

Stanford




Ralph Rabkin

Professor of Medicine, Emeritus

Medicine - Nephrology

 NIH Biosketch available Online

 Resume available Online

Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Medicine - Nephrology

HONORS AND AWARDS

- Glaxo-Allenbury Award for Research in Endocrinology and Metabolism, Glaxo-Allenbury Award (1969)
- Kidney Research Award, 1974 Charlotte Roberts Trust Fund (1974)
- Fellow, Royal College of Physicians and Surgeons, Royal College of Physicians and Surgeons, Glasgow (1982)
- Member, American Society of Clinical Investigators, American Society of Clinical Investigators (1982)
- Training Award, Juvenile Diabetes Foundation International (1989)
- Fellow, American Heart Association (2003)

PROFESSIONAL EDUCATION

- MB, MBChB, University Cape Town, Medicine (1960)
- MD, University Witwatersrand, Medicine (1975)

LINKS

- Medicine:Nephrology: <http://med.stanford.edu/nephrology/research/faculty.html#>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I am an Active Emeritus Professor Medicine/ Nephrology at Stanford University. I began my long career in investigative medicine over 40 years ago. My first major contribution was one of the earliest randomized clinical trials evaluating beta-blockade for angina (Rabkin R et al. The prophylactic value of propranolol in angina pectoris. *Am J Cardiol.* 1966;18:370-83.). Moving from clinical investigation, (e.g. The effect of renal disease on the renal uptake and excretion of insulin in man. Rabkin R et al, *NEJM*, 1970, 282:182-187), my research became more basic orientated and focused on the renal metabolism of peptide hormones (Factors influencing the handling of insulin by the isolated rat kidney. Rabkin, R. and A.E. Kitabchi. *J. Clin. Invest.* 1978, 161:169-175. The handling of immunoreactive vasopressin by the isolated perfused rat kidney. Rabkin, R et al. *J. Clin. Invest.* 1979. 63:6-13). More recently I have focused on the mechanisms accounting for the resistance to growth hormone, insulin-like growth factor-1 and amino acids in uremia to explain their role in the impaired body growth and muscle wasting that is common in chronic kidney disease (CKD) (Schaefer F, Chen Y, Tsao T, Nouri P, and Rabkin R. (2001). Impaired JAK-STAT signal transduction contributes to growth hormone resistance in chronic uremia. *J Clin Invest* 108: 467-475) Chen Y, Sood S, McIntire K, Roth R, Rabkin R. Leucine stimulated mTOR signaling is partly attenuated in skeletal muscle of chronically uremic rats especially when work overloaded. *American Journal of Physiology. Endocrinology and metabolism.* (2011) 301, E873-871. Intrigued by my

findings in rats with CKD, that exercise can correct some of the skeletal muscle abnormalities in signal transduction and IGF-1 and myostatin gene expression, I have been motivated to go from the bench to the bedside, and have brought together an outstanding group of clinical investigators with expertise in exercise rehabilitation as well as clinical trials in CKD patients and together we are embarking on a 4 year VA Merit Review Funded study "Exercise to Prevent Muscle Mass and Functional Loss in Elderly Dialysis Patients".

CLINICAL TRIALS

- Exercise to Prevent Muscle Mass and Functional Loss in Elderly Dialysis Patients, Not Recruiting

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Medicine (Masters Program)

Publications

PUBLICATIONS

- **Impaired renal growth hormone JAK/STAT5 signaling in chronic kidney disease.** *Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association - European Renal Association*
Wiezel, D., Assadi, M. H., Landau, D., Troib, A., Kachko, L., Rabkin, R., Segev, Y.
2014; 29 (4): 791-799
- **Acute uremia suppresses leucine-induced signal transduction in skeletal muscle.** *Kidney international*
McIntire, K. L., Chen, Y., Sood, S., Rabkin, R.
2014; 85 (2): 374-382
- **Acute Acidosis Attenuates Leucine Stimulated Signal Transduction and Protein Synthesis in Rat Skeletal Muscle** *AMERICAN JOURNAL OF NEPHROLOGY*
Sood, S., Chen, Y., McIntire, K., Rabkin, R.
2014; 40 (4): 362-370
- **Epiphyseal growth plate growth hormone receptor signaling is decreased in chronic kidney disease-related growth retardation.** *Kidney international*
Troib, A., Landau, D., Kachko, L., Rabkin, R., Segev, Y.
2013; 84 (5): 940-949
- **Leucine-stimulated mTOR signaling is partly attenuated in skeletal muscle of chronically uremic rats** *AMERICAN JOURNAL OF PHYSIOLOGY- ENDOCRINOLOGY AND METABOLISM*
Chen, Y., Sood, S., McIntire, K., Roth, R., Rabkin, R.
2011; 301 (5): E873-E881
- **The effects of type 1 IGF receptor inhibition in a mouse model of diabetic kidney disease** *GROWTH HORMONE & IGF RESEARCH*
Troib, A., Landau, D., Youngren, J. F., Kachko, L., Rabkin, R., Segev, Y.
2011; 21 (5): 285-291
- **A marked deficiency in circulating and renal IGF-I peptide does not inhibit compensatory renal enlargement in uninephrectomized mice** *GROWTH HORMONE & IGF RESEARCH*
Landau, D., Biada, J., Chen, Y., Sood, S., Yakar, S., LeRoith, D., Segev, Y., Rabkin, R.
2011; 21 (5): 279-284
- **Uremia attenuates growth hormone-stimulated insulin-like growth factor-1 expression, a process worsened by inflammation** *KIDNEY INTERNATIONAL*
Chen, Y., Biada, J., Sood, S., Rabkin, R.
2010; 78 (1): 89-95
- **Endotoxin-Induced Growth Hormone Resistance in Skeletal Muscle** *ENDOCRINOLOGY*
Chen, Y., Sood, S., Krishnamurthy, V. M., Rotwein, P., Rabkin, R.
2009; 150 (8): 3620-3626

- **Increased renal Akt/mTOR and MAPK signaling in type I diabetes in the absence of IGF type 1 receptor activation** *ENDOCRINE*
Landau, D., Eshet, R., Troib, A., Gurman, Y., Chen, Y., Rabkin, R., Segev, Y.
2009; 36 (1): 126-134
- **Low-dose growth hormone is cardioprotective in uremia** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Rabkin, R., Awwad, I., Chen, Y., Ashley, E. A., Sun, D., Sood, S., Clusin, W., Heidenreich, P., Piecha, G., Gross, M.
2008; 19 (9): 1774-1783
- **Increased workload fully activates the blunted IRS-1/PI3-kinase/Akt signaling pathway in atrophied uremic muscle** *KIDNEY INTERNATIONAL*
Chen, Y., Sood, S., Biada, J., Roth, R., Rabkin, R.
2008; 73 (7): 848-855
- **Growth hormone treatment prevents osteoporosis in uremic rats** *HISTOLOGY AND HISTOPATHOLOGY*
Berger, I., Piecha, G., Rabkin, R., Kaya, N., Geldyyev, A., Sun, D., Chen, Y., Koleganova, N., Gross, M.
2007; 22 (11): 1231-1239
- **Endotoxin attenuates growth hormone-induced hepatic insulin-like growth factor I expression by inhibiting JAK2/STAT5 signal transduction and STAT5b DNA binding** *AMERICAN JOURNAL OF PHYSIOLOGY-ENDOCRINOLOGY AND METABOLISM*
Chen, Y., Sun, D., Krishnamurthy, V. M., Rabkin, R.
2007; 292 (6): E1856-E1862
- **Protective effect of low dose growth hormone on uremic cardiomyopathy**
Rabkin, R., Awwad, I., Sun, D., Chen, Y., Berger, I., Gross, M.
ELSEVIER GMBH, URBAN & FISCHER VERLAG.2007: 334-35
- **Work-induced changes in skeletal muscle IGF-1 and myostatin gene expression in uremia** *KIDNEY INTERNATIONAL*
Sun, D. F., Chen, Y., Rabkin, R.
2006; 70 (3): 453-459
- **Transcriptional profiling of aging in human muscle reveals a common aging signature** *PLOS GENETICS*
Zahn, J. M., Sonu, R., Vogel, H., Crane, E., Mazan-Mamczarz, K., Rabkin, R., Davis, R. W., Becker, K. G., Owen, A. B., Kim, S. K.
2006; 2 (7): 1058-1069
- **Circulating growth hormone binding protein levels and mononuclear cell growth hormone receptor expression in uremia** *7th Symposium on Growth and Development in Children with Chronic Kidney Disease*
Greenstein, J., Guest, S., Tan, J. C., Tummala, P., Busque, S., Rabkin, R.
W B SAUNDERS CO-ELSEVIER INC.2006: 141-49
- **Suppressors of cytokine signaling in health and disease** *PEDIATRIC NEPHROLOGY*
Tan, J. C., Rabkin, R.
2005; 20 (5): 567-575
- **Growth hormone resistance in uremia, a role for impaired JAK/STAT signaling** *7th Symposium on Growth and Development in Children with Chronic Kidney Disease*
Rabkin, R., Sun, D. F., Chen, Y., Tan, J., Schaefer, F.
SPRINGER.2005: 313-18
- **Cardiac resistance to growth hormone in uremia** *KIDNEY INTERNATIONAL*
Zheng, Z. L., Sun, D. F., Tummala, P., Rabkin, R.
2005; 67 (3): 858-866
- **Chronic uremia attenuates growth hormone-induced signal transduction in skeletal muscle** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Sun, D. F., Zheng, Z. L., Tummala, P., Oh, J., Schaefer, F., Rabkin, R.
2004; 15 (10): 2630-?
- **Growth hormone-mediated janus associated kinase-signal transducers and activators of transcription signaling in the growth hormone-resistant potassium-deficient rat** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Schaefer, F., Yoon, S. A., Nouri, P., Tsao, T., Tummala, P., Deng, E., Rabkin, R.
2004; 15 (9): 2299-2306

- **New concepts: growth hormone, insulin-like growth factor-I and the kidney** *GROWTH HORMONE & IGF RESEARCH*
Rabkin, R., Schaefer, F.
2004; 14 (4): 270-276
- **Albumin stimulates the accumulation of extracellular matrix in renal tubular epithelial cells** *AMERICAN JOURNAL OF NEPHROLOGY*
Stephan, J. P., Mao, W. G., Filvaroff, E., Cai, L. P., Rabkin, R., Pan, G. H.
2004; 24 (1): 14-19
- **Growth hormone (GH) receptor expression in uremia.** *36th Annual Meeting of the American-Society-of-Nephrology*
Greenstein, J., Guest, S., Tummala, P., Tan, J., Rabkin, R.
AMER SOC NEPHROLOGY.2003: 537A-538A
- **Growth hormone (GH) receptors in uremia.** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Greenstein, J., Guest, S., Tummala, P., Rabkin, R., Tan, J.
LIPPINCOTT WILLIAMS & WILKINS.2003: S152-S152
- **Diabetic nephropathy.** *Clinical cornerstone*
Rabkin, R.
2003; 5 (2): 1-11
- **The role of growth factors and ammonia in the genesis of hypokalemic nephropathy** *JOURNAL OF RENAL NUTRITION*
Fervenza, F. C., Rabkin, R.
2002; 12 (3): 151-159
- **Effect of prolonged uremia on insulin-like growth factor-I receptor autophosphorylation and tyrosine kinase activity in kidney and muscle** *EXPERIMENTAL NEPHROLOGY*
Tsao, T., Fervenza, F., Friedlaender, M., Chen, Y., Rabkin, R.
2002; 10 (4): 285-292
- **Impaired JAK-STAT signal transduction contributes to growth hormone resistance in chronic uremia** *JOURNAL OF CLINICAL INVESTIGATION*
Schaefer, F., Chen, Y., Tsao, T., Nouri, P., Rabkin, R.
2001; 108 (3): 467-475
- **Growth factors in the treatment of wasting in kidney failure** *JOURNAL OF RENAL NUTRITION*
Chen, Y., Fervenza, F. C., Rabkin, R.
2001; 11 (2): 62-66
- **Hepatocyte growth factor receptor in acute tubular necrosis** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Rabkin, R., Fervenza, F., Tsao, T., Sibley, R., Friedlaender, M., Hsu, F., Lassman, C., Hausmann, M., Huie, P., Schwall, R. H.
2001; 12 (3): 531-540
- **Paradoxical body and kidney growth in potassium deficiency** *Ninth International Symposium of Nephrology at Montecatini Italy: Kidney Proteins and Growth Factors*
Fervenza, F., Tsao, T., Rabkin, R.
INFORMA HEALTHCARE.2001: 339-46
- **Growth factor insensitivity in renal failure** *Ninth International Symposium of Nephrology at Montecatini Italy: Kidney Proteins and Growth Factors*
Rabkin, R.
INFORMA HEALTHCARE.2001: 291-300
- **Expression of insulin-like growth factor-I and transforming growth factor-beta in hypokalemic nephropathy in the rat** *KIDNEY INTERNATIONAL*
Tsao, T., Fawcett, J., Fervenza, F. C., Hsu, F. W., Huie, P., Sibley, R. K., Rabkin, R.
2001; 59 (1): 96-105
- **Effect of metabolic acidosis on the insulin-like growth factor-I system and cathepsins B and L gene expression in the kidney** *JOURNAL OF LABORATORY AND CLINICAL MEDICINE*
Fawcett, J., Hsu, F. W., Tsao, T., Rabkin, R.
2000; 136 (6): 468-475
- **Response to growth hormone therapy in experimental ischemic acute renal failure** *JOURNAL OF LABORATORY AND CLINICAL MEDICINE*

- Fervenza, F. C., Hsu, F. W., Tsao, T., Friedlaender, M. M., Rabkin, R.
1999; 133 (5): 434-439
- **Intrarenal insulin-like growth factor-1 axis after unilateral nephrectomy in rat** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Fervenza, F. C., Tsao, T., Hsu, F., Rabkin, R.
1999; 10 (1): 43-50
 - **Role of insulinlike growth factor I in renal transplantation: Evaluation of intra- and postoperative effects** *Congress on New Dimensions in Transplantation - Weaving the Future*
Maestri, M., Adams, G., Gaspari, A., Passalia, L., Innocente, F., Rademacher, J., Luzzana, F., Polese, M., Bolla, E., Noli, S., Scotti-Foglieni, A., Scotti-Foglieni, C., Dafoe, et al
ELSEVIER SCIENCE INC.1998: 2019-23
 - **Insulin-like growth factor-I treatment to enhance renal function in advanced chronic renal failure** *8th International Symposium of Nephrology*
Fervenza, F. C., Friedlaender, M. M., Ike, J. O., Rabkin, R.
TAYLOR & FRANCIS INC.1998: 349-56
 - **The insulin-like growth factor-I axis in acute renal failure** *8th International Symposium of Nephrology*
Friedlaender, M. M., Fervenza, F. C., Tsao, T., Hsu, F., Rabkin, R.
TAYLOR & FRANCIS INC.1998: 343-48
 - **Effect of insulin-like growth factor binding proteins on the response of proximal tubular cells to insulin-like growth factor-I** *KIDNEY INTERNATIONAL*
Yap, J., Tsao, T., Fawcett, J., Fielder, P. J., Keller, G. A., Rabkin, R.
1997; 52 (5): 1216-1223
 - **The IGF-I axis in kidney and skeletal muscle of potassium deficient rats** *KIDNEY INTERNATIONAL*
Hsu, F. W., Tsao, T., Rabkin, R.
1997; 52 (2): 363-370
 - **Insulin-like growth factor-I ameliorates delayed kidney graft function and the acute nephrotoxic effects of cyclosporine** *TRANSPLANTATION*
Maestri, M., Dafoe, D. C., Adams, G. A., Gaspari, A., Luzzana, F., Innocente, F., Rademacher, J., Dionigi, P., Barbieri, A., Zonta, F., Zonta, A., Rabkin, R.
1997; 64 (2): 185-190
 - **The use of growth factors to increase glomerular filtration rate in chronic renal failure patients** *CURRENT OPINION IN NEPHROLOGY AND HYPERTENSION*
Miller, S. B., Rabkin, R.
1997; 6 (4): 401-404
 - **Nutrient regulation of insulin-like growth factor-1** *8th International Congress on Renal Nutrition and Metabolism*
Rabkin, R.
KARGER.1997: 157-60
 - **Nuclear transport of insulin-like growth factor-I and insulin-like growth factor binding protein-3 in opossum kidney cells.** *ENDOCRINOLOGY*
Li, W. L., Fawcett, J., Widmer, H. R., Fielder, P. J., Rabkin, R., Keller, G. A.
1997; 138 (4): 1763-1766
 - **Regional changes in the intrarenal insulin-like growth factor-I axis in diabetes** *KIDNEY INTERNATIONAL*
Fervenza, F. C., Tsao, T., Hoffman, A. R., Rabkin, R.
1997; 51 (3): 811-818
 - **IGF-I receptor binding, autophosphorylation, and kinase activity in kidney and muscle of acutely uremic rats** *AMERICAN JOURNAL OF PHYSIOLOGY-RENAL PHYSIOLOGY*
Tsao, T., Hsu, F. W., Rabkin, R.
1997; 272 (3): F325-F332
 - **Early experience with extended use of insulin-like growth factor-1 in advanced chronic renal failure** *KIDNEY INTERNATIONAL*
Ike, J. O., Fervenza, F. C., Hoffman, A. R., Yeh, I., Hintz, R. L., Liu, F., Rabkin, R.
1997; 51 (3): 840-849
 - **Renal hypertrophy and kidney disease in diabetes** *DIABETES-METABOLISM REVIEWS*
Rabkin, R., Fervenza, F. C.

1996; 12 (3): 217-241

- **Processing of I-125-insulin by polarized cultured kidney cells** *EXPERIMENTAL CELL RESEARCH*
Rabkin, R., Hamik, A., Yagil, C., Hamel, F. G., Duckworth, W. C., Fawcett, J.
1996; 224 (1): 136-142
- **Pharmacokinetics of insulin-like growth factor-1 in advanced chronic renal failure** *KIDNEY INTERNATIONAL*
Rabkin, R., Fervenza, F. C., Maidment, H., Ike, J., Hintz, R., Liu, F., Bloedow, D. C., Hoffman, A. R., Gesundheit, N.
1996; 49 (4): 1134-1140
- **Response of the intrarenal insulin-like growth factor-I axis to acute ischemic injury and treatment with growth hormone and epidermal growth factor** *KIDNEY INTERNATIONAL*
Fervenza, F. C., Tsao, T., Rabkin, R.
1996; 49 (2): 344-354
- **Protein turnover in the hypertrophying kidney** *7th International Congress on Renal Nutrition and Metabolism*
Rabkin, R., Shechter, P., Shi, J. D., Boner, G.
KARGER.1996: 153-56
- **EXPRESSION OF THE GENES ENCODING THE RAT RENAL INSULIN-LIKE GROWTH-FACTOR-I SYSTEM** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Rabkin, R., Brody, M., LU, L. H., Chan, C., Shaheen, A. M., Gillet, N.
1995; 6 (5): 1511-1518
- **RENAL GROWTH HORMONE-INSULIN-LIKE GROWTH-FACTOR-I SYSTEM IN ACUTE-RENAL-FAILURE** *KIDNEY INTERNATIONAL*
Tsao, T., Wang, J., Fervenza, F. C., Vu, T. H., JIN, I. H., Hoffman, A. R., Rabkin, R.
1995; 47 (6): 1658-1668
- **INSULIN-LIKE GROWTH-FACTOR-I TREATMENT OF ACUTE-RENAL-FAILURE** *JOURNAL OF LABORATORY AND CLINICAL MEDICINE*
Rabkin, R.
1995; 125 (6): 684-685
- **THE PROCESSING OF INSULIN-LIKE GROWTH-FACTOR-I (IGF-I) BY A CULTURED KIDNEY-CELL LINE IS ALTERED BY IGF-BINDING PROTEIN-3** *ENDOCRINOLOGY*
Fawcett, J., Rabkin, R.
1995; 136 (4): 1340-1347
- **SEQUENTIAL PROCESSING OF INSULIN BY CULTURED KIDNEY-CELLS** *ENDOCRINOLOGY*
Fawcett, J., Rabkin, R.
1995; 136 (1): 39-45
- **RENAL TUBULAR CELL PROTEIN BREAKDOWN IN UNINEPHRECTOMIZED AND AMMONIUM CHLORIDE-LOADED RATS** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Shechter, P., Shi, J. D., Rabkin, R.
1994; 5 (5): 1201-1207
- **THE INTRARENAL IGF-I AXIS IN COMPENSATORY RENAL GROWTH**
Fervenza, F., Tsao, T., Hsu, F., Rabkin, R.
AMER SOC NEPHROLOGY.1994: 691-91
- **HETEROGENEITY OF IGF-I, IGF-I RECEPTOR AND IGF BINDING-PROTEIN GENE-EXPRESSION IN KIDNEY**
Rabkin, R., Brody, M., Lu, L., Chan, C., Gillett, N. A.
AMER SOC NEPHROLOGY.1994: 793-93
- **INSULIN-LIKE GROWTH-FACTOR-I GENE-EXPRESSION IN ACUTE TUBULAR-NECROSIS (ATN)**
Fervenza, F., Tsao, T., Hsu, F., Rabkin, R.
AMER SOC NEPHROLOGY.1994: 897-97
- **RECOVERY FROM ACUTE ISCHEMIC RENAL-FAILURE IS ACCELERATED BY DES(1-3)-INSULIN-LIKE GROWTH-FACTOR-I** *CLINICAL SCIENCE*
Clark, R., Mortensen, D., Rabkin, R.

1994; 86 (6): 709-714

- **EFFECTS OF FLUOXETINE ON MOOD AND IMMUNE STATUS IN DEPRESSED-PATIENTS WITH HIV ILLNESS** *JOURNAL OF CLINICAL PSYCHIATRY*
Rabkin, J. G., Rabkin, R., Wagner, G.
1994; 55 (3): 92-97
- **TUBULAR CELL PROTEIN-DEGRADATION IN EARLY DIABETIC RENAL HYPERTROPHY** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Shechter, P., Boner, G., Rabkin, R.
1994; 4 (8): 1582-1587
- **DEGRADATION OF INSULIN BY ISOLATED RAT RENAL CORTICAL ENDOSOMES** *ENDOCRINOLOGY*
Fawcett, J., Rabkin, R.
1993; 133 (4): 1539-1547
- **INSULIN UPTAKE AND PROCESSING BY CULTURED MOUSE GLOMERULAR ENDOTHELIAL-CELLS** *AMERICAN JOURNAL OF PHYSIOLOGY*
Rabkin, R., Tsao, T., Elliot, S. J., Striker, L. J., Striker, G. E.
1993; 265 (2): C453-C459
- **AMMONIUM-CHLORIDE ALTERS RENAL TUBULAR CELL-GROWTH AND PROTEIN-TURNOVER** *LABORATORY INVESTIGATION*
Rabkin, R., PALATHUMPAT, M., Tsao, T.
1993; 68 (4): 427-438
- **ENDOSOMES DEGRADE INSULIN** *7TH INTERNATIONAL SYMP ON NEPHROLOGY*
Fawcett, J., Rabkin, R.
KARGER.1993: 61-65
- **RENAL CORTICAL ENDOSOMES PARTICIPATE IN THE DEGRADATION OF INSULIN** *6TH INTERNATIONAL CONF IN RENAL NUTRITION AND METABOLISM*
Fawcett, J., Frank, B., Rabkin, R.
KARGER.1992: 80-83
- **AMMONIUM-CHLORIDE INCREASES KIDNEY-CELL PROTEIN-CONTENT** *6TH INTERNATIONAL CONF IN RENAL NUTRITION AND METABOLISM*
Dahl, D. C., Tsao, T., Rabkin, R.
KARGER.1992: 104-7
- **ALTERED INTESTINAL AND RENAL BRUSH-BORDER AMINO-OLIGOPEPTIDASE STRUCTURE IN DIABETES AND METABOLIC-ACIDOSIS - NORMAL AND BIOBREED (BB) RATS** *METABOLISM-CLINICAL AND EXPERIMENTAL*
Najjar, S. M., Hampp, L. T., Rabkin, R., Gray, G. M.
1992; 41 (1): 76-84
- **AMINO-ACIDS REGULATE KIDNEY-CELL PROTEIN BREAKDOWN** *JOURNAL OF LABORATORY AND CLINICAL MEDICINE*
Rabkin, R., Tsao, T., Shi, J. D., Mortimore, G.
1991; 117 (6): 505-513
- **SUCRASE-ALPHA-DEXTRINASE IN DIABETIC BIOBREED RATS - REVERSIBLE ALTERATION OF SUBUNIT STRUCTURE** *AMERICAN JOURNAL OF PHYSIOLOGY*
Najjar, S. M., Hampp, L. T., Rabkin, R., Gray, G. M.
1991; 260 (2): G275-G283
- **EFFECT OF BACITRACIN ON RETROENDOCYTOSIS AND DEGRADATION OF INSULIN IN CULTURED KIDNEY EPITHELIAL-CELL LINE** *DIABETES*
Dahl, D. C., Tsao, T., Duckworth, W. C., Frank, B. H., Rabkin, R.
1990; 39 (11): 1339-1346
- **MODULATION OF KIDNEY-CELL PROTEIN-DEGRADATION BY INSULIN** *JOURNAL OF LABORATORY AND CLINICAL MEDICINE*
Tsao, T. C., Shi, J. D., Mortimore, G. E., Cragoe, E. J., Rabkin, R.
1990; 116 (3): 369-376

- **FACTORS CONTROLLING INTRACELLULAR PROTEIN-TURNOVER IN THE KIDNEY** *SEMINARS IN NEPHROLOGY*
Rabkin, R., Dahl, D. C.
1990; 10 (5): 472-480
- **ALTERNATE PATHWAYS FOR THE RENAL PROCESSING OF INSULIN** *6TH INTERNATIONAL SYMP OF NEPHROLOGY : KIDNEY, PROTEINS, AND DRUGS*
Dahl, D. C., Tsao, T., Rabkin, R.
KARGER.1990: 53-59
- **BASOLATERAL AND APICAL BINDING, INTERNALIZATION, AND DEGRADATION OF INSULIN BY CULTURED KIDNEY EPITHELIAL-CELLS** *AMERICAN JOURNAL OF PHYSIOLOGY*
Rabkin, R., Yagil, C., Frank, B.
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- **Protein catabolism in cultured kidney cells.** *Kidney international. Supplement*
Rabkin, R., Dahl, D. C., Mahoney, C. A., Tsao, T.
1989; 27: S11-4
- **PROTEIN CATABOLISM IN CULTURED KIDNEY-CELLS** *KIDNEY INTERNATIONAL*
Rabkin, R., Dahl, D. C., Mahoney, C. A., Tsao, T.
1989; 36: S11-S14
- **ABNORMAL INSULIN METABOLISM BY SPECIFIC ORGANS FROM RATS WITH SPONTANEOUS HYPERTENSION** *AMERICAN JOURNAL OF PHYSIOLOGY*
Mondon, C. E., Reaven, G. M., Azhar, S., Lee, C. M., Rabkin, R.
1989; 257 (4): E491-E498
- **RETROENDOCYTOSIS OF INSULIN IN A CULTURED KIDNEY EPITHELIAL-CELL LINE** *AMERICAN JOURNAL OF PHYSIOLOGY*
Dahl, D. C., Tsao, T., Duckworth, W. C., Mahoney, M. J., Rabkin, R.
1989; 257 (2): C190-C196
- **INSULIN DEGRADATION PRODUCTS FROM PERFUSED RAT-KIDNEY** *AMERICAN JOURNAL OF PHYSIOLOGY*
Duckworth, W. C., Hamel, F. G., Liepnieks, J., PEAVY, D., Frank, B., Rabkin, R.
1989; 256 (2): E208-E214
- **HIGH-PERFORMANCE LIQUID-CHROMATOGRAPHIC ANALYSIS OF INSULIN DEGRADATION PRODUCTS FROM A CULTURED KIDNEY-CELL LINE** *ENDOCRINOLOGY*
Duckworth, W. C., Hamel, F. G., Liepnieks, J., Frank, B. H., Yagil, C., Rabkin, R.
1988; 123 (6): 2701-2708
- **EFFECT OF INSULIN THERAPY ON ESTABLISHED DIABETIC NEPHROPATHY IN RATS** *DIABETES*
Petersen, J., Ross, J., Rabkin, R.
1988; 37 (10): 1346-1350
- **EFFECT OF BACITRACIN ON BINDING AND PROCESSING OF INSULIN BY ESTABLISHED RENAL-CELL LINE** *DIABETES*
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