surface and not those in close proximity to the micelle surface, so giving a low hydrogen ion determination. These discrepancies between ORD and CD determinations are being further investigated.

(1) S. Bonkoski and J. H. Perrin, *J. Pharm. Pharmacol.*, **20**, 934(1968).

S. Bonkoski
J. H. Perrin

School of Pharmacy
University of Wisconsin
Madison, Wisconsin 53706

Received June 25, 1969.
Accepted for publication August 1, 1969.

The Biogenesis of Gramine

Keyphrases ☐ Gramine biogenesis—literature correction ☐ Tryptophan relation—gramine biogenesis

Sir:

Many years ago I demonstrated (1, 2) that *dl*-tryptophan-β-^{14}C fed to sprouting barley, is transformed into the alkaloid gramine in which the ^{14}C is located in one position, corresponding to that in the administered tryptophan, strongly suggesting that it was a precursor of gramine. This was one of the first demonstrations, using a radioactive compound, that an alkaloid could be formed from an amino acid.

In a recent paper (3), Digenis states "Based on other tracer experiments and the fact that tryptophan was formed in *Neurospora* by a condensation reaction between indole and L-serine, Bowden and Marion suggested a reversal of the above-mentioned tryptophan biosynthesis could possibly lead to indole and L-serine in barley. This suggested that the indole could subsequently react in a Mannich-type reaction with formaldehyde and dimethylamine to produce gramine." Later in the paper the author continues, "However, Leete and Marion were able to show that the bond between the 3-position of the indole nucleus and the side chain of tryptophan remained intact during the biosynthesis of gramine in barley, thus disposing of the hypothesis of Bowden and Marion described above."

An examination of the only two papers I have published (1, 2), to which Digenis refers, will show that in them no theory on the biogenesis of gramine from tryptophan is proposed or implied. The only conclusion reached was, I quote, "that tryptophan is a precursor of gramine in barley," a conclusion that has been amply justified by subsequent investigators.

(1) K. Bowden and L. Marion, *Can. J. Chem.*, **29**, 1037(1951).
(2) *Ibid.*, **29**, 1043(1951).
(3) G. A. Digenis, *J. Pharm. Sci.*, **58**, 39(1969).

K. Bowden

Smith Kline & French Research Institute,
Welwyn Garden City,
Herts, England.

Received May 21, 1969.
Accepted for publication August 11, 1969.

Drug Transport I: Effect of Potassium Ion on the *In Vitro* Transfer of Several Drugs Across the Rat Intestine: Preliminary Observations

Keyphrases ☐ Intestinal transport, drug—K^+ effect ☐ K^+ substitution of Na^+—*in vitro* intestinal transport

Sir:

Recent work in our laboratory concerning factors that affect drug transport has resulted in several interesting, preliminary findings as to the effect of replacing Na^+ with K^+ on the transfer of several drugs across the everted rat intestine.

Sprague-Dawley rats,[1] weighing approximately 250 g., were fasted 20–24 hr. prior to the experiment. Water was allowed *ad libitum*. The experimental method for preparing the everted rat intestine preparation has been described previously (1). After severing the intestine at the pyloric junction, the first 15 cm. of intestine are discarded and the following 20 cm. are divided into two 10-cm. segments. The most proximal segment is designated Segment 1, and the distal portion is designated Segment 2. A modified physiologic Kreb's bicarbonate buffer,[2] pH 7.4, was prepared to contain a total cation

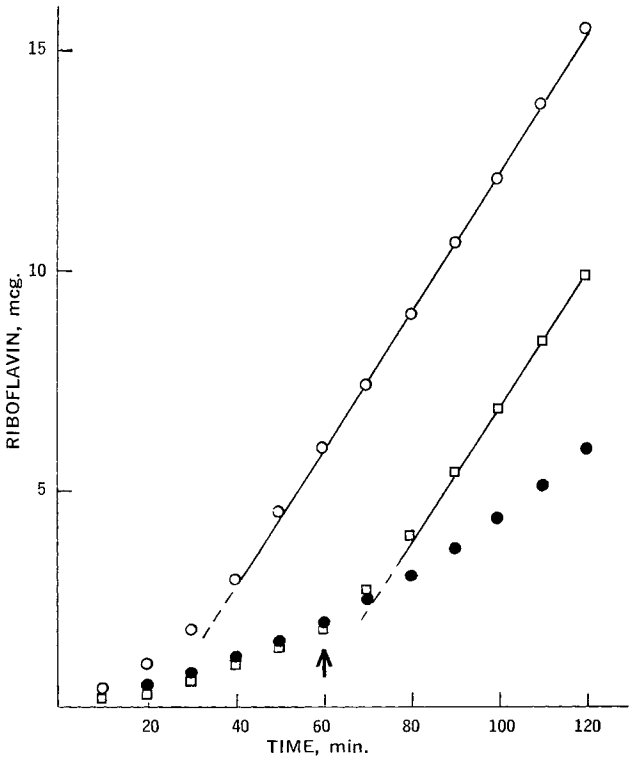

Figure 1—*Cumulative transfer of riboflavin across the everted rat intestine. Mucosal concentration maintained essentially constant at 20 mcg./ml. Key: (○), Na^+-buffer; (●), K^+-buffer; (□), K^+-buffer for 60 min., then placed into Na^+-buffer (arrow). See text for details.*

[1] Blue Spruce Farms, Altamont, N. Y.
[2] KCl, 5 m*M*; KH_2PO_4, 6 m*M*; $NaHCO_3$, 26 m*M*; NaCl *q.s.* 154 m*M* cation ($Na^+ + K^+$).