insects transferred from treated to untreated diet as in insects continued on chronic treatments suggested that, after a time, an enhanced degradative system was destroying the toxicant before it reached the site of action and the inhibited enzyme was being replaced at a characteristic rate. However, experimental evidence did not support this conclusion. In daily comparisons of weevils that were fed sublethal treated diet or untreated diet, we have found (1) that both groups degraded non-toxic, topical doses of C^{14}-labeled Bidrin at equivalent rates, (2) that weevils held on treated diet were always more susceptible to topical and oral doses of Bidrin than those from untreated diet, and (3) that the in vitro inhibition of ChE by OP insecticides was always significantly greater in insects from treated diet.

Detailed investigations of these preliminary findings are in progress and will be reported later.

Zusammenfassung. Bei Imagines von *Anthonomus grandis* Boheman die kontinuierlich mit nahezu letaler und letaler Dosis phosphororganischer Insektizide gefüttert wurden, konnte eine befristete zunehmende Hemmung der Cholinesteraseaktivität beobachtet werden. Trotzdem die Behandlung nicht unterbrochen wurde, gewann das Enzym die fast normale Wirksamkeit wieder zurück.

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Entomology Research Division, ARS, USDA, College Station (Texas USA), September 28, 1964.

Quantitative Distribution of Glucose-6-Phosphate Dehydrogenase and Isocitric Dehydrogenase in the Human Nephron[1]

The broad purpose of our investigations is to determine quantitatively the activity of enzymes in the different anatomical units of the human kidney in health and disease. The ultramicrotechniques developed by Lowry[2] for analysis of brain tissue were adapted for analysis of renal tissue[3]. Immediately on removal from the body, the biopsy specimens of 4 healthy kidneys, weighing a few milligrams, were frozen rapidly in liquid nitrogen. Serial sections of 16 μ thickness were cut with a microtome in a cryostat at 20°C. Alternate sections of frozen-dried tissue were stained by means of the periodic acid-Schiff technique, counterstained with hematoxylin and studied under a microscope. When the various parts of the kidney had been identified in the stained sections, they were cut out of the adjacent unstained section with microscalpels (at 40–100× magnification). The dissected specimens were weighed on a quartz fibre fish-pole balance, useful range 5–50 mμg. Both dissection and weighing were done in a room maintained at low humidity (< 40%) and constant temperature (18–20°C). In addition, homogenates from lyophylised tissue were prepared. Specimens were assayed to determine glucose-6-phosphate dehydrogenase (G-6-PDH) and isocritic dehydrogenase (ICDH) with the kinetic data given elsewhere[4].

Distribution of glucose-6-phosphate dehydrogenase and isocitric dehydrogenase in the human kidney expressed in MKH units

Structure	G-6-PDH	ICDH
Homogenate	0.248 (0.118–0.502)	4.17 (2.22–6.79)
Glomerulum	1.539 (0.567–2.410)	2.26 (1.05–6.29)
Proximal tubule	0.929 (0.698–3.070)	17.26 (9.93–29.70)
Distal tubule	1.432 (1.045–1.590)	41.51 (26.2–63.5)
Collecting duct	–	37.5 (21.6–53.4)
Arteriole	1.419 (0.685–2.220)	1.58 (0.15–3.00)
Capsule	0.480	5.27 (4.44–6.71)

Means, and in brackets the least and the most active measurements, are given. 129 identified tissue pieces were used for the analysis of G-6-PDH and 179 for ICDH. Collecting ducts, arteriolar and capsular tissue were not available from all 4 biopsies.

To our knowledge no quantitative enzymatic data for the human nephron have been reported so far for G-6-PDH and ICDH. It seemed therefore important to make available typical results as given in the Table. Activity is expressed in moles of substrate split per kg tissue per h at 37°C (MKH). Accuracy and reproducibility of the method employed here, variation in enzyme activity within a species and individual variations from nephron to nephron have been discussed elsewhere[5].

The topography of enzyme activity in the human nephron in health has shown in general lower activity in the glomerulum than in the other parts for many enzymes, with the exception of acid phosphatase[6]. Glomerular G-6-PDH activity is very high and surpasses the distal tubular one. One might assume therefore an especially active pentose-monophosphate shunt in this structure. Activity of arteriolar tissue is similar to the glomerular activity for both enzymes. The results for ICDH parallel in magnitude those for malic dehydrogenase, as would be expected from another enzyme of the Krebs cycle[4].

Zusammenfassung. In den einzelnen Abschnitten des menschlichen Nephrons und in Nierenhomogenaten wurden quantitativ die Glucose-6-phosphat-dehydrogenase- und die Isozitronensäuredehydrogenase-Aktivität gemessen.

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Medizinische Poliklinik der Universität Basel (Switzerland), January 29, 1965.

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