The DiaGame Study

were eligible for the current study if they are CKD stage 0 at the time of their first biobank sample and at least the year before. Cases where those that developed CKD during on average nine years follow-up (risk stage ≥ 2) in at least two consecutive years whereas controls where sex and diabetes-duration matched persons who remained stable in stage 0 during at least three yearly follow-up visits. We aimed to elucidate if circulating sRNAs are associated with incident CKD in diabetes during follow-up with a negative binomial generalized log-linear model.

RESULTS

We found that eleven small RNAs, including the small nucleolar RNAs *SNORD12C* (logFC = -1.6, p-value = $1{\cdot}10^{-6}$) and *SNORD105B* (logFC = −1.4, p-value = $2{\cdot}10^{-6}$) as the strongest signals, are associated with future CKD. In addition, we found that miR-581 is associated with eGFR lower than 60 ml/min (logFC = -0.3, p-value = $2{\cdot}10^{-3}$).

CONCLUSION

Together, our results show that different classes of small non-coding RNAs are associated with future development of diabetic CKD, including small nucleolar RNAs (snoRNAs). This provides a starting point for our future functional studies to investigate the role of the identified sRNAs during the development of diabetic CKD.

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The DiaGame Study: Free-Living Data Collection in Patients with Diabetes Using Wearable Devices

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BACKGROUND

Self-management of Diabetes Mellitus is a multi-faceted and persistent process, for which an adequate understanding is required of factors influencing blood glucose levels at an individual level. The collection of data in free-living conditions can aid in gaining insight into patient-specific effects of lifestyle and daily decision-making (e.g., dietary intake, physical activity) on blood glucose dynamics.

METHODS

To alleviate associated burdensome tasks of data digitization and information inference, we designed and executed an observational study leveraging merely wearable devices for scalable and patient-centered data collection. Furthermore, the feasibility of this study was evaluated.
Free-living data was collected over 14 days from 60 patients (type 1 and 2, predominantly elderly) utilizing a CGM, smartwatch and smartphone, as well as anthropometric and fasting laboratory measurements (**figure 2** gives a workflow overview). Patient-reported dietary intake and physical activity were collected through a smartphone application, while insulin medication and mood were reported using our smartwatch application supplemented with measurements from integrated sensors (accelerometer, pedometer, heart rate).

RESULTS

The study demonstrated inter- and intra-patient variability in blood glucose dynamics. Furthermore, the feasibility analysis indicated successful compliance and overall sufficient data quality. Additionally, preliminary results showed participants were susceptible to nudging via the smartwatch to promote mood reports. Nonetheless, while the reported data were generally in line with expected values, the quantity and quality of information differed between individuals.

CONCLUSION

Ultimately, the aim is to develop a personalized educational interactive serious game using the acquired data, to empower patients and stimulate adequate self-management in a playful manner.