

1. Bioinstrumentation

***SIMPLE AND QUICK GENETIC TESTING DEVICES**

(INFECTION & OTHERS, ON MARKET<OM> IN JAPAN)

***DOWNSIZED SYSTEM FOR MEASURING RESPIRATORY SYSTEM IMPEDANCE**

(RESPIRATORY, APPROVAL OF LEGISLATION)

***AN AUTOMATIC PREPARATION EQUIPMENT FOR MIXING INJECTION OF ANTI-CANCER AGENTS**

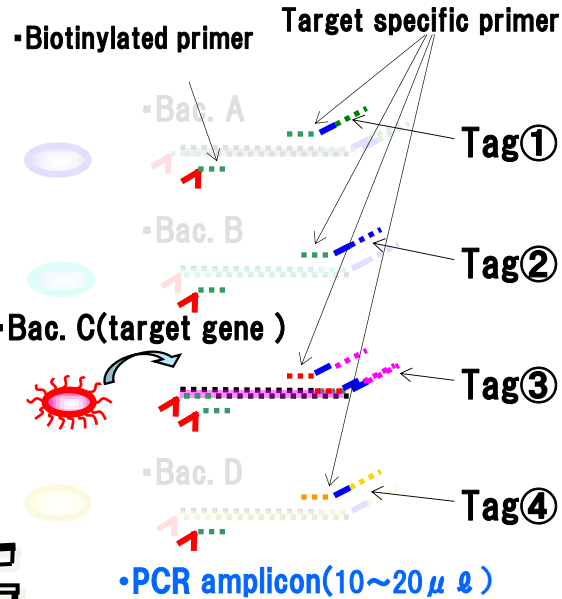
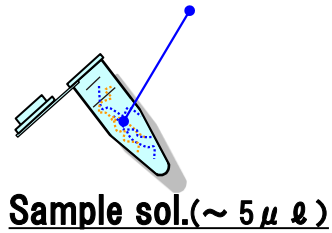
(HOSPITAL, OM IN JAPAN)



STH-PAS technology for multiplex DNA Detection

TBA (Tohoku Bio Array), Ltd. (collaboration with **Prof. M. Kawase** in Medical Engineering Tohoku University)

Sample with multiple pathogen



STH reagent

- tagged Primer for Bac. A~D
- Enzyme
- Buffer



15~30min.

Avidin-coated Blue Beads

Labeling reagent(10~20 μℓ)

•tagged PCR product

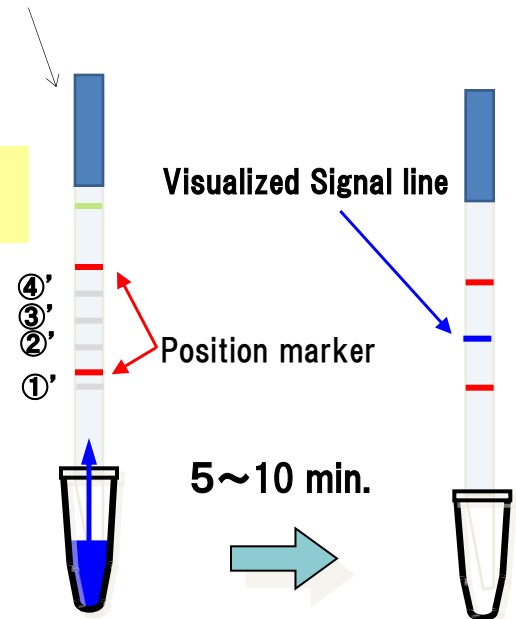
Single-strand Tag

STH: Single-strand Tag Hybridization (Patent)

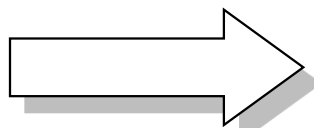
More simple and more precise lateral flow assay
Heat denaturation process...Unnecessary

PAS: Printed Array-Strip (Patent)

- For multiplex lateral flow assay.
- Available for any assay



PCR



Lateral flow assay

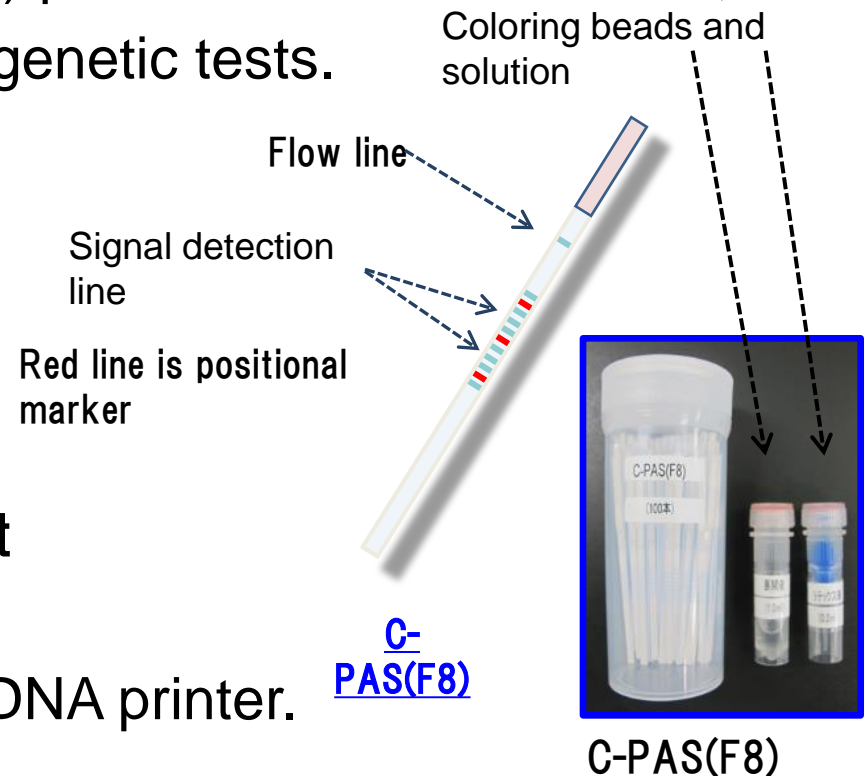
“PAS” : Strip with several lines immobilized complementary tag DNA

➤ Using STH primers(tagged primer) patent-licensed from NGK, PAS can be available for various genetic tests.

➤ Line-up

- C-PAS(F4) : For 4 targets test
- C-PAS(F8) : For 8 targets test
- C-PAS(F12): For 12 targets test

➤ PAS is manufactured by ink-jet DNA printer.



Candidates of STH-PAS Applications

Research, Others

- **Genetic research**
 - Marker research
- **Disease risk research**
 - Adiposity, Cancer, etc
- **For pet**
 - Adiposity, Cancer, etc



Food testing

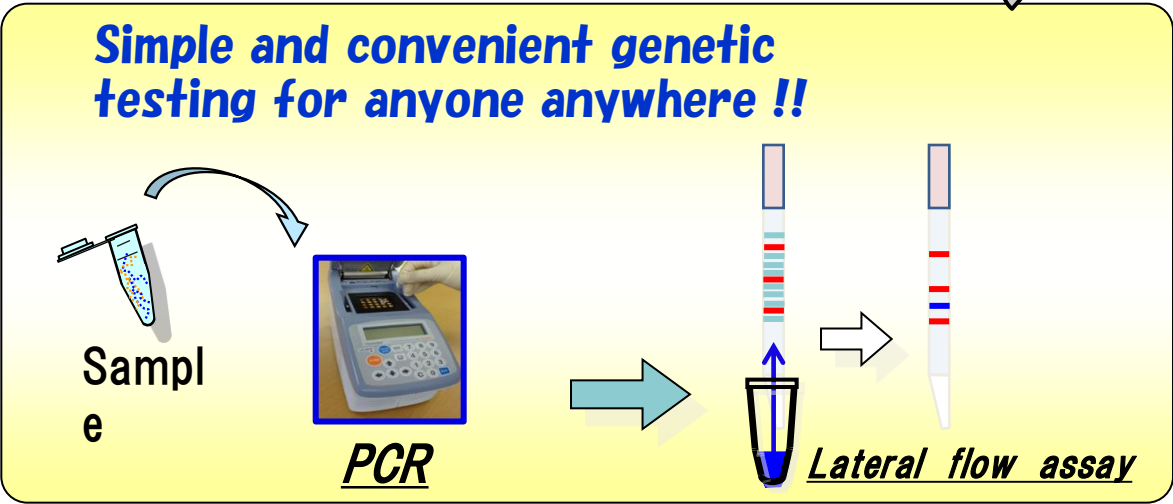
- **Pathogen inspection**
 - Food poisoning
- **Species inspection**
 - Meat, Grain, etc.



Diagnosis

- **Infection diagnosis**
 - Tuberculosis, Malaria, Dengue, etc.
 - HPV, HIV, HBV, HCV, Other Virus.
 - STD, Oral Microbe, etc.

Simple and convenient genetic testing for anyone anywhere !!

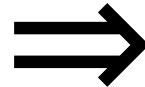


The diagram illustrates a workflow for genetic testing. It starts with a 'Sample' (represented by a test tube with blue dots) being processed by 'PCR' (represented by a thermal cycler machine). The result of the PCR is then used in a 'Lateral flow assay' (represented by a test strip that shows a color change from blue to red).

Marketing towards developing countries

Downsized system for measuring respiratory system impedance

CHEST M.I. INC. (collaboration with Prof. Kurosawa in Medical school, Tohoku University)



MostGraph-01

On market in Japan & Taiwan/Korea

Approval of legislation in Japan



宮城県



社団法人
東北経済連合会



Intelligent Cosmos Research Institute
株式会社インテリジェント・コスモス研究機構

Tohoku University





抗がん剤自動調製装置

UG-ADO1 (特許出願)

近年、抗がん剤の化学曝露の低減対策の一つとして、自動化装置を導入する調製操作が期待されています。本装置 (UG-ADO1) は東北大学薬剤部スタッフに蓄えられた豊富な知識と経験を活用して自動化を実現した注射用抗がん剤調製装置です。

UG Technology and Laboratory
UNIVERSAL GIKEN

**Universal Giken Co. Ltd. (collaboration with
pharmaceutical department of Tohoku University hospital)**
On market in Japan from April, 2015



宮城県

社団法人
東北経済連合会

77 七十七銀行
BANK (しちじゅうしち)

ICR Intelligent Cosmos Research Institute
株式会社インテリジェント・コスモス研究機構

Tohoku University



2. High-precision diagnostic instrument

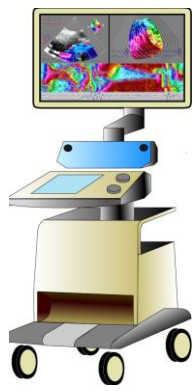
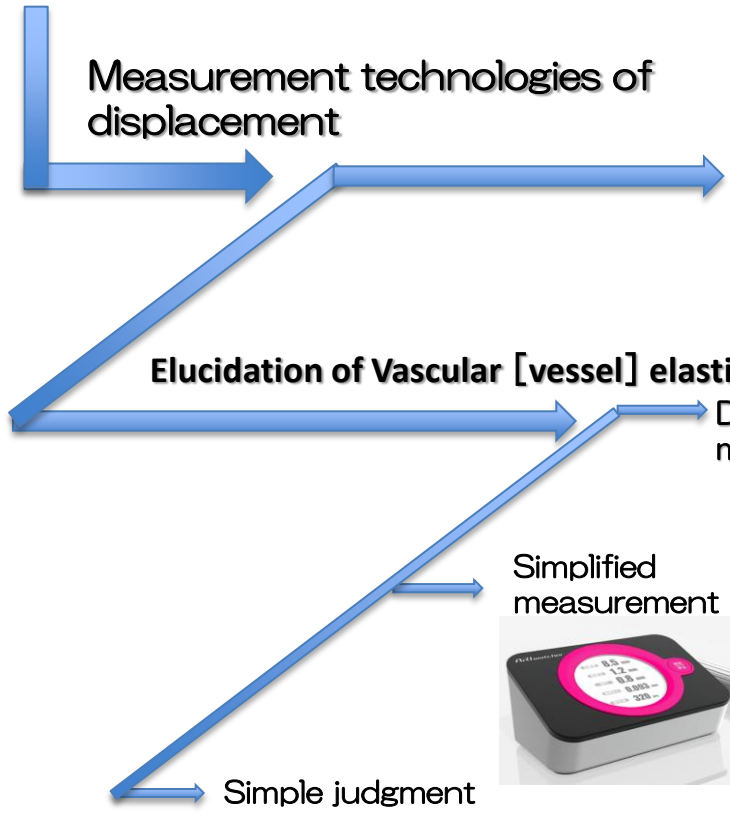
* ROOM TEMPERATURE MAGNETOCARDIOGRAPHIC AND MAGNETOENCEPHALOGRAPH [TUNNELING MAGNETO-RESISTIVE SENSORS/TMR S]

* **DEVELOPMENT OF HIGH RESOLUTION IMAGE ULTRASOUND DIAGNOSTIC EQUIPMENT**
UNDER DEVELOPMENT

* THE REVISED METHOD USING NANO-BIO VISUALIZATION TECHNIQUE FOR THE DETECTION RATE OF CANCER METASTASIS IN SLNS



Tracking technologies of phase difference



For cardiologist
 目的:心機能解析、診断
 特徴:専門知識、技能を有する心臓専門医用の詳細データ解析機能



For hospital
 目的:動脈硬化診断
 特徴:専門知識、技能を有する血管系検査者用の詳細データ解析機能



For primary-care physician
 目的:健康管理、専門医受診の目安
 特徴:簡単操作、細目データ記録



For people who are interested in healthcare
 目的:健康管理、専門医受診の目安
 特徴:簡単操作、スマホ等へのデータ出力

3. Advanced therapeutic instrument

- * EXTRACORPOREAL ULTRASONIC WAVE THERAPY AGAINST ISCHEMIC CARDIAC DISEASES UNDER (CLINICAL DEVELOPMENT/UCD)
- * DEVELOPMENT OF THE PULSED LASER-INDUCED LIQUID JET MESS (CLINICAL DEVELOPMENT/UCD)
- * **RADICAL STERILIZATION TREATMENT DEVICES FOR PERIODONTAL DISEASE (DENTISTRY, UNDER CLINICAL DEVELOPMENT/UCD)**
- * INNOVATIVE IMPLANTABLE DEVICE FOR CELL THERAPY (DIABETES, UD)



A-Z Co. Ltd. (collaboration with Professor K. Sasaki in F. Dentistry, Tohoku University)

Schedule for commercialization

July 2015~Feb 2016 Clinical Trial

Dec 2016 New medical device application

April 2018 On market in Japan



4. Functional prosthetic device

*** POTENTIAL CAPACITIES OF BIO CERAMICS: MATERIALS SCIENCE AND BIOLOGICAL RESPONSE IN BONE REGENERATION**

(OCP/GELATIN, OCP/COLLAGEN , UD)

*** INTERFACE PARTS THAT CAN CONNECT NERVES TO PROVIDE A
SUBSTITUTE FOR BIOLOGICAL FUNCTIONALITY (HEALTHCARE &
MEDICAL DEVICE, UD)**

*** WEARABLE DIAGNOSTIC AND THERAPEUTIC SHEET DEVICES
CREATED WITH SOFT, WET ELECTRODES (HEALTHCARE &
MEDICAL DEVICES, UD)**



Bone regeneration by OCP materials



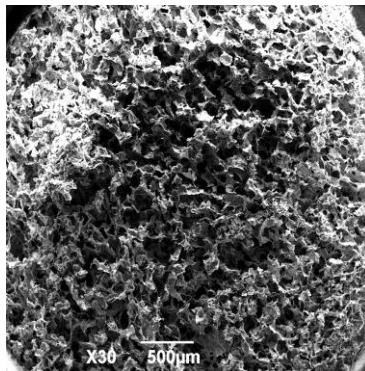
* Nipro Corporation (collaboration with Prof. O. Suzuki in F. of Dentistry, Tohoku University)

* Toyobo Co. Ltd. (collaboration with Prof. S. Kamakura & O. Suzuki in F. of Dentistry, Tohoku University)

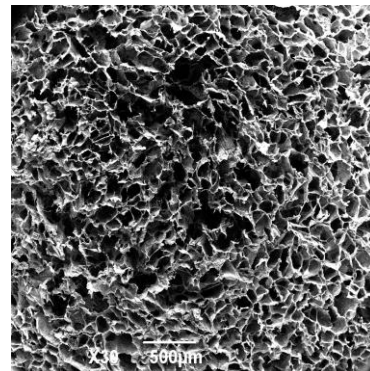
OCP: poor moldability

OCP-polymer: better moldability

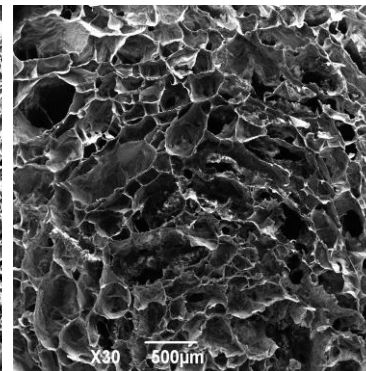
(Collagen, gelatin, alginate etc.)



OCP40/Gel



OCP31/Gel



OCP24/Gel

Cells can be infiltrated: Porous OCP/Gelatin composites

5. Rehabilitation aid instrument

*** DEVELOPMENT OF NEW REHABILITATION SYSTEM USING TRANSCRANIAL MAGNETIC STIMULATOR WITH HIGH FREQUENCY FOR SELF-SUPPORT OF PARALYSIS PATIENTS OF THE EXTREMITIES**

*** DEVELOPMENT OF AUDITORY REHABILITATION SYSTEM USING TABLET PC**



New rehabilitation system for paralysis patients

IFG Co. Ltd. (collaboration with Professor S. Izumi (Tohoku University))

Peripheral magnetic stimulator

On market in Japan from April, 2015

Transcranial & peripheral magnetic stimulator
Under development



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