfer 1.0 mMole of Glucuronic Acid from UDPGA to Phenolphthalein per min. at pH 8.0 at 37°C.

Present lot contains Glucuronidase impurity approx. 0.0015 mMolar units per mg at pH 4.5. Approx. 0.000055 mMolar units/mg at pH 8.0.

5 units $4.50
25 units $50.00

**α-D-GALACTOSE-1-PHOSPHATE**

G0350 Dipotassium Salt. Enzymatically prepared. Purity: 98-100%. Substantially free of G-1-P.

10 mg $ 4.50
50 mg $16.20
100 mg $30.00

Also available—See our Catalog or inquire:

* D(+) GALACTOSE
* α-D-GALACTOSE-1-PHOSPHATE (synthetic)
* α-D-GLUCOSE-1-PHOSPHATE
* D-GALACTOSE-6-PHOSPHATE
* D-GLUOSE-6-PHOSPHATE
* SEVERAL GLUCURONIDES

**ORDER DIRECT - TELEPHONE COLLECT from ANYWHERE in the WORLD**

Day, Station to Station, 314-771-5750 — Night, Person to Person, Dan Broida, 314-993-6418

TWX (Teletype) Day or Night: COLLECT 910-761-0593

TELEGRAM: SIGMACHEM, St. Louis, Missouri

**The Research Laboratories of**

**SIGMA CHEMICAL COMPANY**

** MAILING ADDRESS: P. O. BOX 14508, ST. LOUIS, MO., 63178, U.S.A.**

**MANUFACTURERS OF THE FINEST BIOCHEMICALS AVAILABLE**

Distributed through:

SIGMA LONDON Chem. Co. Ltd. • 17, Lettice St., London, E.W.6, England • Telephone: 01-734-5223 (Reverse Charges)

SIGMA ISRAEL Chem. Co. Ltd. • 29 Kali-Gimel St., Givatayim, Israel • Telephone: 63 760 64 (Reverse Charges)

(x)
CLINICAL SCIENCE

EDITORIAL BOARD

For the Biochemical Society
R. Hoffenberg, Chairman
C. N. Hales, R. G. Huntsman, G. H. Lathe, J. Liddell,
I. MacIntyre, K. L. Manchester, J. A. Owen, R. W. E. Watts

For the Medical Research Society
J. S. Robson, Deputy Chairman
R. D. Cohen, W. I. Cranston, G. Cumming, D. M. Matthews,
A. Polak, J. I. S. Robertson, B. Robinson, S. J. G. Semple

VOLUME 41, No. 5 November 1971

CONTENTS

Effect of ileal resection on bile salt metabolism in patients with ileostomy following proctocolectomy. By I. W. Percy-Robb, K. N. Jalan, J. P. A. McManus and W. Sircus

On the mechanism of hyperkalaemia due to hyperosmotic expansion with saline or mannitol. By D. L. Makoff, J. A. da Silva and B. J. Rosenbaum

The plasma clearance and liver uptake of iron from transferrin of low and high iron saturation. By J. Fletcher

The effect of ammonium salts on cerebral and hind-limb consumption of oxygen and glucose in the ventilated dog. By I. M. James, M. Garassini and E. Larbi

Rates of absorption by rat intestine of pancreatic hydrolysates of proteins and their corresponding amino acid mixtures. By R. F. Crampton, S. D. Gangolli, Pamela Simson and D. M. Matthews

The reflex stimulation of catecholamine secretion during the acute stage of myocardial infarction in the dog. By Janina Staszewska-Barczak

The role of vasopressin and urea in the renal concentrating defect of patients with cirrhosis of the liver. By C. A. Vaamonde, Liliana S. Vaamonde, J. I. Presser, H. J. Morosi, E. L. Klingler, Jr. and S. Papper


Leg blood flow during exercise in man. By L. Jorfeldt and J. Wahren

The excretion of salicylate in salicylate poisoning. By A. G. Morgan and A. Polak

Subscription: £2.00 ($7.50) per part; £20.00 ($70.00) per year.
Orders may be placed with your bookseller, or sent direct to the publishers.

BLACKWELL SCIENTIFIC PUBLICATIONS LTD
5 ALFRED STREET, OXFORD, OX1 4HB, ENGLAND
SCALE UP

GEL FILTRATION WITH THE PHARMACIA SECTIONAL COLUMN KS 370 USE ANY KIND OF GEL

The Pharmacia Sectional Column opens up completely new possibilities for large scale chromatography. It offers a unique combination of high resolution and high output.

ANALYTICAL QUALITY SEPARATIONS. Production scale fractionation of proteins, enzymes etc. are now possible.

FOR ALL TYPES OF SEPHADEX® AND SEPHAROSE®. Now even the soft gels can be used in 100 litre columns.

HIGH OUTPUT AND VERSATILITY. The capacity of the column is increased simply by adding more sections (section volume = 16 litres). Fractions can be removed between any of the sections which can be replaced without disturbing the production sequence.

HIGH FLOW RATES. Obtained on all gel types even with a large number of sections in the column.

STERILIZABLE. A sterilizable version is available.

Full details of these exciting new developments are available from Pharmacia (Great Britain) Ltd., or from our Sales Representative in your country.
Insolubilized Enzymes
Affinity Chromatography
Immunosorbents
Supports

Miles-Seravac
Miles-Yeda

ENZITE™ a stable and reusable form of enzyme activity.
for the purification and isolation of enzymes.

for the purification and isolation of antibodies and antigens.

for the insolubilization of proteins.

The combined efforts of Miles-Seravac and Miles-Yeda have provided the research investigator with the world's most comprehensive selection of insolubilized biochemicals.

The following technical brochures listing products with full specifications, methods of use and references are available on request.
ENZITE™ brochure No. 2. Insolubilized Enzymes
ENZITE™ brochure No. 3. Insolubilized Biochemicals.

Special attention!
GLYCOSYLEX-Α™ (Insolubilized Concanavalin A)
See brochure 'Concanavalin A and Related Products.'

Miles-Seravac (Pty.) Limited
(A Subsidiary of Miles Laboratories Inc.)

IN THE UK
Miles-Seravac (Pty) Ltd.,
Holyport, Berkshire, England.
Telephone: Maidenhead 21343
Telex: 84672

IN SWITZERLAND
Miles-Seravac,
5 Chemin de Mennon, CH-1006 Lausanne, Switzerland.
Telephone: Lausanne 232201
Telex: 24426

IN THE USA
Research Division,
Miles Laboratories Inc.,
P.O. Box 272, Kankakee, Illinois 60901.
Telephone: 815 935-4417
TWX: 910-632-1474
Again our busy research workers bring you more new biochemicals

20 New enzymes
plus two enzyme inhibitors.

9 New Molecular Biologicals
plus BD Cellulose.

4 New Substrates
plus 3 other new biochemicals

Combisets
Biochemical sets for standardisation and comparison.

Enzymes
ß-amylase
L-arginase
Arylsulphatase
Bromelain
Carbonic Anhydrase
Carboxypeptidase-A
Carboxypeptidase-B
Deoxyribonuclease Grade I
Deoxyribonuclease Grade II
Enzyme X - Papain
ß-glucosidase
ß-gluconidase
Neuraminidase
Nuclease
Nucleoside diphosphate kinase
Papain
Pepsin
Pepsinogen
Phosphatase alkaline
UDPG pyrophosphorylase

Enzyme Inhibitors
Trypsin inhibitor-soya bean
Trypsin inhibitor-egg white

New Substrates
Ethanolamine
ß-glucose-6-phosphate
DL-3-Hydroxybutyrate
Succinyl-L-phenylalanine-p-nitriiide

Molecular Biologicals
BD Cellulose
Ribonucleic acid (soluble)

Nucleosides
2'-deoxy-adenosine
2'-deoxy-cytidine
2'-deoxy-guanosine
2'-deoxy-thymidine

Nucleotides
Deoxy-thymidine-5'-diphosphate
Uridine-5'-diphospho-galactose
Poly A C
Poly I C
Xanthosine-3',5'-monophosphate cyclic

Combisets
Casein by Hambursten
Calibration Protein set
Haemoglobin by Anson
Insulin Chain A
Insulin Chain B
Insulin Chains A & B

Other Biochemicals
Coenzyme A Grade II
Insulin Chain A
Insulin Chain B

For further details on any of these new products please contact:
Boehringer Corporation (London) Ltd.,
Bilton House, Uxbridge Road,
London, W.5.
If you live in Britain or the Commonwealth

or
Boehringer Mannheim G.m.b.H.,
68, Mannheim 31,
P.O.B. 51, West Germany
If you live outside the Commonwealth

Printed in Great Britain by
William Clowes & Sons, Limited, London, Colchester and Beccles