

The Researchers Attempt Work to Reduce Ammonia and Urea That Produced Through Amino Acids Metabolism as Byproduct in Kidney Failure Patients

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Abstract: In this study of kidney failure patients researchers are attempt to understand the nature, function and the syeps that precede their work to purify the blood of urea and other substances resulting from metabolic processes, converting amino acids in to useful compounds use in building the body and release energy.

The byproduct of these processes is toixc ammonia which reacts with carbon dioxide(CO₂) to produce urea.In kidney desease its basic function stops ,and blood loaded with urea enters and exits the kidneys without being filtered, therefore the only way to get out rid of this is either by transplanting anew un affecyed kidney or by dialysis process, both of them are costly and tiring,therefore more required searches to eliminate or reduce the ammonia production level and urea generation includind balancing or adjustment the nature of food that kidney patient eat to reduce urea or chemicaly treatment (Medicines), i.e. controlling the inputs precursor of urea(production metabolites).

Also the wearble artificial kidney by researchers of the american chemical socity have been develop.

Keywords: kidney, tranplanting, dialysis, drugs, foods and artificial kidney.

1. INTRODUCTION

1. Kidney failure

1.1 - Chronic kidney disease(CKD)by presence of the kidney damage or an estimated glomeruler filtration rate (eGFR) of less than 60ml/min/1.73m², presisting for 3 months or more irrespective of cause.CKD caused by diabetel and high bood pressure damaging the kidneys filter over time⁽¹⁾.

1.2 - kidney failure and risk factors.

1.2.1 - Diabete and high blood pressure the two leading causes of kidney fauilure, because they can damage the bood vessels and filtering units in kidneys

1.2.2 - Can result from autoimmune or genetic diseases that directly impact kidneyeny or from conditions that reduced flow or block urine.

1.2.3 - Life style changes like maintaining amoderate weight managing blood suger and quitting smoking can help lower the risk of kidney failure⁽²⁾.

1.3 - The basic function of kidneys is to filter waste products from blood and convert them into urine.

1.3.1 - Glomeruli are closters of very porous blood vessels within the kidneys that act as natural filters.

1.3.2 - The filtration process.The glomeruli pass, water, salts and waste products (urea and creatinine) from the blood into renal tubules.

1.3.3 - The body reabsorbs beneficial substances while waste and excess fluids are excreted in urine ⁽³⁾.

1.4 - The chemical structure of glomeruli consists of capillary wall, a cellulor lining and a window that allow the passage of water and dussolved substances supported by a negatively charged glomerular secondary membrane(GBM) and converting of prodocytes surrounded by on extracellular matrix and other cellular components.The filtered substances mainly consist of the filter, salts, glucoses, urea, and ammino acids excludind large proteins and acidic substances⁽⁴⁾.

1.5-Amino acids structure, properties and metabolism.

General metabolism for example, Serine to pyruvate ⁽⁵⁾.

Serine, $\text{COO}^- \text{CHNH}_3\text{CH}_2\text{OH} \rightarrow \text{dehydration } (-\text{H}_2\text{O}) \rightarrow$

Imino acids ($\text{COO}^- \text{C}=\text{NH}-\text{CH}_3$) $\rightarrow \text{H}_2\text{O}/\text{NH}_3 \rightarrow$ pyruvate($\text{COO}^- \text{C}=\text{O}-\text{CH}_3$).

2. UREA PRODUCTION STEPS

Protein break down, urea cycle, in liver and transportation and excretion out side the body.

$\text{CO}_2 + \text{NH}_3 \rightarrow (\text{ATP} \rightarrow \text{ADP}) \rightarrow \text{Carbomayl phosphate} \rightarrow \text{NH}_2\text{-CO-NH}_2$ urea.

i.e : $\text{NH}_3 + \text{CO}_2 \rightarrow \text{amino acids} \rightarrow \text{ATP/enzyme} \rightarrow (\text{NH}_3)_2\text{CO}$ Diaminomethanal, urea.

2.1 - Urea removal, biological mechanism (urea cycle) basic step in liver⁽⁶⁾.

2.2 - Methods for eliminating urea in cases of high levels, (kidney failure patients).

2.2.1 - Kidney transplant. Is surgery to place a healthy kidney in the lower abdomen, conecting its blood⁽⁷⁾.

2.2.2 - Kidney dialysis.

a. Hemodialysis (HD) and b.peritoneal diaysis (PD).

2.2.3 - pharmaceutical , drugs such as sodium phenyl acetate, sodium benzoate and amino acids supplements such as arginine and citulline to support the urea cycle⁽⁸⁾.

2.2.4 - Suitable foods and herbs.a.grain: whiye rice, corn, and millet ⁽⁹⁾.

b. Low protien meats: white fish, skinless chicken, leanbeef and camel meat ⁽¹⁰⁾.

c. Fruits that are low in protein: apples, bananas, peaches, pears, water melon, oranges and pine apple ⁽¹¹⁾.

d. Herbs: finugreek, parsley, pigeon'sfood, frankincense, barley bitter khella geeds, cranberries and ginger⁽¹¹⁾.

2.2.5 - pH- adjustments.

The relationship between ammonia and blood acidity (pH) ammonia (NH_3) is converted to ammonium ion, (NH_4^+), (less toxic).

Normal pH ,pH=7.4

acidic pH , pH <7

and basic pH , pH >7 ⁽¹²⁾.

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3. THE WEARABLE ARTIFICIAL KIDNEY (WAK)

which uses different technologies of ubase enzymes or adsorbents to break down urea in the dialysis fluid is under development and forces efficiency challenges⁽¹³⁾.

The artificial kidneys need approximtly two to three years to technically read for clinical trials, however, they require sufficient funding (estimated at US\$10 million) to complete preclinical development⁽¹⁴⁾.

Researchers at american chemical socity have developed a new technology that could pave the way for creation of small artificial kidney that a patient can wear all the time.

Anew technology discovered call "M-«Zin" that takes the form of two sheets of micro-emergent materials belonging to metal carbides that retain urea of 94% between its folds, which is then purified from body by dialysis machines⁽¹⁵⁾. Artificial challenges and opportunities.(PMC)⁽¹⁶⁾.

An update on portable, wearable and implant tables ⁽¹⁷⁾.

Continuous kidney replacement, therapies: core currculation^(17a).

Development of patient-reported outcome measure of aside effect for pateints Taking calcineurin inhibitors the FACJT-CNI-NeX^(17b).

Finding battries for implementation of advanced care planning in patients reciving Dailysis^(17c).

The portable dialysis machine is connected to body via asuegical created "Vascular" connection (Fistula, arteriovenous ,or graft)⁽¹⁸⁾.

4. RECOMMENDATION

1. More work for developing technologies are need for implanting an electronic battry inside the kidney failure to replace damages vital organs.
2. Serious efforts are being made to develop aspecific diatary program to reduce the production of urea in the individuals suffering from kidney failure
3. It is so important to find away to detect the causes of kidney failure before it worsens and development appropiate treatments for it.
4. The portable dialysis machine which connect to body via a surgically created vascular need more intensivr research for industrie of a suitable devises door connection.
5. My suggestion to put all variable parameters in computing program to istimate optimize condition fir repiaring kidney failure.

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