	Hersteller	Präparate		Wirkung an Fibroblasten 8^h	Wirkung auf die Auswanderung von Leucocyten (16^h)					
				10^{-4}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}
Stoffe bakterieller Herkunft	KAHNT	Proteus-Polysaccharid-Fraktion		∅			+	+	+	+
	SHEAR	*S. marcescens*, Polysaccharid		∅		+	+	+	+	∅
	MORGAN	Shiga specific Polysaccharide		∅			+	+	+	∅
		Shiga full antigen		∅			+	+	+	+
	Travenol Labs.	Pyromen		toxisch 10^{-6}			−	±	+	(+)
	LEDERER	Lipopolysaccharide	aus Brévannes		−	∅				
			aus BCG			∅				
		Phosphatide	aus $H_{37}Rv$ Tb	∅	+	+	∅			
			aus Brévannes		+	∅	∅			
			aus M. phlei	∅	−	+	∅			
			aus M. smegmat	∅	−	−	∅			
Stoffe tierischer Herkunft	BENZ	Schwangernharnextrakt		∅	+	+	+	∅		
	MEYER	Chondroitinschwefelsäureester			+	+	∅			
	SMITH	Polysaccharid A (Heparin)			+	+	∅			
		Bloodgroup substances	High A, Low H		+	∅				
			Low A, High H		∅	∅				
	HERRMANN	Gastric Mucin Polysaccharid			−	∅				
	McCREA	Sheep Salivary Mucoid			∅	∅	∅			
	GOTTSCHALK	Virus Receptor aus Speicheldrüsen		∅	∅	∅	∅			

Legende: + Förderung der Leucocytenemigration; — Hemmung der Leucocytenemigration; ∅ keine Wirkung.

Summary

Different purified polysaccharides, mucopolysaccharides, phosphatides and carbohydrat-sulfonic acids have been investigated for their effect on stimulation of leucocytic migration *in vitro*. The bacterial polysaccharides of proteus, *S. marcescens*, shiga and shiga fullantigen, have been found to be of high specific activity. All other compounds have much less or no activity. Therefore it might be concluded that the type of bacterial polysaccharides which promote leucocytic migration belong to a highly specific group.

X-Ray Inactivation of Saccharomyces During the Budding Cycle

A previous study of ultraviolet inactivation of baker's yeast during the budding cycle[1] established biological referents for all aspects of the ultraviolet survival curve. It was shown that the target value and rate of logarithmic inactivation are related to the desoxyribosenucleic acid (DNA) content of the cell and that the length of the shoulder portion of the curve prior to the onset of logarithmic inactivation is conditioned by the nucleoplasm/cytoplasm ratio. The remarkably great resistance of baker's yeast to X-rays made difficult the extension of such an analysis to the X-ray survival curve. However, conditions have been determined for obtaining the comparatively sensitive tetraploid yeast, 11294 × 11296, of the Carbondale Breeding Stocks in an unbudded condition so that the first budding cycle proceeds in good synchrony.

Cells were grown for 48 h at 30°C in 25 ml of the following broth contained in a 250 ml flask: Budweiser liquid yeast extract, 25 ml; glucose, 30 g; KH_2PO_4, 2 g; $MgSO_4$, 0·5 g; distilled water to 1 l. Following incubation the culture exhibited less than 5 per cent budding and each cell possessed a complement of numerous prominent mitochondria indicating physiologic quiescence. In order to obtain yeast populations at various stages of

[1] A. SARACHEK, Exptl. Cell Res. *6*, 45 (1954).

the budding cycle, the non growing cells were added to fresh nutrient and shaken at 30°C. After 50–55 min incubation, the first small buds arose. The first budding cycle was completed by 125 to 130 min incubation.

Microscopic examination revealed that budding begins in good synchrony; 70–85 per cent of the cells showing small buds between 55 and 75 min. The rate at which the buds developed after their initial appearance was quite variable throughout the remainder of the cycle. However, since the DNA content of the cell doubles with the inception of budding[1], it was assumed that, regardless of variations in the size of buds during growth, an essentially synchronous series of nuclear changes was being examined.

For irradiation, cells were harvested after various periods of incubation, washed once in M/15 KH_2PO_4 and resuspended in M/15 KH_2PO_4 to a concentration of approximately 5×10^5 cells/ml. Forty milliliters of the suspension contained in a sterile petri dish was irradiated at a rate of 1000 r/min with radiation emitted by a tungsten target tube operating at 180 KV/20 ma, 2 mm AL total filtration. Survival determinations were made by plating in a medium consisting of the broth described above solidified by the addition of 2 per cent agar.

Table

Time of Incubation	Target Values	Inactivation Rates
min		
0	3·5	0·101
55	1	0·037
75	1	0·027
90	1	0·035
120	1	0·042
135	1	0·042

Changes in the target values and inactivation rates over the course of a single budding cycle.

Control interphase cells yield sigmoid multitarget survival curves with an average target value of about 3·5 and a rate of logarithmic inactivation of 0·101 (Table). However, the survival curves of cells throughout the entire budding cycle are exponential (target value 1). At the inception of budding the rate of logarithmic inactivation decreases markedly with respect to that of the control. After 55 min incubation, the inactivation rate drops to 0·037 and after 75 min incubation drops still further to 0·027. By 90 min incubation, the inactivation rate rises to the value observed at 55 min and remains at that level until 120 min at which time it rises again to 0·042. Between 120 and 135 min incubation, when the second budding cycle is about to commence, no significant change occurs in the X-ray sensitivity of the cells.

These results agree well with the earlier studies by DARLINGTON and LACOUR[2] of the relation between chromosome breakage and the nucleic acid cycle. These workers demonstrated that the accretion of nucleotides by chromosomal structures rendered these elements resistant to breakage by X-rays. It is observed here that as nucleotides are produced during the early phases of the budding process, the resistance of the yeast cell to X-ray inactivation greatly increases, and that as dechromatinization of the chromosomal structures occurs during the middle and later phases of the budding cycle the cellular resistance to inactivation decreases. The fact that the inactivation rate at the completion of the budding cycle does not fall to a value equal to that of the original interphase cells, together with the observation that the survival curve does not return to a sigmoid form, may reflect the fact that complete dechromatinization does not occur in cells of an actively dividing population.

These observations provide additional support for the earlier presumptive evidence[1] indicating that the inactivation of yeast cells by X-rays is in large part a consequence of the induction of chromosomal aberrations.

This work has been supported by research grants from the U.S. Atomic Energy Commission and the Office of Naval Research NR 164–140.

A. SARACHEK

Biological Research Laboratory, Southern Illinois University Carbondale, Illinois, March 3, 1954.

Zusammenfassung

Es wurde die Beeinflussungsmöglichkeit der tetraploiden Hefezellen durch Röntgenstrahlungsinaktivierung während besonderer Stadien der Keimungsdauer untersucht. Das Kurvenbild der überlebenden, nichtkeimenden interphasen Zellen ist sigmaförmig und ergibt einen Zielwert 4 (target value 4). Die Kurvenbilder der Zellen sind während aller Phasen der Keimungsdauer exponential. Nichtkeimende Zellen zeigen der Inaktivierung gegenüber ein Mindestmass an Widerstand, Zellen im Mittelpunkt der Keimungsdauer ein Höchstmass an Widerstand. Aus diesen Versuchen darf man schliessen, dass eine Wechselbeziehung zwischen der Röntgenstrahlungssensibilität der Zellen und des Kernsäurezyklus während der Mitose besteht.

[1] A. SARACHEK, and W. H. LUCKE, Exper. *9*, 374 (1953).

Der Einfluss der Pantothensäure, des Pantethins und des phosphorylierten Pantethins auf die Carotinbildung bei *Mucor hiemalis*

Die Pantothensäure ist als wesentlicher Bestandteil im Coenzym A eingebaut. Wie man weiss, spielt das Coenzym A bei den Acetylierungsreaktionen eine wichtige Rolle.

Unsere bisherigen Arbeiten über die Biosynthese der Carotinoide haben ergeben, dass die Essigsäure als eine primitive Vorstufe der Carotinoide anzusprechen ist[1]. Somit stellt sich die Frage, ob das Coenzym A nicht auch die Bildung der Carotinoide beeinflussen würde, wie dies auch schon ARNAKI und STARY[2] angedeutet haben.

Über die ersten Ergebnisse der Experimente mit Pantothensäure, Pantethin und phosphoryliertem Pantethin, welche im Coenzym A (siehe Konstitutionsformel) eingebaut sind, soll hier kurz berichtet werden. Es standen uns Präparate von Pantethin und phosphoryliertem

[1] M. OGUR, S. MINCKLER, and D. O. MCCLARY, J. Bact. *66*, 642 (1953).

[2] C. D. DARLINGTON, and L. F. LACOUR, J. Genetics *46*, 180 (1945).

[1] E. C. GROB, W. H. SCHOPFER und G. G. PORETTI, Int. Z. Vitaminforschg. *23*, 484 (1952). – E. C. GROB und R. BÜTLER, Exper. *10*, 250 (1954).

[2] M. ARNAKI und Z. STARY, Biochem. Z. *323*, 367 (1952).