Readings in Cell Physiology

A. Colchicine
B. Mitosis
C. Enzymology (functional) + Protoplasms
D. The Physical Chemistry of Biological Process
E. Chemistry, miscellaneous
F. Class references
G. Bacteriological
H. Leukemia
A. Colchicine
1. Chemistry and Pharmacology
   a. Caryophasis + organinal reaction
   b. C-mitosis, etc. Phylogeny
   c. Physiological correlations
   d. Genetic progress with
   e. Physical or Chemical Theory
   f. Other C-agents
   g. Misc. and Application

B. Mitosis
0. Descriptive Morphology
   a. Physical measurements (see also 7)
   b. Chemical stimuli, specific + general
   c. Sulfhydryl hypothesis; growth, ... see also 6 C
   d. Tumors and tumor conditions, chemotherapy
   e. Microtosis, Anistasis, etc.
      A. Mic, etc. C. Histo
      B. Other inhibitors. D. Hormones
   f. Toxicology
0. Physical Agents, X-rays, Neutrons, etc.
   g. Anoxic conditions
      see also 6 A, B
   h. Energy metabolism
   i. Chromosome metabolism
   j. "Genetic Abnormalities"
10. General Biophysics
   1. Kinetics & Thermodynamics
   2. Diffusion
   3. Mathematical
   4. Macromolecules
   5. Membranes
   6. Viscoelastic...
Clark + Barnes '40 PSEBM 44:340 colch.
poisoning in dogs treated as paradoxaal cortical
insufficiency.

Henry '39 The Plant Alkaloids Churchill

10% pilocarpus + HCl → crystals.

5% HCl + 5% HSCN + HCl → crystals + CH3-

NH4OH extracts. Colch found in various
Persicaria rubra. Colchicine.

Robinson '05 JBC 1:542 Toxicity of colch.
and salts on hamsters.

Schiffay + Higgins '40 P. Mayo 15:536
Colch more toxic in hepatectomized

Fyfe 39 imp. Bu Pr Br + "im."

Chodkiewicz '39 Arch int Med exp 13:665

Sapronin as a cappoelastic agent

Delcourt '38 Arch int Med exp 13:719

Colch in amphibia high fat deposition

Miller. Dautui theory

Leblond + Segal '38 CR56 128:995 Colch provokes the alarm reaction (involution of thymus)

Hypoplasia of adrenal) as a non-specific poison

Lits '36 Arch int Med exp 11:811-901 Dautui theory: white mouse
75.189

Rawotting 38 BB. Paramaecium not affected. Tinetting 188
140 pB. .000217, 22 min after
fulguration, stopophobacig

1/10 JICP does not affect
Paramaecium or amoeba

Boas & Brittle '39 Pf. 33.30: Flex, pea type
reaction. antibiotic cannot be seen
in reduced (?) Inhibits Isoniazid fluorescence!!

Common '44 BBl. 197, Colchicine au-
turns PN4 affected at 10%, C. byzantium
and 5% concentrations.

Boole: '41 J.A.N.S. 60:105 Anacystis+
Engleman (orthotrop) barrel spore, P-1 fil.
Heterokontiq short thread and rod. Sogii
wollen. Appears differentiable without
division virgin cells!

Bourn & Willi '39 CRSB 132:553 A. amytoni
C-nitroso; no stimulation of CO. microphlebian
Keppel & Dawson '39 BB 76:153 R. piperaceus
Various abnormalities at lower concentrations.
Weyan '38 Hereditas 24:471 Allumino of tip
W. '39 Hereditas 25:9 mucicric
W. '41 Hereditas 26:18, 411 — also
similarities with methion, cacodylate,
auramine and colchicine.
O'Mara '39 JH 30:35 Allum smears —
good illustration.
Paff '39 Am. J. Scien. 64:331 Chick embryos.
2.045 g. is sub lethal dose. Anergrowth indica-
ting greater cell proliferation under the action of
colchicine, reisolating Allum, etc.
Vandendriess + Davierden '39 CRAS 208:1675
9 fx on: Ewing, chlamydomonas, saccharo-
ymyces, psilocybe, strophoria, B. subtilis, etc.
X
Waller + Youngman '40 PSEBM 144:271
Bacteria: none.
Wesley, CA 35:1128° Panig.
1:5000 severe effect. 2Hr. O.C. not changed.
Lewis and Jackson, 37 A. J. Cancer 3050.

Leucosma 180t mouse liver
7 stages defined + time max + wnp
Tennant and Liebow, 40 Yale J B N 13:37
Tissue culture + type-mitosis described
compared with EMT 2 + lectin reaction
Wolcott, 41 J H 32:67 Nuclei in cell
(epididymis) c-mitosis; contraction and
clumping of chromosomes. In space mother cells
independent induce cull.

Commwell, J. Path. 104: 105(1942) Resistance
of tubercle b. of
Crosby and St. J. H. 33163 (1942) Drosophila
mitosis. c - scatted

Sparrow, AH Science 96: 363 (1942) mutation
chromosome in certain human males
Cisterny and Young, J. R. 1937 (Chromatic
relative). Holmgren, 1941.

Herbison, J. A. 44: 17 (1942) Allines
Frenkel and Vegard, Acta Bayer Neuroland
8: 16, 1938 Phosphatemia.

Feininger and Helke, Toreybull 70: 175 (1943)
Metaphase stage: c - coo hydronor. Cornti;
uniluminating.
Berke & Cullen. PRS 6/3/04. Medicine
and cellular nuclear features. See report. Theoretical reanalysis.
Good photos.

Monahan & de Formentro. CRSB 136. 4/10–11 '42.
10% on Amoeba rhizopodes.
Medium: orange. Slightly of equatorial
late stage. Stage of double cytoplasm which
usually died out.
Boyland & Boyland '37 Beach J. 31. Lymnaea
Colchicine lowered indophenol reducing
power of liver, pituitary, not of brain or testes. Hémorrhage, hematuria leading to low oxalate. In vitro .03% colchicin reduced
0.2 Colchicine more effective

Beach, Beudant, Herlain '39 Arch. Path. Physiol.
Strongyleentoxisis 250 x dose for CO, no effect
on CO.

Gmürich 140 CPAS 210: 579 increased
oxygen pressure in Triticum 7.1 to 11.6 atm.

Phytophthora 4.9 - 4.6, pHytoptilum 5.4 - 5.2

Hartman & Michel '40 AJS 27: 612 Colchicine

Glycyl-glycine at 10^-4 M, 1/3 0.2 at 4×10^-4, 2×10^-4

No effect.

Protoporphyrin II peptideless: slaughtryne
Following observations:
\[ 2n-1, 2n+1, 2n+1+1, 4n+1, 4n-6, 1 \]
\[ 4n-2-2-1-1, 4n-2-1-1-1, 4n-2-1-1, 4n-2-1-1, 4n-2-1-1-1, 4n-2-1-1-1 \]

Law, PNAS 24:546 (1938) No effect on lethal mutation rate in Drosophila
Physical reactions, etc.  Theory

Beams + King '38 Bio Bull, coldlynum viscosity in Tritesin dividing cells.

Yal '38 B5CB20  Calodylate has no effect; colchicine inhibits preparations of lactic and citric dehydrogenase. No effect on succinic, glucose, or glycogen dehydrogenase.

Leim '41 - '42 B. R. CEN/41  Colchicine lowers the viscosity of A F. glycera egg in hypotonic sea water. All the gels (ital) not affected.

Smith '41 Abel P. De Pr 21:105  Cold did not inhibit diastase or invertase.  

aside from pH effects and surface tension

Wada '41 Cyb. 11:93  Viscosity of "attacto-plasm" reduced.

Wilbur '40 P5EBM 45:696  Anti. method

Cold reduces mitotic viscosity only, by 60% at first, which later catches up.
12 similar compounds tested. Mitotic shown (cell).

Acetabulin 27 R. Pfeffer 46/469 cells

Zavander '39 CR SB 430: 53

\[ \text{similar effects few details.} \]

Zavander '39 CR SB. Listed: ascorphthine
Ethyl magnesium phosphate, \( \text{CNH} \), \( \text{OEt} \), \( \text{PCl} \)
Heterocycl. \( \text{(CH}_3\text{)}_3\text{CNO}_4 \), \( \text{CH}_2 \), \( \text{AC} \cdot \text{OCH} \)
Zavander '39 CR SB 430: 432 comparison

with \( \text{CH}_3 \text{CHOH} \) inconclusive.

Dass '37 Phyt. Path. 27: 95 Ethyl magnesium phosphate \( \rightarrow \) polyplody, multinucleate cells.
Spindle + fragments are discernible.

Siminut + Zimochel '39 CR SB 130: 1057

\[ \text{Spindle not inhibited although cell and results are note coefficient.} \]

Nucleus fixation.

Colchicin '37 J Path. Bact. 44:469 Colchicin cannot be used in treating tumors in vivo or other tumors more affected.
Lahr and Riddle AJP 123:614 (1938) Croo colletutum vescicorum, endocervical analysis with colchicine.
contribution.
Chambers '17 J. exp. Zool. 23:483 Cell actin
is a hydrophobic gel. Centros some are fluid.
division by growth of actin.
Chambers '38 JCPP 12:149 Cell division
in echinoderm: polar streaming, cortical growth.
Cooper '41 PNAS 27:486 Spindle
fibers readily seen inducing kato mes.
of pediculopiosis graminum. Dc centrosomes
actin.
Foote & Stichell '05 A.J.B. 4:199 Smece
Gelrochphora fodulfera the spindle flow out
as an intact structure.
Lamb '08 J Exp Zool. 5:27 Hydrodynamics:
oscillating centers.
Meink '33 Am NYS 58:567 General
Bea & Malcovsky '27 Pr. 2:312
More 13.3 Exp 2.10:2.30 experiments on
Dendraster x Strongylumtotes crossed indicate
that cleavage rate is determined by the egg cytoplasm.
Cannon '23). Den '13.47 extension of
Sarn's hypothesis.
Coccolinumis: diffuse hibrid or host.

Molodintitiae
Svecas 6. Stork. 1 M 52:91.1931) UV photo
Hughes - Schaefer. J Morph 34:131 (1924)

Accromonum
Mitsy Ann Nat. LXXIV (743): 485 1935
Sccara

Mitsy Bid Bull 64:333 (1933) Scanna
Scott J Morph 59:485 (126) Micromalthus
Mitsy Cytologia 7:217 (1935) Scerag
Darlington, J. Gen. 37:341 (1929) M. divarica
White. PRB 125:516 '38 M. divisum Callimodes
Gower BB 43:18 v122 polyplody in bugs
Physical Observations

- Bailey '39 Chemo: Rate of chromosome movement measured. 5-3 μm/minute in different tissues

- Daz, Yama, and Hiro: 137 P. 28:66 movement of basipetal particles followed. Differential stretching of spindles in C-D.

- Wits '29 1S16 B85: 494 index of refraction, 1.405 in late anaphase. V infer

- End + Paller '34 P. 21:473 Viscosity curves in Histores, by centrifuge. Summarizes:

--- Graph ---

- Heidtmann
- Chambers
- Auffen, F-P
- Hootoff, Mato

Heidtmann '20 J. Exp. Zool. 30:211 Spindle formation associated with doubling of cytoplasmic viscosity followed by a drop.

- Anesthetic: EtO, CH₃, AcH, propylene, P₂O₂, H₂O₂, HCN, NO₂, CH₃CH(ON)₂, C₆H₃CO₂Et, Et₂NO₂, Et₂NHCO₂Et, Judd's spindle and gelation
concurrently, Hypermnesia C.D. but is antagonized by ether.

Heilbrunn '21, Exp. 200, 19417 are
above. Cumingia, cytoplasm 2-3 x 20
nucleus at spindle formation.

Turgut '35 PE8BN 33: 163 Centrifuging, 30,000G
for 1 hour, albumin.

nuclear cells.

chromosomes completely displaced.

spindle in a cone.

McLendon '11 Arch Ent. 31: 80 . 001 amp. 

anodic accumulation of basophile and chroomat
on spindle. . 003 amp. best dose. (-) charge on
chromatin, compared from acid and base.

Schedler '34 B. B. 67: 519 "reality of
spindle fibers." Centrifuge cyclophases.

binding of longitudinal elements
without the coagulation; previous
components exist.

centri.

half spindle.

chromosome
intracellular cycles.
Schade '31 2 w. 2 138:386 Prototonia + Synepris; Spindle tubes
Schade '32 w. 3 142:520 Haptotonia; + tubular intemodal + films
Schade '35 Cyt 6:422 Amphitonia
Schade '36 B 70:484 Kinetochore
Schade '40 Bid Sympos 1:87 Mitosis
Meier Bot Lab 72:113(1921) DC on pro cell.
Schade, J. Morph 68:123(1941) Anisochromy
elastic correction.

(60) Wilson, E.B. Chromatonic ideacrisis ideacrisis
J M 52: 429(1911)

Czechowsky & Klein B 72:384(1937) Gephrooles
Synchrony needle; a = 1, n. mem. (+).

Rhoads & Uchmann PNAS 43:36, 1943
peculiar range, preliminary (secondary
kinetochore.)

Pirq. S. Am. N. 77: 442-462 (1943) The naked
nuclei of spindle films; many chromosomes.

Vaginal smear.
Trumet '39 Nature 27:805

A thermocouple detects a temperature rise of 0.02° with peak near the end of mitosis, then a fall sharper than the rise. Triton parallel results.

Vlië '21 CRSG 85:494 Refractive index, S.H.

egg. peak of 1.405 just before end of segmentation.

Beam et al. '36 BB 71:188 150000 G 10m

Chick myo. cells. Nucleus stratified: nucleoli, chromosomes, euclerolisma. Spindle is lighter than cytoplasm, may be distorted by centrifuging as by shaking.

Footed '130 PD 11:177 Amb. Nicotiana. As the basis of weak evidence, lowest viscosity is at metaphase.

Laughlin '19 Can. Inst. Week 265 Statistical study on the men. By following the progress of a mitotic wave, the duration of various phases was estimated. This was analyzed against temperature changes at 10°, 20°, 30°. The
early anaphase has a Q10 of only .8546
Bela '29 22 Feb 10:73 Tradescantia
(hypotonic) accentuates importance to the
Stemmen's array in anaphase movements;
directed at the kistokines; chromosomes
fairly stiff.
Shimamura Cyt. 11:186 (1940) Cytol. 14:6, etc.
B2 Chemical strain

Allee, Findeel, and Gardner '41 Ann. Rev. 81:3125
dil. Cu⁺⁺ accelerates C. D. in Atracia

Reid '41 JB 28:410 Vit. C or

cells age

incongruent. High C values associated
with nuclear division.

Allee Findeel and Gardner '42 JCP 26

Cu⁺⁺ More complete account. Crowding
effect. Development accelerated.

Cleburne MA 15:2892 (1931) High K, low Ca
enhance "maturation" in Vicia, Arabis
Hence, RT J March 66:409 (1950)

X-Ray stimulation in mouse follicle

Nordahl '45 JNP 11:13. Nucleic acid in
regenerating livers.
Ellis '33 JCCP 4:127  see B66
August 21, 1939
Rec 73:17

Viability of cancer cells is higher and may be cause of abnormalities.
B6a. Cyanide, CO, NO, HCN, H2S.


can be fertilized in .006% HCN-saturated but

clearage does not proceed past prophase.

Blumenthal '30 Physiol Zool 3:539. Anthracia,

HCN(N/1000x - N/1000x), eggs proceed at least 1 hour

before being affected. No direct dependence on

oxygen availability presumed.

Celsius '33 see B6b.
Eisenberg '36 Trans Physiol. 16:94
EtOH, NaOH, H2O, oX, & H2O, M.W.
Ellis '33 JCB 4:127 Urechis caremo eggs.
F 4/100, [AcONa] 4/100, lactate 190 mg./lit.
[SH] -SH inhibited somewhat. CN-0.001M
inhibited, overcome by methylene blue and

dyeo E0  0.17  0.2 V. Carbohydrate
metabolism is non-essential.

Ellie '14 JBC 17:121 Various anesthetics
on the S. U. egg after the first change:
CN-  1/1000, CCl3H(OH)2, RNH2COET.

Et2O, CHCl3, paraflin, EtONO2, CH3NO2, CH3CN
chloroform are lethal at effective conc. 6NH4Ac +
chloroform were ineffective at 5% for 24 hours. Anoth
behavior based on surface properties.

Rosenthal '22 Arch exp 26:12:570 Et2O
Chromatin dispersal. Spindle dissolvd
for a large extent. Renewal of mitosis.

Shleifer '35 JBA 36:1258-9] 22 a
H2 12 hrs. 22-26°C, split, pseudo-bivalves
(C-pathec ?) 7.7 ± 1, Et2O, same; 70°.
sticky chromosomes, polyploidy.

Reduction '35. 3369.უია: division but abnormal development in OSIM 1328 H.

Trout '41. J.H. 30. Sulfanilamide - polymorphonuclear cells, mechanism still to be developed.

Dundary & Schiesser '38 Arch Exp Path Pharm 188:208

Caffein particularly inhibits cytokinins.

Rosenfeld '33 Arch exp 26: 17 NH<sub>3</sub>::

Severe clumping of chromosomes. Not due to 0.1% but to NH<sub>3</sub> itself.

Higashinari '37 Cyt. Fujii: 464 Tissue petals

CH<sub>3</sub>CH(OH)<sub>2</sub> - 19% polyplody, micrometals at walls. small spindle. Anaphase anomaly.

.25% nicotine, .25% caffeine No phagophore activity. Wall not formed. CT<sub>50</sub> had no effect hydration hypothesis.

Fibrous culture

Bulan,'33 Cyt. H.135. Tradescantia :
Methylene blue. long acronus. may inhibit meiotic prophase. Chromosome bridges.
Neutral red. Staining chromosomes.
Ether antagonized methylene blue
Blumenthal 28 Phys. Zof. 1. 269 acid

eggs sterilized in 5% MeCN 1.5% AcOEt
3% iPrOH, 3% mPrOH, 10% MeOH can be sterilized but don't cleave. CN superimposes an oxygen debt.

Edwards,'36 AJB. 223: 483 Neutral saltion Tea. No abnormalities. Lethal effects > \( \frac{M}{30} \).

Roswilin '40 CRAS 210: 544 Affine. Thymidyle
only wall formation is inhibited.

Haywood & Bock '32 JCCP 2: 177 Co2 inhibit
Lessened by NaHCO3. Permeability effect also.

Takmann & Andreas 13: 4 Pl Phys. Traces
No division < 18° > 41° opt. 28° (69 m.)
CO<sub>2</sub> C.D. bleb, in VsB, oil: EtO VsB bleb n. 6 m. CHCl<sub>3</sub> VsB 60 sec.

Fluorescein no flu.

Levin NE 133 Arch Exp 14: 464

11'3 J. Hapte. Hop Bul 34: 373

reversible gelation, spindle at pH 4.6

3.3 Ag NO<sub>3</sub> 15: 167 keratoy

isolated spindle and yielded split chromosomes as in cancer cells.

135 Arch Exp 17: 16 Fluorescein X

shishy chromosomes - terminal adherens,
mon-disjunction, pseudo-amitosis.

Suzoto Y. Osaka 141 Bot 17: 17

helograms + halide no mitotic data

Zinkenagel 132 BerBot 50: 134 Allison

Illuminating gas: a few hrs. disappearance
of spindle, polar chromosome movement,
entire.
Drude, 38 Ann. exp. Path. Pharm. 188:198
aut. pet. 10−4 inhibited enucleation of cells. The compounds mentioned. No cytology.
Eugai, 41 Cytology Sci. 21:101 homoeost of other compounds affect T. aestivum pollinised Nodulis.
Physical Agents

Breed & King '40 JCP low temperature
acutely inhibits because of amphotage

David & Challenger '32 2:311 Temperature
characteristic of Amoeba diminuta; C.D. 11,500
Ino. 11700 Aug. 20, 200. [see Mühlen '31]

Dragoin & Vlees '21 CRAS 72:1210

Dissociated pressure. Progressively: polymally,
alteration of actins, cytoactins, pyronoids,
granules, cytoplys.

Dragoin '22 CRAS 174:199 Recovery.
- 30 atm. Yes.
- 35 atm. 2 dies.
- 40 atm. No.

Freud '40 Acta histoq. med. 10:39
3-8°C. cold on newborns, yes. Cold
less parasous. Approx. Mitosis arrest in
normal metaphase.

Hilgren '38 P 30:427 Description of
Oncocystis → microspory. Hay occur in
nature thus.

Hovane '23 JASB 88:191 Dana ag. 0°-4°
achrometric figure unaltered. "Pelophase"
ncomplete, some chromosomes and fragments persisting without going into nucleus.

- Temper. Jund' 3/6. M.O.S. 8/24/3 11:02
- Semin. Temp. 1-24 hour recovery
- 30° C. 20 min. coagulation, 47°-50° wound current
- Septoria 45-49 metaphase block, initiation of spindle.
- Riccio, MB '33 Arch. Tep 11:46. Heat. Vulnerable
- prevented separation of the spindle.
- MacLeod 138 J CCP 12:57 Autolysis, hydrostatic pressure. 450 Atmos inhibited cortical division
- Patterson '41, '42 A JB 28, 628 Neutral red sensitizes Hordeum root tips photodynamically
- The radiation is 1.7500 W. R. = decrease in CO2, death...
- Please '41. Nagda 69: 405 treatment
Near chromosomes may form half-spindle which are functional & carry up chromosomes at metaphase. gel-col transformation related important imbrication movement and the spindle is comprised with the cortical gel.

Peralta & Cotton, 1939 CRAS 208:1686 Negative evidence for magnetic effect.

Vito & Dragoj, 1921 CRAS 172:1127

Osm. pressure in the middle of diastase, placed into sea water & sucrose. 30-60 atm. division rate lowered 60-100
cells in cell form.

W=nV. First division 4.09 ergs.

Stobell, Am. J. Biol. 84:123 (1942) Photosynthetic action, neutralized, fibroblasts. fixe

Creighton & Evans, J. 69:187 (1941) X-rays on Chondrophages.

Ehren, 1945

Carlson, J. G. J. Morph. 71:479 3 hr X-rays on Chondrophage mesoderm.

Carlson, J. G. 1941 Sym. 9:104 (1941)

Carlson J. Morph. 66:119 (1943) 250 x

Kamiya Cytologia (En) 10:26 (1937) O.C. + Tragose.
Stone, Ann Bot. 47: 815 (1933) X-rays
Cheese Dairy Bull. 72: 377 (1932) UV Ureidio
delay, pH variation and cleavage
Heidrich J Morph. 55: 265 (1933) X-rays, Rthropt
8 Relative oxygen lack

Anderson '28 Biol Bull 55:79 clog in
Algae is unaffected down to 11 mm. Change
ceases at < 4 mm

Andrews, F. '05 Ann Bot. 19:521 H₂ reversibly
inhibits: 1) Prophase 2) Wall formation 3) CO₂
inhibited all stages. Nitros late occurred down
to 3 mm O₂ in vacuo Tradescantia

Brachet '35 J. phys. de Biol 45:611 Anaerob.
Effects only after 15 hours. Then "prepyolytic"
figurations, vitreous nuclei, hyperpigmentation;
Nitros late occurs, cytoplasmic form, an
astites may degenerate to anastom. type. Separation
of cells from spindle

Laser '33 Bioch 2. 284:72 Chief fibro-
blasts can survive anoxia. Tumour like
metabolism

→ Harvey '27 Biol Bull 52:147 Alumina +
Strong concentration H₂, red. H₂ as O₂. Prophase
inhibition

Havard & Mendal '34 Bioch 3 28:1121
Expressed as Eq. Hemichordate, division down
$E_h = 0.2V$

Lyon '02 AJP 7:56 O$_2$ essential 10-15 mins after fertilization (anther+ovum, auxin grows!) sensitivity to CN-inematics as development proceeds.

De Hoog '95 AndroBiol Tradescantia.

H$_2$, wall-formation inhibited. Same, in CO$_2$, 7-8 cm H$_2$.

Nabokov '10/Barrett 22:62 Phaseolus roots cease mitosis in 5 hours of anoxia. Many bimolecular shoots of Phaseolus, Pisum, Helianthus, 23-40 hours anoxia stops mitoses with few bimolecular cells.

Stebbins '39 AJP 13:26 effect.

Horeau. Mitosis stops immediately, some protoplasts survive after 3-4 days in some specimens.

Steinietz. '43, '44 AJP. Effects on mitosis + meiosis. See reprint.
B9. Energy metabolism

Albirey '42 Zool. Colloquium, Calif. Univ.,
Avian coleoptile, 1st 72 hours. Cytochrome oxidase
system, not through Cyt. Time coincidence
enzymes and cell division only basic.

Fischer '41 BB 81:282a Benzoate inhibits
0.5-5% before toughening Cyt. . . . this in-
hibitor affects energy activity metabolism last.

Fischer '42 JCP 19:109 Breaks in O2
curve, at point of Cyt. blocks, in methanol con-
centrations, no evidence for 2 basic systems.


Macleod, Clower, Hecht '35 Biochem J. 25, O2
blocks division, ngs. Specificity:

Prophase: Astasia, Echimenes, ; All Shaggs,
Asterea; Metaphase: Cusningen, Nerio
Mathews '07 Ap 18, 85. Nucleus releases
oxidease, cistus have substrate . O2 needed
for division. Recently confirmed. Various
inhibitors employed

Voegtlin, Chalkley '35 Pl 24, Amerika
H2S, H2SO4 inhibit prophase; O2 ineffective.
Phyocerat & Willmer '39 J. Exp. Biol. 16: 232
Phyocerat & Willmer '39 J. Exp. Biol. 16: 232
Styce-aldehyde inhibition of direct glycolysis and growth (T.T.C. - Chick periosteal fibroblasts)
Conclusions: direct (starcholytic) glycolysis without phosphorylation supplies the energy. Evidence is clear and really contradictory. Other aldehydes have varying effects on CD. 0.02 M F, 0.0005 M NaCN, 0.001 M HCN, inhibit growth at proper levels.
0.007 M NaCN after 1 hour mitosis occurs and 95% CO no effect
0.001 M NaCN little inhibition
0.01 M malonate, fumarate had no effect. After starvation, lactate stimulated mitosis. "Growth by CO is intimately connected with direct non-phosphorylating glucose breakdown" Buckland & Ramshorn. 33 Planta 28: 371 1954
>1.0 dismeristene. Fermentation, &OH, AcOH, and alcohol dehydrogenase; & probably aldehyde & are found thus.
The O.C. is lower than in connective tissue.
Voeghtlin, Challenge '35 p. 24: Amoeba

H₂S, HCN inhibits mitosis—prophase. CO is ineffective except in complete lack of O₂... mitosis per se is independent of respiration.

Et₃O: irregularities in fission. 

Na₂As₂O₃ does not affect nuclear division, but inhibits cell division. 

H₂O₂, As₂O₃, H₂O₂, CuCl₂, HgCl₂ have no influence. CO₂ inhibits prophase. HCN is redundant.
The Krahl-Cholera et al. Service
as Telft's Institute. Cell division.
Complete Absorb. J. C. pagins.
2. " 19 JGP 20. 173
3. " 140 JGP 28. 401
4. " 140 JGP 23. 413
5. " 141 JGP 14. 997
6. Telft, Cholera, Krahl, Cholera 42 JGP 25. 717

1. @ 8 x 10^-M, 5 x 10^-N x C. e C. (Avboling g. receta man
6 x Hul (A. F. 3 x Hul. F.) CO 1 x VOB 21 x (6 x bynd 2
pH. 9 x VOB 2) x s. w. (6 x bynd in + b. w.) s/v a p. pl
10 g) 6 x p. d. edd. e. trn f. n. p. l. trn clothed
trn e p. e. ph. in mol: a r y. r. o. r. s. m. spl. g. Hul
o. act. x e r a. l. f. p. l. d. p. i. i. n. p. B. f. VOB 0.1 x
Us p. r. n. n. p. I + d. Trn e r a. s. c. a. r. e. 5
of OC g. Hul C. + C. Trn. P. n. s. d. e. Hul. e. i. i. p
n. 0.0 25 M @ 0.0025 M 5 C. F. 0.6 M 0.6 C.
F. F. 10 Z U + 0.6 0.6 M Ullin VOB DSC.

@ ZD. U. H. C. H. CO 1 x M u. Ull. UCC
of max @ C p' + C p T d. d. s. I. b. l. +
+ 1 U. 9 VOB. E. p. e. e. e. s. u. V. F
add. L + 1 U. d. u. n. u. = R. H. H. a. t. .
Fe found: 4.4% 
Cot found: 3.5% 
Cot calc. 3.2%

CoCl\(_2\) 2H\(_2\)O: 4\% C, 4.9\% H, 21.8\% Cl, 51.3\% O, 300 \(\text{mM}\) 

KOH: 0.25 \(\text{M}\) 

CuCl\(_2\) 2H\(_2\)O: 1.8\% C, 3.2\% H, 15.4\% Cl, 52.8\% O, 34\% Cu 

CaCO\(_3\): 100 \(\text{mg}\) 

MgCO\(_3\): 100 \(\text{mg}\) 

MgCl\(_2\): 100 \(\text{mg}\)
I...
6. Fe (II) homog. use molybdate CbHDr,
PbB: use Pt

7. Co-carboxylase in U. F. g. 2.3 X 10^2
DTP after Hg. Lactobacillus attaches pyruvate
at aerobically. F. g. 2.0 ± 0.2
Oxygen consumption

Atlas '38 Physiol 11:278

Pan, even

respiratory curve from fertilization

\[ \gamma = ae^{kt} \]

Brett '41 A JB 28(10):1s condutor \( \frac{302}{2} \)

with mitotic frequency, young leaves.
B9.

Red sea 135 Exp Bird 12:27 R.Q. of developing
Tunica eggs about 1.05

May 24 B.R. 1:225 in the chromis
egg, random fluctuations in O.C. bear
no visible relationship to the cleavage cycle.
Strong oxidation inhibits C.D. The physiological role of SH is to act with O₂ in regulation of enzyme synthesis, and thereby cellular growth.


Lettier, Nealde & Salter '37 Am. J. Cancer 31: 268
The extent of N₂ spacing by glucose is proportional to the mitotic index in various tissues. May be related to glycolysis into nucleic metabolism.

Voegthii '34 Symp. Am. Biol. 14: 274 Synthetic protease require -SH, glycolysis...

nuclear growth...

Willmer '42 J. exp. Biol. 19: 11 Phosphatase found in chick endothelium culture chromosomes.

Casperooss 138 Chr. 1: 147 Somphocereus:
increased nucleic acid absorption spectrum before mid-leptotene, constant till diplotene.

Dallinger '40 J. Am. 40: 185 Cold lab.
reduction of chromosome in heterochromatistic segments of these + Williams
BII.

Allen, Smith, Jander, 137 A. J. p. 61
acidified colchic used to accelerate growth effects of thelin

Pecquet, '41 Botan. Notizen 310 isolated
Triticum roots. C.D. & elongation vary inde-
pendently of glucose.

Commoner, '40 Biol. Rev. CN analysis.
CNsb protein! constant over a wide
range of materials, about 5% total. Not
affected by temperature change RA = 0.8
CNsens RA = 1.0

Commoner & Thimmann '41 J. B. P. 24, 279.
argin binds the C.G. & growth & respiration
only 10% of respiration important.
Hamp '42 Physiol. Photodynamic action in amoeba lowers protoplasmic viscosity 30%  
Blumenthal '27 Biol. Bull 5:2313 HCN N/3000
- M/2000 increases the rate of water-hemolysis in hypotonic sea water, or
- washes out HCN. HCN causes a decrease in volume, perhaps due to hydrolysis to OH
- Carrauelli, Roger, Rapport '42 AIP 85:309
- Hypotonicity lowered O.C. brain tissue
- 85, stimulated O.C., inhibited by Ca++.
- Cooper and Schulte '40 PNAS 26:537 Nuclei
- and perinuclear cytoplasm have a high concentration of ribose nucleic acid in
- many materials.
- Chalkey '37 Pk 28:489 Nucleopaste,
- -SH test in amoeba. Different sites in
- mitochondria. -M nucleic membrane disaggres
- -SH is discharged into cytoplasm.
Ball '41 Wisc. Symp. Resp. Enzyme
CN reduces cytochrome. U. F. Adrana, cytochrome is linked to flemi.
Agide combines with both oxidized and reduced forms of cytochrome oxidase.
Barrett '42 J. Exp. Biol. 19: 88 Ascorbic acid is localised in cell membranes.
Amaro '38 J. Exp. Path. 10: 549 Uric acid found in many nuclei.
Horni '41 JEP 17: 7! Histochemical for acid phosphatase determinations.
Hoagland & Bray '36 Pl. Phys. 11: 471 Aerobic metabolism is a necessary condition for salt accumulation in roots.
Howard & Stumpholz '40 JEP 15: 249.
Arena: \(1 \times 10^{-3} \text{M} \) growth inhibitor
in 24 hours 30%, 9-10 hours 30%, argin does not appreciably stimulate
w. Huntel '41 Anad. Rec 81:375, 376 for
although change metabolizer of chitin egg
thoughts to -infrmmoly semi permeability
Hutchison, Keltch, Kibbe, Brames '42 JCP
Carbohydrate, lactose, NH\(_3\), q.v.
Zellie '18 ANP 45:406 Metabolism necessary
for semi-permeability of seauhin egg. The fur-
tilized egg is more penetrable. CN, diethylamino acetate
permeability increases.

Nasney & Harvey 35 Bid Bull 69:342
The pumice does not contain most of the
cytochrome oxidase activity. also:
Sheppie '35 JCP 6:701
Havard '35 Br. J. Radiol. 8: 787 20000 R
X-rays had no significant effect on the activity of lactose, glucose, citric or succinic dehydrogenase preparations, (or, cytochrome oxidase).
Albert and Walley, '42 SC 144: 697
Cytochrome + cytochrome oxidase do not appear in the chick embryos before the 5th day, + N2 does not inhibit either.
Kitching '39 6 B. 77: 339 Brora Lamarcus
C. 25 mm cytochrome oxidase, eventually, reappears, not due to CO loss. Administer
C3

Heilbrunn, 24 AJP 68; 645 Heaf and viscosity

Cummins:

\[ \mu \]

\[ 0 \quad 16 \quad 32 \]

Northern '40 Ann. Heri Soc Tr. 59; 279

cyclic or distinct viscosity increase in
Sporozya viscosity with MB, mutated.
Hoffman '33 Bot Mag. 95: 279 Allium cepa.
The stelle arises from 2-4 cells at the distal end. A puncyca is first differentiated, then large cell enlarges and grows longitudinally yielding the central vessel. Duct to sterile histogamy is thicken of 3-6 x 1 x cell. Cortical cells develop from minute root cap from base of leaf.


2. Medium for pollen tube cultivation:
2g sucrose
0.5g agar
0.5g gelatin
2.5cc water
D (Feb 20, 1942)

Johnson, Bunn + Naslund (1942, Science 95: 203)

Temperature, pressure, and composition

Leprince and Magee, JCP 26: 154 (1952)

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62:2264, and 63:1517 (1941) — Quenching
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potentials and steady-state state.
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Histological classification of tumours

Sarcomatous

Fibroma: connective tissue
Chondroma: cartilage
Chordoma: chordoid ossicle
Asteoma: bone
Myxoma: mucous
Lipoma: fat
Angioma: blood vessel
Lymphoma: lymphatic

eosarcoma: cellular tumour of above
Myxoma, myxosarcoma,

leiomyoma: smooth

ehthymoma: striated

Neural

Neuroma
" ganglionic

eopoma: gliotic tissue
Neuro-epithelioma: epidermoid

Endothelioma

Epithelioma: occurring
Papilloma: parenchymal or subepithelial supporting tissue
dermal, glandular
Epithelioma: atypical arrangement
epidermoid: glandular, atypical
Consider critically:
1. Spindle relation + Heilbrunn's determination of cytoplasmic relations.
2. Viscosity effects of anesthetic
3. Actual viscosity effects of colchicine
4. Actual cytophological effects of anesthetic
5. Generality of colchicine effects + the fundamental identity of mitosis (physical)
6. Enzymatic effects of colchicine
7. The gradient + experimental conditions
8. Morphology of mitosis, etc.
9. Protoplasmic structure relations...
10. Do energy specifically required for C.D. or the maintenance of spindle
11. The use of inhibitors, etc., in your work.
Experimental Plans:

1. The fine cytological effects of CN, Na$_3$N, phenylmethane, melamin, and colchicine on excised rice in culture at rigidly controlled experimental conditions.

2. If intracellular gradient is confirmed, effects of variation in temperature, oxygen, pH, and other reagents on it.

3. Microchemical tests for the distribution of absorbed colchicine.

4. Electrical effects on colchicineized cells.

5. High pressure on allium and partly colchicineized cells, for additive effects. I see Harkness at NYU. See please about him.

6. Antagonism with hysteresis.

7. Confirm quenching of eosin fluorescence, and determine possible photodynamic relationship.

8. If the colchicine gradient is activated, the effects of CN and other metabolic inhibitors on the absorption and accumulation of colchicine by the root cells. I see Hoagland 367.
9. Look for possibilities in solution's ultracentrifuge
bacteriology
Virus
1. Chemistry
2. Physics
3. Transplant
4. Mutation
5. Medicine
6. Treatment
7. Pathology
8. Metabolism

Bacteriophage

Northrop
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see for references

______________
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ela chloro- allantoic supports many viruses
Marten Stolle + Nahrung 1390 BC 130.686
W. metabolism
Scholes 36 BB 70:484 kundstücke
Carnotus'36 BB 71:469 acriidal:
spinile, etc.
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## Summary: Collinear Riders

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